

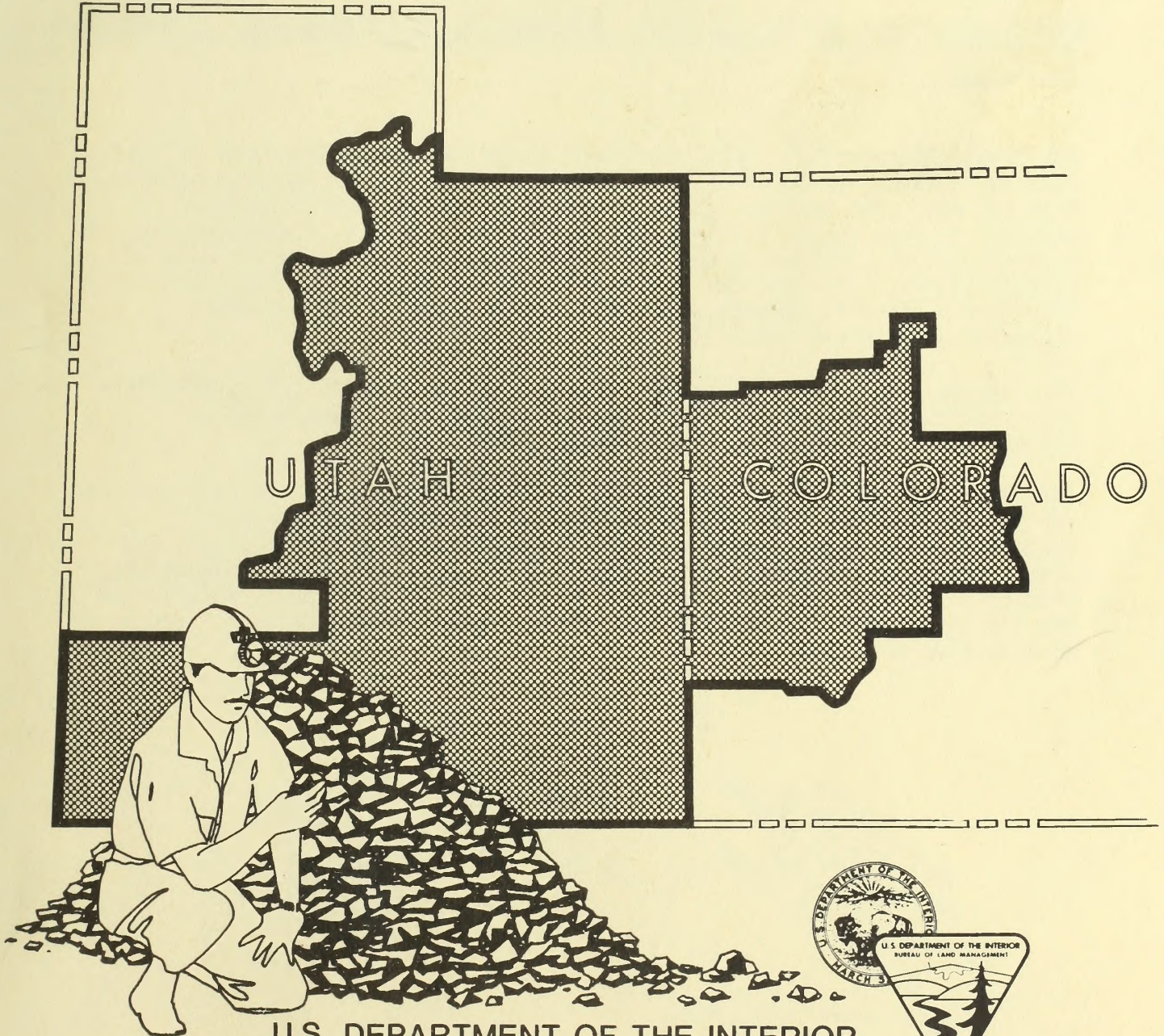
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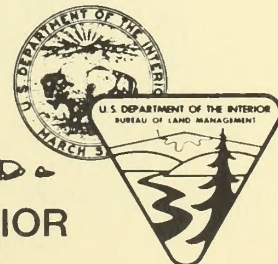
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UINTA-SOUTHWESTERN UTAH COAL REGION

ROUND TWO FINAL ENVIRONMENTAL IMPACT STATEMENT



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT





United States Department of the Interior

IN REPLY REFER TO

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(U-933)

BUREAU OF LAND MANAGEMENT
UTAH STATE OFFICE
136 E. SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

Dear Reader:

The Final Environmental Impact Statement (EIS) for the second round of coal leasing in the Uinta-Southwestern Utah Region is furnished for your information and use. The document reflects modifications and new information provided at four public hearings and by 55 formal letters received during the comment period. Changes in the Final EIS have been underlined for ease in identification. The Regional map inserted in the back of the Final EIS has also been revised to correct some deficiencies found in the map which accompanied the Draft EIS.

The Regional Coal Team (RCT) and Bureau of Land Management (BLM) thank those individuals and organizations who provided appropriate suggestions and comments on the Draft EIS.

The final decision made by the Secretary of the Interior will be based on the analysis in the Final EIS along with public concerns and comments, RCT recommendations, consultation with the Governors of Utah and Colorado, and other multiple-use objectives applicable to the Uinta-Southwestern Utah Coal Production Region. No decisions will be made for at least 30 days following the filing of the Final EIS with the Environmental Protection Agency and distribution to the public.

Sincerely yours,

Roland G. Robison
BLM State Director

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UTAH STATE DIRECTOR

Uinta-Southwestern Utah Coal Region
Round Two
Environmental Impact Statement

() Draft

(X) Final

Lead Agency

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of Agriculture
Forest Service

U.S. Department of the Interior
Geological Survey
Fish and Wildlife Service

Counties That Could be Directly Affected

Utah

Carbon
Emery
Sevier

Sanpete
Kane
Garfield

Colorado

Delta

Abstract

This EIS assesses the environmental consequences of four alternative levels of coal development in the region. The alternatives for this second round of leasing activity range from leasing 27 tracts (1.907 billion tons of in-place coal) to leasing 20 tracts (1.316 billion tons of in-place coal), and also includes the No Action alternative. The analysis is generally regional in nature, however, in certain areas, site specific analysis is also conducted. The EIS focuses on major issues identified during scoping.

For further information regarding this statement or proposed alternative actions contact:

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Date EIS Made Available to EPA and the Public:

Draft: May 5, 1983

Final: October 7, 1983

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SUMMARY

Introduction

The Uinta-Southwestern Utah Coal Region was established by the United States Department of the Interior (DOI) as part of the Federal coal management program initiated in June, 1979 to foster greater use of the Nation's coal resources and to offset reliance on imported energy resources. The leasing of Federal coal is expected to facilitate production and use of coal to meet National energy requirements. The overall coal leasing program is described in the Federal Coal Management Program Final Environmental Statement (BLM, 1979a).

The current effort represents the second round of coal leasing in the region. First round leasing activities began in 1979. An Environmental Impact Statement (EIS) for Round One was completed in April, 1981, followed by coal lease sales in July, 1981, and February and May, 1982. Thus far, seven tracts covering some 219 million tons of in-place coal have been competitively leased. The possibility exists that an additional four tracts analyzed during the first round may be reoffered for sale. No date has yet been set for the reoffering of these tracts, however, they would be offered independently of the current second round leasing effort. For the purpose of this EIS, these tracts are considered, in general terms, as part of the projected baseline.

On June 12, 1982, the Assistant Secretary, Land and Water Resources, after consultation with the Governors of Utah and Colorado, approved a final Round Two leasing target for the region of 1.6 to 2.1 billion tons of in-place coal. The target was established after analyzing potential production from planned and existing coal mines in the region and projected demand for coal. The decision on the leasing target was made to ensure that sufficient coal resources are offered to enhance industry competition. The Secretary of the Interior has selected February 16, 1984, as the tentative date to initiate Round Two leasing. It was also decided that competitive leasing in southern Utah be confined to the Alton coal field and that leasing on the Kaiparowits Plateau be deferred. A public hearing on the leasing target was held April 20, 1982, in Salt Lake City, Utah.

The Uinta-Southwestern Utah Coal Region includes 17 counties in Utah and seven counties in Colorado. The area includes all the known commercially minable coal in Utah and 32 percent of that found in Colorado. The leasing proposed in this statement includes only those areas for which land use planning had been updated to determine suitability for leasing. These lands are entirely within Carbon, Emery, Sevier, Sanpete, and Kane Counties in Utah and Delta County in Colorado.

In accordance with the National Environmental Policy Act of 1969 (as amended) and the final regulations of the Council on Environmental Quality, scoping meetings were held in April, 1982, in Delta, Colorado and in Price, Castle Dale, Kanab, and Salt Lake City, Utah. Participants at these meetings aided

BLM in identifying the following as primary concerns in analyzing the proposed coal leasing program: socioeconomics, hydrology, wildlife, land use, aesthetic values, cultural resources, and transportation.

Alternatives

Four alternatives were recommended by the Regional Coal Team for consideration in the EIS. These alternatives range from leasing 27 tracts to leasing 20 tracts and the mandatory No Action. The Gooseberry tract has been transferred to the State of Utah as part of the indemnity selection process. The State has indicated that the tract will be offered for sale in the near future. The Hoffmann Creek tract was offered for sale as an emergency lease on August 12, 1983. The apparent high bidder was AMCA Coal Leasing, Inc. Because both tracts have been or will be offered for sale near the same time as the Federal Coal Lease Sale scheduled for February 1984, they will remain a part of the alternatives analyzed in the EIS.

Alternative One: Maximum Level (1.907 Billion Tons)

Alternative One considers leasing 27 tracts and represents the maximum level of coal leasing for the region. Two tracts would be surface mined, the remaining 25 would be mined by underground methods. The tracts total 82,208.48 acres and include approximately 1.907 billion tons of in-place Federal coal. Approximately 732.6 million tons would be recovered.

Alternative Two: (Preferred Alternative) High Level (1.668 Billion Tons)

Alternative Two considers leasing 22 tracts. One tract would be surface mined, the remaining 21 would be mined by underground methods. The tracts total 72,814.02 acres and include approximately 1.668 billion tons of in-place Federal coal. Approximately 659.7 million tons would be recovered.

Alternative Three: Medium Level (1.316 Billion Tons)

Alternative Three considers leasing 20 tracts. No tracts would be surface mined and none of the five tracts in southern Utah would be considered. The tracts total 58,610.66 acres and include approximately 1.316 billion tons of in-place Federal coal. Approximately 528.7 million tons would be recovered.

Alternative Four: No Action (No Competitive Federal Leasing)

Alternative Four is the No Action Alternative. If implemented, this alternative would result in no new leasing of Federal coal in the region in 1984. However, coal development would continue to occur on existing leases and fee land.

Environmental Consequences of the Proposed and Alternative Actions

The impacts discussed in Alternative Four are projected baseline impacts based on continued coal development in the absence of additional Federal leasing. The analysis found in Alternatives One, Two, and Three considers only the tracts involved and does not include the projected baseline and also does not include those areas in the region not affected by coal leasing.

Alternative One

Four areas near Price, Castle Dale, Mt. Pleasant, and Alton, Utah and two areas near Delta and Cedaredge, Colorado would exceed the primary National Ambient Air Quality Standards (NAAQS) for total suspended particulates (TSP). TSP emissions resulting from Alternative One would increase 34 percent over 1981 levels and 19 percent over the projected baseline by the year 2000. Secondary NAAQS would be exceeded in a 2,845 square mile area, by the year 2000, of which 1,275 square miles would be attributed to implementation of Alternative One. The greatest impact contribution would come from vehicular traffic on unpaved roads and growth in population centers.

Soil and vegetation productivity on 2,503 acres would be lost for the life of the mines but could eventually be reclaimed. An additional 2,754 acres productivity would be lost to community development (including retiring irrigated croplands) and would not be reclaimed for agricultural purposes. However, this could be reclaimed and stabilized as part of residential development. An unquantified amount of soil would be lost prior to reclamation.

The mining of 732.6 million tons of coal (38 percent) would result in 1,174.3 million tons (62 percent) of coal remaining underground and unrecoverable by present technology.

Up to 16 feet of subsidence could occur on portions of the 81,266 acres that would be mined by underground methods. Surface mining would alter topography on an additional 687 acres. Changes in aquifers and distribution of surface water due to subsidence could occur. The extent of this change is not known. Annual water requirements for community development would increase by 7,041 acre-feet annually by the year 2000. An additional 484 acre-feet would be required annually for mine development. Development of certain tracts could result in an increase in annual sediment flow into local reservoirs and streams. While water discharged from mines is generally more saline than runoff in adjacent streams, salinity contribution to the Colorado River at Imperial Dam would actually slightly decrease due to the reduction in salinity from reduced irrigation return flow.

Approximately 1,923 acres of big game habitat, including winter range and calving grounds, would be lost. Regionwide the loss would be insignificant; however, in some specific areas big game populations would be reduced as a result. The permanent loss of 1,978 acres of irrigated croplands would reduce pheasant and other small game populations. Increased pressures on wildlife through harvest, harassment, and displacement would occur. Highway related deer losses would increase.

Approximately 1,978 acres of irrigated croplands (less than 1 percent regionwide) would be changed to community use. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.

Development of three tracts in central Utah would conflict with Carbon County zoning ordinances. Tract development in southern Utah could conflict with protection of irrigated croplands and water resource development provisions of the Kane County Master Plan.

Employment in the region would increase by 11,237 jobs or 20 percent by the year 2000 over projected baseline conditions. Population would increase by 28,349 persons or 21 percent over the projected baseline. Coal development would bring added revenues into the affected counties. However, the counties would also experience significant infrastructure impacts. The elements most affected would be housing, education facilities, social services, water and sewer capacities, and law enforcement.

More than 20,000 additional vehicles per day (21-percent increase) would be on roads in the region by the year 2000. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 between Price and Spanish Fork, Utah. Roads and highways would experience increased deterioration. Associated safety and maintenance problems would result.

Inadvertent loss of cultural resources could occur, and sites that are salvaged would lose context for further study. Losses through illegal collection or vandalism would increase. Increases in local demand for recreation opportunities over the projected baseline (71 percent in southern Utah, 18 percent in central Utah, and an undetermined but slight amount in west-central Colorado) could result in overutilization and deterioration of existing recreation developments and reduced hunter and fisherman success. Recreation facilities in local communities would also be overcrowded. Coal development related noise and fugitive dust could be noticeable on certain days from Yovimpa Point in Bryce Canyon National Park. Tract development in some areas would not meet visual resource management (VRM) standards.

Alternative Two

Four areas near Price, Castle Dale, Mt. Pleasant and Alton, Utah and two areas near Delta and Cedaredge, Colorado would exceed the primary NAAQS for TSP. TSP emissions from Alternative Two would increase 31 percent over 1981 levels and 17 percent over the projected baseline by the year 2000. Secondary NAAQS would be exceeded in a 2,730 square mile area by the year 2000, of which 1,160 square miles would be attributed to implementation of Alternative Two.

Soil and vegetation productivity on 2,308 acres would be lost for the life of the mines but could eventually be reclaimed. An additional 2,723 acres productivity would be lost to community development (including retiring irrigated croplands) and would not be reclaimed. An unquantified amount of soil would be lost prior to reclamation.

The mining of 659.7 million tons of coal would result in 1,007.8 million tons (60.4 percent) of coal remaining underground and unrecoverable by present technology.

Up to 16 feet of subsidence could occur on portions of the 72,192 acres that would be mined by underground methods. Surface mining would alter topography on 622 acres. Changes in aquifers and distribution of surface water due to subsidence could occur. The extent of this change is not known. Annual water requirements for community development would increase by 6,964 acre-feet

annually by the year 2000. An additional 446 acre-feet would be required annually for mine development. Development of certain tracts could result in an increase in annual sediment flow into local reservoirs and streams. Salinity contribution to the Colorado River would actually slightly decrease.

Approximately 1,771 acres of big game habitat including winter range and calving grounds, would be lost. Regionwide the loss would be insignificant; however, in some specific areas, big game populations would be reduced as a result. The permanent loss of 1,956 acres of irrigated croplands would reduce pheasant and other small game populations. Increased pressures on wildlife through harvest, harassment, and displacement would occur. Highway related deer losses would increase.

Approximately 1,956 acres of irrigated croplands would be changed to community use. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.

Development of the Castle Valley Ridge tract would conflict with Carbon County zoning ordinances. Tract development in southern Utah could conflict with protection of irrigated croplands and water resource development provisions of the Kane County Master Plan.

Employment in the region would increase by 10,577 jobs or 19 percent over the projected baseline by the year 2000. Population would increase by 27,277 persons or 20 percent over the projected baseline. Coal development would bring added revenues into the affected counties. However, the counties would also experience significant infrastructure impacts. The elements most affected would be housing, education facilities, social services, water and sewer capacities, and law enforcement.

More than 18,000 additional vehicles per day (19 percent) would be on roads in the region by the year 2000. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 between Price and Spanish Fork, Utah. Roads and highways would experience increased deterioration. Associated safety and maintenance problems would result.

Inadvertent loss of cultural resources could occur, and sites that are salvaged would lose context for further study. Losses through illegal collection or vandalism would increase. Increases in local demand for recreation opportunities (71 percent in southern Utah, 17 percent in central Utah, and an undetermined but slight amount in west-central Colorado) could result in overutilization and deterioration of existing recreation developments and reduced hunter and fisherman success. Recreation facilities in local communities would also be overcrowded. Coal development related noise and fugitive dust could be noticeable on certain days from Yovimpa Point in Bryce Canyon National Park. Tract development in some areas would not meet VRM standards.

Alternative Three

Three areas near Price, Castle Dale, and Mt. Pleasant, Utah and two areas near Delta and Cedaredge, Colorado would exceed the primary NAAQS for TSP. TSP emissions resulting from Alternative Three would increase 26 percent over 1981 levels and 14 percent over the projected baseline expected in these areas by the year 2000. Secondary NAAQS would be exceeded in a 2,605 square mile area by the year 2000, of which 1,035 square miles would be attributed to implementation of Alternative Three. The greatest impact contribution would come from the vehicular traffic on unpaved roads and growth in population centers.

Soil and vegetation productivity on 1,373 acres would be lost for the life of the mines but could eventually be reclaimed. An additional 1,910 acres productivity would be lost to community development (including retiring irrigated croplands) and would not be reclaimed. An unquantified amount of soil would be lost prior to reclamation.

The mining of 528.7 million tons of coal would result in 787.5 million tons (59.8 percent) of coal remaining underground and unrecoverable by present technology.

Up to 16 feet of subsidence could occur on portions of the 58,611 acres that would be mined by underground methods. Changes in aquifers and distribution of surface water due to subsidence could occur. The extent of this change is not known. Annual water requirements for community development would increase by 4,855 acre-feet annually by the year 2000. An additional 363 acre-feet would be required annually for mine development. Development of certain tracts could result in an increase in annual sediment flow into local reservoirs and streams. Salinity contribution to the Colorado River would actually slightly decrease.

Approximately 1,018 acres of big game habitat including winter range and calving grounds, would be lost. Regionwide the loss would be insignificant; however, in some specific areas, big game populations would be reduced as a result. The permanent loss of 1,375 acres of irrigated croplands would reduce pheasant and other small game populations. Increased pressures on wildlife through harvest, harassment, and displacement would occur. Highway related deer losses would increase.

Approximately 1,375 acres of irrigated croplands would be changed to community use. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.

Development of two tracts would conflict with Carbon County zoning ordinances.

Employment in the region would increase by 7,842 jobs or 14 percent over the projected baseline by the year 2000. Population would increase by 19,765 persons or 14 percent over the projected baseline. Coal development would bring added revenues into the affected counties. However, the counties would also experience significant infrastructure impacts. The elements most affected would be housing, education facilities, social services, water and sewer capacities, and law enforcement.

More than 13,000 additional vehicles per day (14 percent increase) would be on roads in the region by the year 2000. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 between Price and Spanish Fork, Utah. Roads and highways would experience increased deterioration. Associated safety and maintenance problems would result.

Inadvertent loss of cultural resources could occur, and sites that are salvaged would lose context for further study. Losses through illegal collection or vandalism would increase. Increases in local demand for recreation opportunities (18 percent in central Utah and an undetermined but slight amount in west-central Colorado), could result in overutilization and deterioration of existing recreation developments and reduced hunter and fisherman success. Recreation facilities in local communities would also be overcrowded. Track development in some areas would not meet VRM standards.

Alternative Four (Baseline)

Even though no new Federal coal would be developed, the region would continue to be an active coal producing area and the following impacts would be expected.

Three areas near Price, Castle Dale, and Mt. Pleasant, Utah and two areas near Delta and Cedaredge, Colorado may exceed the primary NAAQS for TSP. In these areas, an increase in TSP of 78 percent is expected by the year 2000 over 1981 conditions. Currently, 245 square miles exceed the secondary NAAQS; this would increase to 1,570 square miles by the year 2000.

Cumulatively, over 5,500 acres of surface disturbance would occur. Over 4,600 acres disturbance would occur in central Utah and would be attributable to coal mining and related community expansion. The majority of the remaining acres would be attributable to general community growth.

Over 500 million tons of coal left underground in existing holdings would not be recovered by present technology. Coal in seven of the tracts proposed for leasing in this round would also not be mined and could be bypassed resulting in a total loss of the resource. About 21.6 million tons would be produced annually in central Utah and 1.35 million tons annually in Delta County in west-central Colorado by the year 2000.

An undetermined amount of subsidence of up to 16 feet would occur on areas that would be mined. Changes in aquifers and distribution of surface water could result; however, the extent of this change is not known. Over 9,000 acre-feet of water would be consumed by mining and population growth annually by the year 2000. Of that amount, 7,798 acre-feet would be consumed in central Utah. Water required to meet population growth or community development would result in the loss of nearly 2,500 acres of irrigated cropland by the year 2000, 1,500 acres of which would be lost in central Utah.

Community expansion and mining activities would result in an unquantified but expected insignificant loss of wildlife habitat. Direct wildlife loss would

result from highway mortality, hunting, and illegal killing. An undetermined number of animal unit months (AUMs) would be lost as a result of soil and vegetation disturbance.

No significant conflicts are expected between coal development of existing holdings and county zoning ordinances.

A 44-percent population increase in central Utah, 34 percent in southern Utah, and 14 percent in west-central Colorado is projected by the year 2000 over 1982 estimated population. Much of this growth, especially in southern Utah, would not be coal related. Waste water treatment facilities would need to be constructed or upgraded for several communities. Some housing shortages are anticipated. Coal mining would produce jobs and income for local residents and additional revenue for affected counties.

The potential exists for overcrowding on Highway 10 south from Price, Utah as well as US-6 east from Price across Soldier Summit. Price would also experience traffic congestion during rush hours. No significant traffic related problems are anticipated for southern Utah or west-central Colorado.

Inadvertent loss of cultural resources could occur, and sites that are salvaged would lose context for further study. Losses through illegal collection or vandalism would increase.

Local demand for recreation by the year 2000 would increase by 44 percent in central Utah, 34 percent in southern Utah, and a slight amount in west-central Colorado over 1982 levels. Some developed sites could experience overcrowding and deterioration. Some facilities in towns would also be overcrowded. There would be a reduction in hunter and fisherman success regionwide.

Coal development would continue to modify the natural landscape in isolated portions of the region. Visual resource management objectives would probably not be met in some areas. Special Designation Areas, while not directly affected, would experience increased recreation activity. Some values could be degraded.

Unresolved Issues

1. Markets for coal were not identified except on a general basis: therefore, additional analysis of coal transportation systems and interrelated projects may be needed on an individual basis as specific markets become known.
2. Tract boundaries are subject to change based on additional exploratory drilling and subsequent surveys.
3. The determination of recoverable coal reserves on the tracts is subject to revision based on ongoing and planned drilling programs.
4. Cultural resource inventories of affected areas would also be required as provided for in the coal programmatic Memorandum of Agreement between the

President's Advisory Council on Historic Preservation, Office of Surface Mining, and BLM. Full compliance with procedures outlined in 36 CFR, Part 800 Protection of Historic and Cultural Properties must also be completed.

5. A consolidated lawsuit is pending in the U.S. District Court for the District of Utah regarding the availability of coal for surface mining in the Alton coal field. Resolution of these suits may affect the availability of certain of the five tracts in the Alton Coal field being considered in this EIS.

6. Application of the coal unsuitability criteria in the Alton coal field did not consider Criterion 16, special flood plains, and Criterion 19, alluvial valley floors, due to lack of data. If Federal land in this area is leased, the lessees' mining plans will have to comply with these criteria under the Surface Mining Control to Reclamation Act of 1977 prior to obtaining a mining permit.

Identification of the Preferred Alternative

Alternative Two, the high level scenario (1.668 billion tons) involving the leasing of 25 tracts in southern and central Utah and west-central Colorado is the Regional Coal Team's preferred alternative. Prior to leasing, a record of decision identifying an environmentally preferred alternative will be prepared.

CHAPTER 1 INTRODUCTION

**CHAPTER 2 ALTERNATIVES
INCLUDING THE PROPOSED ACTION**

**CHAPTER 3 DESCRIPTION
OF THE AFFECTED ENVIRONMENT**

**CHAPTER 4 ENVIRONMENTAL
CONSEQUENCES**

**CHAPTER 5 COORDINATION
AND CONSULTATION**

**CHAPTER 6 INDIVIDUAL
TRACT SUMMARY**

RESPONSE TO COMMENTS

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GLOSSARY

ABBREVIATIONS

REFERENCES CITED

CHAPTER 1

INTRODUCTION

Purpose and Need for Action

The Uinta-Southwestern Utah Coal Region was established by the United States Department of the Interior (DOI) as part of the Federal coal management program initiated in June 1979. The program is to foster greater use of the Nation's coal resources and to offset reliance on imported energy resources. The leasing of Federal coal is expected to facilitate production and use of coal to meet National energy requirements. The overall coal leasing program is described in the Federal Coal Management Program Final Environmental Statement (BLM, 1979a).

The current effort represents the second round of coal leasing in the region. First round leasing activities began in 1979. An Environmental Impact Statement (EIS) was completed in April 1981, followed by coal lease sales in July 1981 and February and May 1982. Thus far, seven tracts covering some 219 million tons of in-place coal have been competitively leased. The possibility exists that an additional four tracts analyzed during the first round may be re-offered for sale. No date has yet been set for the re-offering of these tracts; however, they would be offered independently of the current second round leasing effort. For the purpose of this EIS these tracts are considered, in general terms, as part of the projected baseline.

A combined Federal and State Regional Coal Team (RCT) provides guidance for Federal coal activities within the region. The RCT made recommendations to the Director of the Bureau of Land Management (BLM) and to the Secretary of the Interior concerning adoption of regional coal production goals, regional coal leasing targets, and the selection and scheduling of tracts to be analyzed in this EIS and offered for competitive coal lease sale. The RCT provided guidance concerning tract delineation and preparation of site specific analyses (tract profiles). They also ranked the tracts and developed the alternative leasing levels analyzed in this EIS.

On June 12, 1982, the Assistant Secretary, Land and Water Resources (DOI), after consultation with the Governors of Utah and Colorado, approved a final leasing target for the region of 1.6 to 2.1 billion tons of in-place coal. The target was established after analyzing potential production from planned and existing coal mines in the region and projected demand for coal. The decision on the leasing target was made to ensure that sufficient coal resources are offered to enhance industry competition. It was based in part on the fact that industry formally expressed interest in some 3.8 billion tons of in-place coal resource. The Secretary of the Interior has selected February 16, 1984, as the tentative date to initiate Round Two leasing. It was also decided that competitive leasing in southern Utah be confined to the Alton coal field and that leasing on the Kaiparowits Plateau be deferred. A public hearing on the leasing target was held April 20, 1982, in Salt Lake City, Utah. Four comments were received with all but one supporting the leasing target.

The region produces very high quality coal, but increased markets are relatively limited due to the reduced growth of local electric power generation, higher production costs resulting from underground mining, and distances to other markets. Currently, the coal demand is somewhat evenly split between use in the region and export to other states. Nevada, California, and the midwest are the primary users of exported coal. Coal use for electric power generation accounts for about 60 percent of the market. The remainder is used for general industrial use. Future market expansion is expected to be in local electric power generation with moderate growth in exports outside the region.

Regional Setting

The Uinta-Southwestern Utah Coal Region consists of 17 counties in Utah and 7 in Colorado (Figure 1-1). Several major coal fields are located in the region which cumulatively includes all known commercially minable coal in Utah (Doelling, 1972; Doelling and Graham, 1972a; Doelling and Graham, 1972b) and approximately 32 percent of all known commercially minable coal in Colorado (Landis, 1959). The estimated in-place coal resources in the major coal fields of the region are (in billions of tons): Wasatch Plateau 6, Emery 1.4, Book Cliffs 3, Alton 1.5, Kaiparowits 7.9, Kolob 2, (Doelling, 1972), Colorado Book Cliffs 7.2, Carbondale 5.2, Grand Mesa 8.6, and Somerset 8, (Colorado Geological Survey, 1980).

The region is an active coal producing area. In September 1981 there were 270 Federal coal leases in the region, and 204 of these were in Utah. Forty-two leases are producing coal, and 28 of these are in Utah. Cumulatively, there are 364,279 acres currently under lease in the region and 238,319 acres are on public land surface administered by BLM. The remaining acreage under lease includes 72,811 acres of National Forest System surface administered by the Forest Service (FS) with the remainder (53,149 acres) being private or State-owned surface (DOI, 1982).

Required Authorizations

Development of Federal coal resources is controlled by numerous laws and regulations imposed by Federal, State, and local agencies and authorities. Federal laws of importance include the Mineral Leasing Act of 1920, Federal Coal Leasing Amendments Act of 1976 (FCLAA), Federal Land Policy and Management Act of 1976 (FLPMA), Surface Mining Control and Reclamation Act of 1977 (SMCRA), the Multiple Use Sustained Yield Act of 1960, and the National Forest Management Act of 1976.

The Mineral Leasing Act of 1920 set the government policy of retaining ownership and leasing Federal coal resources. This act was modified by the FCLAA which set forth major requirements including strictly competitive bidding, the abolishment of preference right leasing, the concept of logical mining units, diligent development requirements, maximum economic recovery, and lease acreage restrictions.

FLPMA provides BLM with a statutory framework for land use planning on public lands and requires BLM to use principles of multiple use and sustained yield, give priority to the protection of areas of critical environmental concern

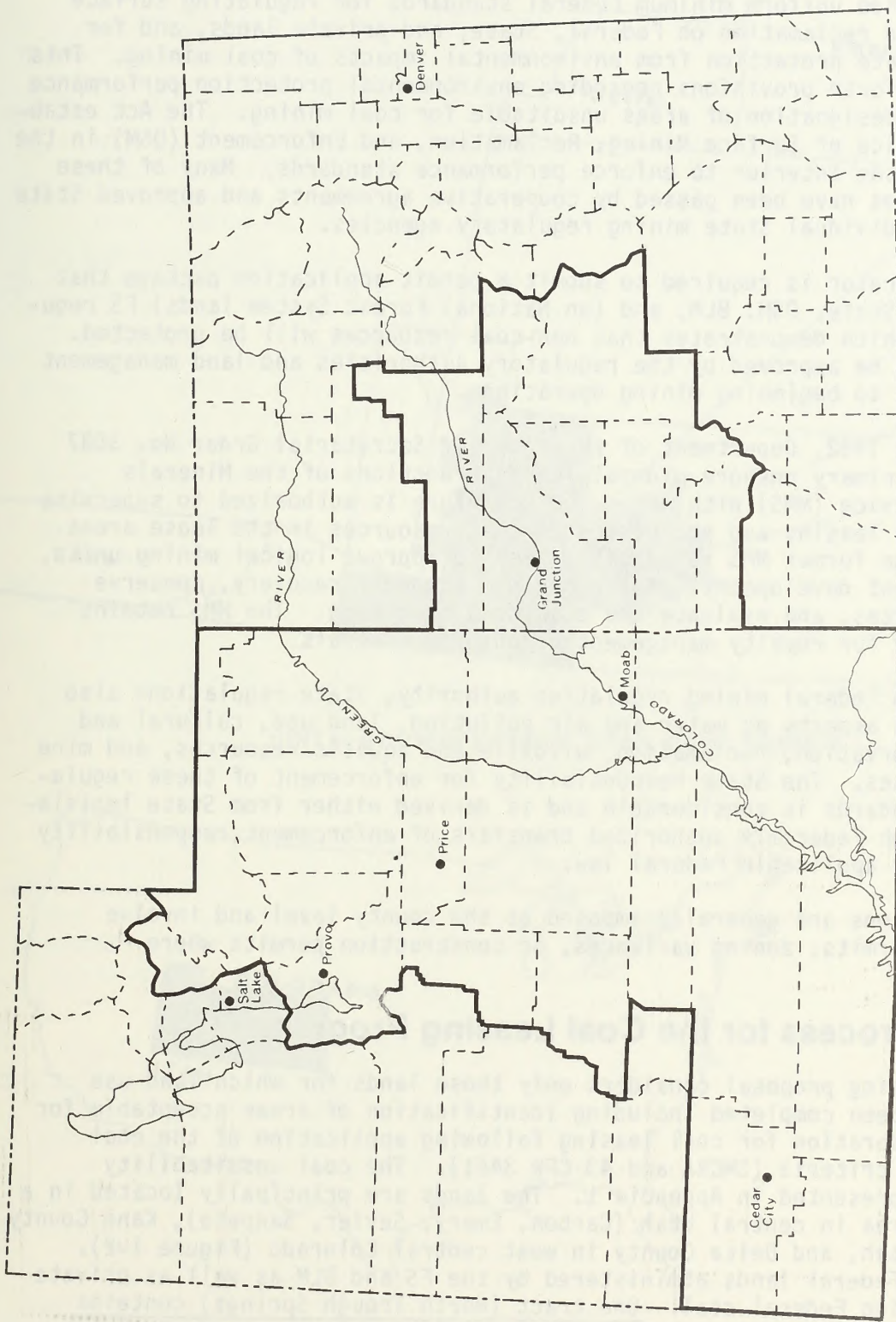


FIGURE 1--1

UINTA-SOUTHWESTERN UTAH COAL REGION

(ACEC), consider present as well as future uses of public lands, and coordinate planning activities with Federal, State, and local agencies.

SMCRA established uniform minimum Federal standards for regulating surface coal mining and reclamation on Federal, State, and private lands, and for ensuring adequate protection from environmental impacts of coal mining. This Act also sets forth provisions regarding environmental protection performance standards and designation of areas unsuitable for coal mining. The Act established the Office of Surface Mining, Reclamation, and Enforcement (OSM) in the Department of the Interior to enforce performance standards. Many of these responsibilities have been passed by cooperative agreements and approved State programs to individual State mining regulatory agencies.

Each lease operator is required to submit a permit application package that complies with State, OSM, BLM, and (on National Forest System lands) FS regulations, and which demonstrates that non-coal resources will be protected. This plan must be approved by the regulatory authorities and land management agencies prior to beginning mining operations.

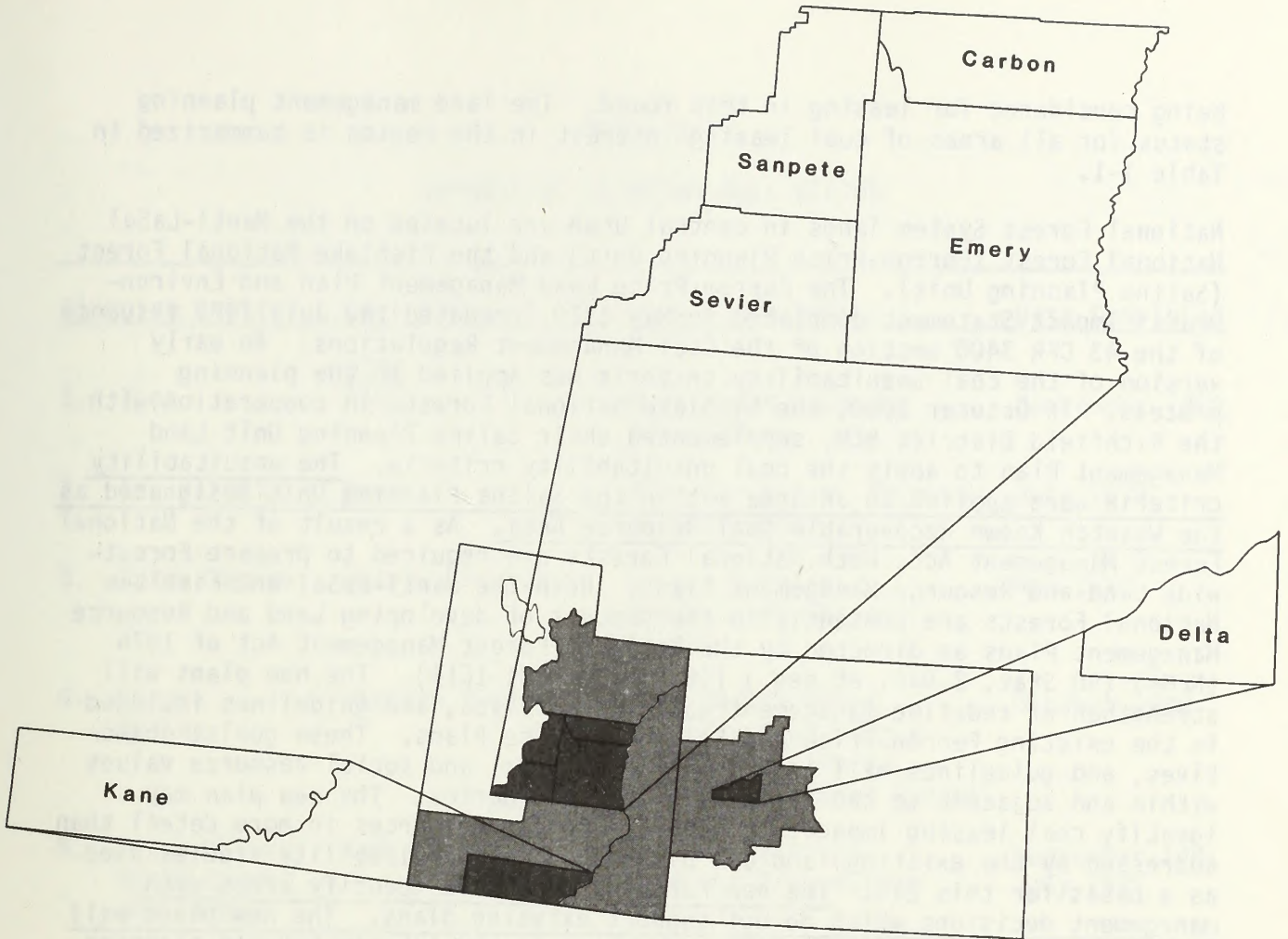
On December 3, 1982, Department of the Interior Secretarial Order No. 3087 consolidated primary onshore mineral leasing functions of the Minerals Management Service (MMS) with BLM. BLM therefore is authorized to supervise all aspects of leasing and production of coal resources in the lease areas. Included is the former MMS responsibilities to approve logical mining units, enforce diligent development, attain maximum economic recovery, conserve mineral resources, and evaluate the economics of mining. The MMS retains responsibility for royalty management of onshore minerals.

In addition to Federal mining regulation authority, State regulations also deal with such aspects as water and air pollution, land use, cultural and historic preservation, reclamation, wildlife and aquatic resources, and mine safety practices. The State responsibility for enforcement of these regulations and standards is considerable and is derived either from State legislation or through Federally authorized transfers of enforcement responsibility as provided by applicable Federal law.

Local regulations are generally imposed at the county level and involve special use permits, zoning variances, or construction permits where applicable.

Planning Process for the Coal Leasing Program

This coal leasing proposal considers only those lands for which land use planning has been completed including identification of areas acceptable for further consideration for coal leasing following application of the coal unsuitability criteria (SMCRA and 43 CFR 3461). The coal unsuitability criteria are presented in Appendix 1. The lands are principally located in a four-county area in central Utah (Carbon, Emery, Sevier, Sanpete), Kane County in southern Utah, and Delta County in west central Colorado (Figure 1-2). Included are Federal lands administered by the FS and BLM as well as private lands overlaying Federal coal. One tract (North Trough Springs) contains approximately 40 acres of private surface overlaying State-owned coal, but the coal would not be leased as part of the tract. Other counties were included in the land management planning process but do not contain tracts



UINTA-SOUTHWESTERN UTAH COAL REGION

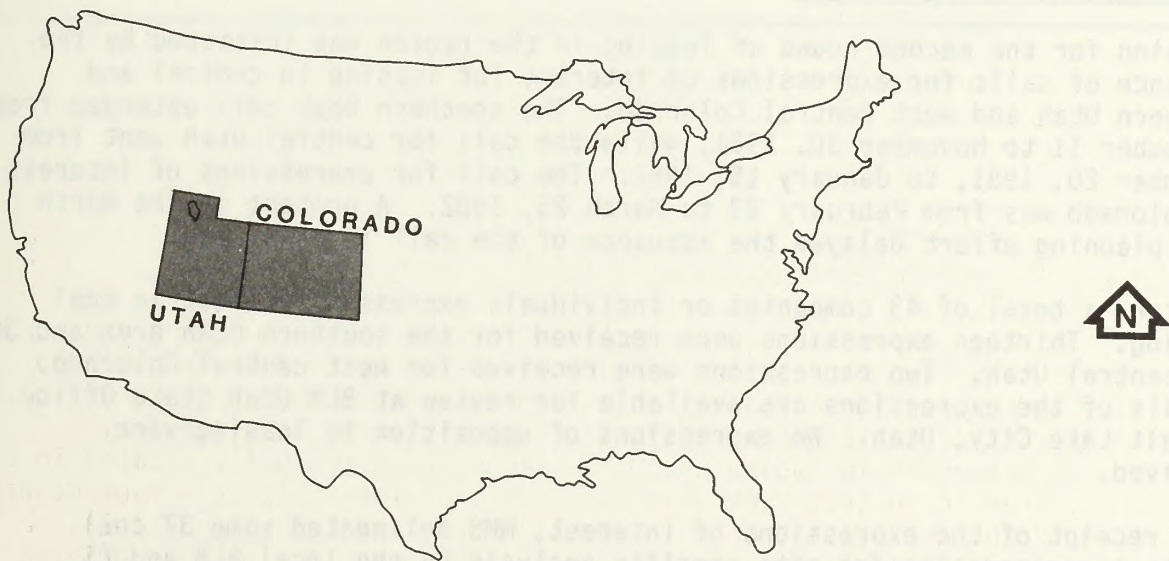


FIGURE 1-2

**UINTA-SOUTHWESTERN UTAH COAL REGION:
AREAS OF LEASING CONSIDERATION**

being considered for leasing in this round. The land management planning status for all areas of coal leasing interest in the region is summarized in Table 1-1.

National Forest System lands in central Utah are located on the Manti-LaSal National Forest (Ferron-Price Planning Unit) and the Fishlake National Forest (Salina Planning Unit). The Ferron-Price Land Management Plan and Environmental Impact Statement completed in May 1979, predated the July 1979 issuance of the 43 CFR 3400 section of the Coal Management Regulations. An early version of the coal unsuitability criteria was applied in the planning process. In October 1980, the Fishlake National Forest, in cooperation with the Richfield District BLM, supplemented their Salina Planning Unit Land Management Plan to apply the coal unsuitability criteria. The unsuitability criteria were applied to an area within the Salina Planning Unit designated as the Wasatch Known Recoverable Coal Resource Area. As a result of the National Forest Management Act, both National Forests are required to prepare Forest-wide Land and Resource Management Plans. Both the Manti-LaSal and Fishlake National Forests are presently in the process of developing Land and Resource Management Plans as directed by the National Forest Management Act of 1976 (NFMA) (90 Stat. 2-949, et seq.) (16 U.S.C. 1601-1614). The new plans will strengthen or redefine management goals, objectives, and guidelines included in the existing Ferron-Price and Salina Land Use Plans. These goals, objectives, and guidelines will address all biological and social resource values within and adjacent to the National Forest boundaries. The new plan may identify coal leasing impacts to National Forest resources in more detail than addressed by the existing land use plans and coal unsuitability studies used as a basis for this EIS. The new Forest plans could identify areas with management decisions which do not support existing plans. The new plans will not be completed before late 1985. However, in the interim between planning efforts, coal leasing decisions will be based on the existing land use plans as well as available data from the Land and Resource Management Plans currently under preparation.

Planning for the second round of leasing in the region was initiated by the issuance of calls for expressions of interest for leasing in central and southern Utah and west central Colorado. The southern Utah call extended from September 11 to November 30, 1981, while the call for central Utah went from November 20, 1981, to January 15, 1982. The call for expressions of interest in Colorado was from February 23 to March 25, 1982. A protest on the North Fork planning effort delayed the issuance of the call in that area.

In Utah, a total of 43 companies or individuals expressed interest in coal leasing. Thirteen expressions were received for the southern Utah area and 30 for central Utah. Two expressions were received for west central Colorado. Details of the expressions are available for review at BLM Utah State Office in Salt Lake City, Utah. No expressions of opposition to leasing were received.

Upon receipt of the expressions of interest, MMS delineated some 37 coal tracts in preparation for site specific analysis by the local BLM and FS offices. However, due to land management, budgetary, and other constraints, not all of the tracts were analyzed and carried forward for analysis in the EIS. Eventually, site specific analyses were completed on 27 tracts. Pertinent tract data are summarized in Table 1-2.

TABLE 1-1

SUMMARY OF PLANNING AREA STATUS

Planning Unit(s)	Coal Field(s)	Agency and Office	Date Completed
1. Zion	<u>UTAH</u> Alton	BLM, Kanab Resource Area Office	September 1980
2. San Rafael	Emery	BLM, San Rafael Resource Area Office	July 1979
3. Price/Ferron	Wasatch Plateau	Forest Service Manti-LaSal National Forest	May 1979
4. Forest Salina	Wasatch Plateau	BLM, Sevier River Resource Area Office and Forest Service Fishlake National Forest	October 1980
5. Price River/ Range Creek Coal Area	Book Cliffs	BLM, Price River Resource Area Office	September 1981 July 1982
6. North Fork	<u>COLORADO</u> Paonia-Somerset	BLM, Uncompahgre Basin Area Office	October 1981

TABLE 1-2
SUMMARY OF INDIVIDUAL TRACT DATA

Office	Tract	Acres	In-Place Coal million tons ^a	Recoverable Coal million tons
BLM-Moab	Soldier Creek	2,168.02	81.9 ^{b,d}	37.0
	Coal Creek	4,198.09	114.4 ^{b,d}	46.0
	Graves	550.16	19.8 ^b	7.0
	Hoffman Creek	120.00	2.0 ^b	1.0
	Blue Trail Canyon	320.00	1.0 ^d	0.9 (Surface)
	Whitmore Park	160.00	6.3 ^d	1.9
	Alkali Creek	2,080.30	33.8 ^{b,d}	15.0
	Dugout-Pace	3,149.62	106.7 ^d	25.0
	Subtotals	12,746.19	365.9	133.8
BLM-Richfield/FS Fishlake NF	Walker Flat (BLM)	1,520.43	73.6 ^{b,c}	25.0
	Ivle (Fishlake)	1,040.00	10.1 ^b	5.6
	Skumpah (Fishlake)	639.80	4.5 ^{b,c}	2.0
	Acord (Fishlake)	120.00	3.4 ^b	1.5
	Subtotals	3,320.23	91.6	34.1
BLM-Cedar City	Alton Amphitheater	2,781.15	74.8 ^d	24.0
	Flax Lakes	5,600.48	112.7 ^d	30.0
	Ford Pasture	1,400.00	36.3 ^d	20.0 (Surface)
	Fisher Canyon	5,724.91	134.0 ^d	54.0
	Mill Creek Canyon	6,562.48	204.0 ^d	65.0
	Subtotals	22,069.02	561.8	193.0
FS-Mantle-LaSal NF	Gooseberry	920.00	46.3 ^c	16.0
	North Trough Springs	3,195.61	30.2 ^d	12.0
	Castle Valley Ridge	3,442.16	73.7 ^c	35.0
	Mud Creek	1,208.80	27.9 ^c	10.0
	Trail Mountain	6,950.61	87.3 ^c	40.0
	Ferron Canyon	2,680.38	28.5 ^c	10.0
	Quitcupah	9,905.46	276.3 ^{b,c}	115.0
	The Pines	8,924.97	167.0 ^{b,c}	70.0
	Subtotals	37,227.99	737.2	308.0
BLM-Montrose	Cedaredge	1,847.20	46.4 ^{b,c}	23.2
	Paonia D Seam	4,997.85	104.0 ^b	40.5
Subtotals	6,845.05	150.4	63.7	
TOTALS	82,208.48	1,906.9	732.6	

^a The estimates of In-place and recoverable coal were made by the MMS (1982). Estimates of In-place tonnage range from demonstrated reserves to speculative resources depending on the number of core samples drilled on or near the tracts. All estimates reflect the best available data are based on the known or average thickness of the various coal seams within the coal fields.

^b Demonstrated - Reserves within 3/4 mile of an exploration point (core sample).

^c Inferred - Reserves within 3/4 - 3 miles of an exploration data point.

^d Speculative - Over 3 miles from an exploration data point or coal bed uniformity and continuity is not known.

On July 22-23, 1982, the RCT met to rank the tracts and establish alternatives for the EIS (individual tract ranking summaries are presented in Appendix 2). However, as a result of questions concerning unleased tracts from first round activities, several additional weeks were required to finalize the alternatives.

Scoping Process

Several Federal, State, and local government agencies, and private groups and individuals participated in the scoping process through meetings and correspondence. They provided information, made suggestions, and raised questions regarding potential issues. (See Chapter 5 for details of scoping and issues identified.)

Alternatives

The RCT identified the Alternatives for analysis in the EIS in meetings on July 22, 1982, and January 14, 1983. The Alternatives ranged from leasing all 27 tracts to no new Federal coal leasing. Details of the Alternatives are presented in Chapter 2.

With the exception of no Federal action, the alternatives recommended by the RCT are near or within the leasing target established by the Secretary of the Interior. However, the Secretary's decision on a course of action is not limited solely to the alternatives presented in the EIS. He may, through the use of his discretionary authority, select additional alternatives that are intermediate in magnitude to those analyzed. These intermediate alternatives could be developed through changes in the proposed level of leasing, changes in tract combinations, changes in the lease sale schedule, or modification of the leasing target. These alternatives could be developed in response to expressed preferences of the Governors of Utah and Colorado, the analysis in the EIS, recommendations of the RCT, public input, or coordination with other Federal agencies.

Interrelationships

Transportation

Feasibility of additional railroad development in many parts of the region is directly tied into development and transportation of coal from existing and future mines. An example is the planned Denver and Rio Grande Western Railroad in Castle Valley which is scheduled for development from Wellington, Utah, south to Emery. A draft EIS on the proposed railroad was released in November 1982 by the Interstate Commerce Commission. The line could play a role in delivering coal to the Intermountain Power Project (IPP). Rail operations are expected to begin in the 1985-1990 period if the line is approved and constructed.

Electrical demand has moderated, reducing construction of new generating facilities. Construction of one coal-fired powerplant (IPP near Lynndyl, Utah) in the area is continuing. IPP is projected for operation in 1986, and the coal source (some 4.5 million tons annually) would come from the coal fields, including certain proposed tracts, in Emery and Carbon Counties.

Construction of the fourth unit of Utah Power and Light Company Hunter powerplant in Emery County has been indefinitely delayed. Plans call for its construction at some future date.

Other possible energy developments in Utah could significantly interact with coal development. Foremost among these are the proposed tar sand developments in the Sunnyside Special Tar Sand Area in Carbon County. While details on possible tar sand developments are not yet available, these projects could compete with coal for available water, workforce, housing, etc. Since details are not available, possible tar sand development is not considered in the baseline of this EIS. Future tar sand studies will include interrelationships with coal development.

Three law suits are pending in the U.S. District Court for the District of Utah which seek to set aside a decision on December 16, 1980, by Cecil Andrus, then Secretary of the Interior, which declared a portion of the Alton coal field unsuitable for surface mining. Resolution of these suits may affect the availability of certain of the five tracts in the Alton coal field being considered in this EIS.

State and Local Land Use Plans, Programs, and Controls

In addition to Federal land use plans, coal development is also subject to State and local programs and controls. The State of Utah has no State land use plan, however, Section 17 of the Utah State Code empowers counties within the State to develop zoning ordinances and enforcement procedures. County zoning ordinances are detailed in the Land Use Plans (County Plans) Section of Chapter 3.

The State of Colorado enacted Colorado Revised Statutes 29-20-101 and 24-65-101 to assist counties with general and specific power to manage land use. Delta County completed a land use plan in January 1983.

Preference Right Lease Applications

The authority for coal prospecting permits and noncompetitive Preference Right Leases was repealed by the Federal Coal Leasing Amendments Act of 1976; however, several applications issued before 1976 are still pending. In the Uinta-Southwestern Utah Coal Region there are fifteen PRLA's in Utah and one in Colorado. Utah also has six applications for extension of prospecting permits which are being examined. All of the applications except one small one in Kane County, Utah, are outside the area of impact influence from new competitive leasing being considered in the EIS. An environmental analysis (EA) is being prepared on the Colorado PRLA by the Forest Service and it is expected to be available in late 1983. Seven PRLA's in Utah have completed environmental analyses and six have EA's under preparation which are planned for completion by the end of 1983. Upon completion of NEPA compliance for the PRLA's, BLM will request a final showing. If the applicant proves commercial quantities under 43 CFR Part 3430, a lease will be issued. Otherwise, the application would be rejected.

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Introduction

Four alternative levels of leasing for the Uinta-Southwestern Utah Round Two leasing program are identified. The Round Two proposed leasing includes 27 coal tracts in coal fields at three separate geographic locations: central Utah (20 tracts), southern Utah (5 tracts), and west-central Colorado (2 tracts). Each coal leasing alternative is described by identifying specific tracts, in-place and recoverable coal resources, projected annual production rates, acres proposed for leasing, and identification of mining methods. Figure 2-1 presents a production graph depicting projected coal development for the three leasing Alternatives and the No Action Alternative. Mining plans are not prepared for coal tracts until after lease issuance; therefore, for analysis of potential impacts, a series of assumptions has been made regarding probable development scenarios. Stipulations (mitigating measures) that would be part of lease issuance were considered in the analysis and are included as Appendix 3. A scenario for surface mine reclamation is also presented. A list of analysis assumptions used in describing the potential impacts that would result from development of individual tracts is presented in the introduction to Chapter 4. These assumptions are used to develop quantification for work force, acreages, and water requirements and have been carried to decimal points to avoid rounding errors. However, it should be recognized that the quantifications used are approximate figures only.

The Gooseberry tract has been transferred to the State of Utah as part of the indemnity selection process. The State has indicated that the tract will be offered for sale in the near future. The Hoffmann Creek tract was offered for sale as an emergency lease on August 12, 1983. The apparent high bidder was AMCA Coal Leasing, Inc. Because both tracts have been or will be offered for sale near the same time as the Federal Coal Lease Sale scheduled for February, 1984, they will remain a part of the alternatives analyzed in the EIS. These two tracts are small and represent only about 0.04 percent of the total acreage under leasing consideration and about 0.025 percent of the in-place coal resource and 0.023 percent of the estimated recoverable coal. Neither of these tracts constitutes a major Federal action nor precludes the Secretary of the Interior's decision on the remaining 25 tracts.

Anticipated environmental impacts are summarized in narrative table form at the end of this chapter. The impacts discussed are those considered to be most significant as determined through the scoping process (40 CFR 1501.7) and environmental analysis (Chapter 4). Individual tract development discussions are presented in Chapter 6.

Tract delineation reports and site specific environmental analyses detailing probable mine development and anticipated environmental impacts have been completed for all tracts under consideration. These reports are available for review at BLM's Utah State Office in Salt Lake City. In addition, reports for the Utah tracts are available at the Moab, Cedar City, and Richfield District BLM Offices, the Manti-LaSal National Forest Supervisor's Office in Price, and

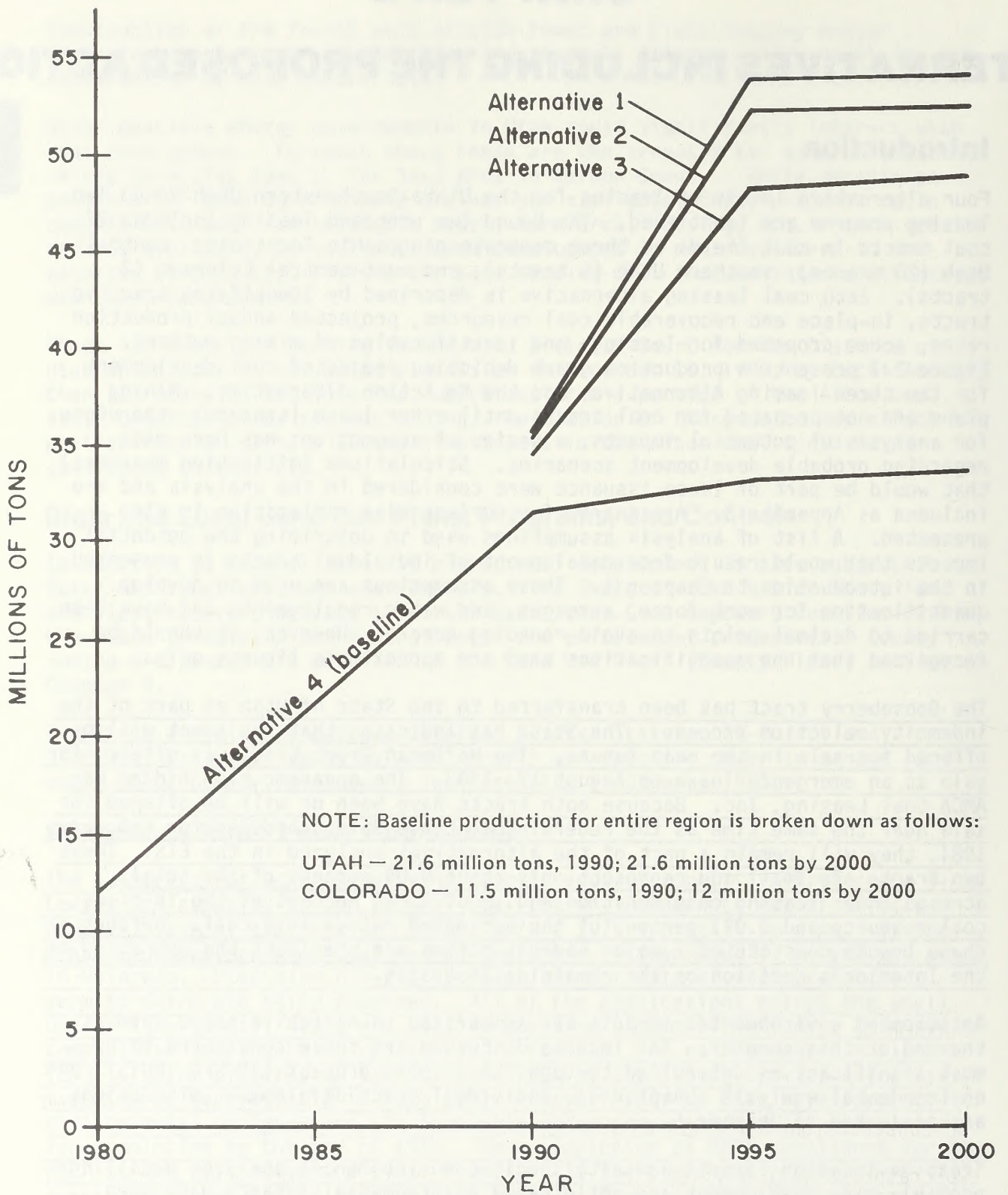


FIGURE 2-1
PROJECTED COAL PRODUCTION IN REGION
BY ALTERNATIVE

the Fishlake National Forest Supervisor's Office in Richfield. Colorado tract reports are available for review at BLM's Colorado State Office and the Uncompahgre Area Office in Montrose, Colorado. Surface mining would not occur on private surface; consequently, surface owner consultation was not required for any of the tracts. Table 2-1 is a summary of the information presented in the tract development descriptions which is based on the best available data. Coal quality data for each tract are found in Table 2-2. All tracts have been found suitable for leasing and preliminarily ranked by the Regional Coal Team (Appendix 2). All tracts are proposed for multiple seam leasing with the exception of the Paonia tract which is proposed for single (D) seam leasing. If all tracts were developed, five new 20-acre coal delivery and loadout facilities would likely be needed, one each at Castle Dale, Emery, and Fairview and two east of Wellington, Utah.

Description of the Alternatives

Alternative One: Maximum Level (1.907 Billion Tons)

Alternative One considers leasing all 27 delineated tracts in Utah and Colorado (Table 2-3). The tracts total 82,208.48 acres with an in-place Federal coal resource of 1,906.9 million tons of which 732.6 million tons are estimated to be recoverable. BLM and Forest Service administer 52,802.96 surface acres of the lease areas; 29,405.52 acres are in non-Federal ownership. All coal on the tracts is owned by the Federal Government with the exception of 40 acres of private surface and State coal on the North Trough Springs tract. The locations of the individual tracts are shown in Chapter 6 and in the Regional map located inside the back cover of this document.

Coal would be mined underground by room and pillar and/or longwall methods except for 687 acres of surface mining on the Blue Trail Canyon and Ford Pasture tracts. Up to 17 new portals and five new coal loadouts would be required. Maximum annual coal production would be 20.78 million tons per year. About 2,503 acres of surface disturbance (Table 2-4) would be required for mine development by the year 2000, including exploratory drilling, portal areas, ventilation shafts, coal storage, required access, and coal loadouts. Approximately 65.25 miles of existing access roads would be improved and 219.3 miles of new road construction would be needed. The average number of additional coal haul truck round trips per day in the region would be 1,946 in addition to 416 round trips per day by service vehicles.

Approximately 5,872 permanent employees (including truckers) would be needed in the region by 1995. A maximum of 1,877 temporary employees would be needed for construction from 1987 through 1989.

Exploratory drilling would require a total of about 477 acre-feet of water from 1987 through 1989 and the estimated maximum water requirement for mining after 1995 would be 483.9 acre-feet per year. Table 2-4 summarizes the maximum level alternative.

TABLE 2-1

U INTA-SOUTHWESTERN UTAH COAL REGION
ROUND TWO LEASING SUMMARY

Tract	Surface Acres		Coal Resource		Mining Methods	Average Annual Production ^b (tons/year)	Mine Life ^b (yrs)	New Portal
	Total	Federal	Non-Federal	In-Place (mmt) ^a				
<u>Central Utah: Book Cliffs Area</u>								
Alkali Creek	2,080.3	220	1,860.3	33.8	15	600,000	25	Yes
Coal Creek	4,198.09	40	4,158.09	114.4	46	1,150,000	40	Yes
Dugout-Pace	3,149.62	0	3,149.62	106.7	25	555,000	45	No
Graves	550.16	228	322.16	19.8	7	700,000	10	No
Hoffman Creek	120.0	120	0	2.0	1	153,000	6.5	No
Soldier Creek	2,168.02	0	2,168.02	81.9	37	925,000 ^b	40 ^b	No
Whitmore Park	160.0	0	160.0	6.3	1.9	380,000	5	No
Subtotal	12,426.19	608	11,818.19	364.9	132.9	4,463,000	N/A	N/A
<u>Central Utah: Wasatch Plateau Area</u>								
Acord	120.0	0	120.0	3.4	1.5	83,000	18	No
Castle Valley Ridge	3,442.16	3,442.16	0	73.7	35	875,000	40	Yes
Ferron Canyon	2,680.38	2,680.38	0	28.5	10	500,000	20	Yes
Gooseberry	920.0	0	920	46.3	16	400,000 ^b	40 ^b	Yes
Ivite	1,040.0	1,040.0	0	10.1	5.6	140,000	40	No
Mudcreek	1,208.8	569.0	639.8	27.9	10	250,000	40	Yes
North Trough Springs	3,195.61	2,913.9	281.71	30.2	12.0	300,000	40	Yes
Quitcupah	9,905.46	9,905.46	0	276.3	115	2,875,000	40	Yes
Skumpah	639.8	520.0	119.8	4.5	2	50,000	40	Yes
The Pines	8,924.97	8,924.97	0	167	70	1,750,000	40	Yes
Trail Mountain	6,950.61	6,950.61	0	87.3	40	1,000,000	40	Yes
Subtotal	39,027.79	36,946.48	2,081.31	755.2	317.1	8,223,000	N/A	N/A
<u>Central Utah: Emery Area</u>								
Blue Trail Canyon	320.0	320.0	0	1.0	0.9	45,000	20	N/A
Walker Flat	1,520.43	1,440.0	80.43	73.6	25	625,000	40	No
Subtotal	1,840.43	1,760.0	80.43	74.6	25.9	670,000	N/A	N/A
<u>Southern Utah: Alton Area</u>								
Alton Amphitheater	2,781.15	0	2,781.15	74.8	24	600,000	40	Yes
Fisher Canyon	5,724.91	3,149	2,575.91	134.0	54	1,350,000	40	No
Flax Lakes	5,600.48	3,920.48	1,680	112.7	30	750,000	40	Yes
Ford Pasture	1,400.00	1,400	0	36.3	12.4/7.6	1,000,000	20	Yes
Mill Creek	6,562.48	2,911	3,651.48	204.0	65	1,625,000	40	Yes
Subtotal	22,069.02	11,380.48	10,688.54	561.8	193	5,325,000	N/A	N/A
UTAH TOTAL	75,363.43	50,694.96	24,668.47	1,756.5	668.9	18,681,000	N/A	N/A
<u>Western Colorado</u>								
Panola D Seam	4,997.85	1,000.0	3,997.85	104.0	40.5	1,500,000	27	Yes
Cedarage	1,847.2	1,108.0	739.2	46.4	23.2	600,000	40	Yes
COLORADO TOTAL	6,845.05	2,108.0	4,737.05	150.4	63.7	2,100,000	N/A	N/A
GRAND TOTAL	82,208.48	52,802.96	29,405.52	1,906.9	732.6	20,781,000	N/A	N/A

(cont Inued)

TABLE 2-1 (cont'd.)

Tract	Water Requirement ^c (ac. ft./yr)	Total Mining Related Surface Disturbance (Acres) ^d			Improved Access (miles)	New Access (miles)	Loadout Destination	Haul Distance (miles)
		1987	1990	1995				
<u>Central Utah: Book Cliffs Area</u>								
Alkali Creek	12.9	6.7	40.7	40.7	45.8	7.55	East Wellington	18.0
Coal Creek	24.7	8.6	69.3	92.1	92.1	10.05	East Wellington	19.4
Dugout-Pace	11.9	8.2	8.2	10.7	10.7	4.0	Sunnyside Junc.	18.3
Graves	0	0.2	0.2	0.2	0.2	0	Wildcat Siding	19.4
Hoffman Creek	0	0	0	0	0	0	Wildcat Siding	19.4
Soldier Creek	19.9	9.1	9.1	20.9	20.9	5.75	East Wellington	17.6
Whitmore Park	0	0.3	0.3	0.3	0.3	0	East Wellington	17.6
Subtotal	69.4	33.1	127.8	164.9	170.0	27.35	N/A	N/A
<u>Central Utah: Wasatch Plateau Area</u>								
Acord	1.8	0.5	0.5	0.5	0.5	0.25	Levan	83.4
Castle Valley Ridge	18.8	33.9	186.9	186.9	188.9	23.0	Wildcat Siding	13.9
Ferron Canyon	10.7	27.5	155.4	155.4	157.4	23.1	Castledale	24.4
Gooseberry	8.6	4.3	36.4	36.4	38.4	1.25	Fairview	13.6
Ivle	3.0	0.9	0.9	0.9	2.9	0.5	Emery	16.0
Mudcreek	5.4	7.7	34.4	34.4	36.4	2.75	Eccles Canyon	4.6
North Trough Springs	6.4	23.2	79.3	79.3	81.3	9.75	Eccles Canyon	8.4
Quitchupah	61.8	28.7	181.8	181.8	183.8	19.6	Emery	10.4
Skumpah	1.1	6.5	80.5	80.5	82.5	6.3	Levan	83.4
The Pines	37.6	26.0	138.1	138.1	140.1	14.2	Emery	15.1
Trail Mountain	21.5	69.5	144.4	144.4	146.4	21.5	Castledale	17.6
Subtotal	176.7	228.7	1,038.6	1,038.6	1,058.6	122.2	N/A	N/A
<u>Central Utah: Emery Area</u>								
Blue Trail Canyon	1.0	2.4	31.3	46.1	64.9	1.7	Emery	18.5
Walker Flat	13.4	1.0	1.0	1.0	1.0	0	Emery	0
Subtotal	14.4	3.4	32.3	47.1	65.9	1.7	N/A	N/A
<u>Southern Utah: Alton Area</u>								
Alton Amphitheater	12.9	29.1	69.4	69.4	71.4	9.0	Slurry Prep Plant	10.7
Fisher Canyon	29.0	58.2	58.2	58.2	60.2	18.0	Slurry Prep Plant	5.0
Flax Lakes	16.1	56.5	120.6	120.6	122.6	18.5	Slurry Prep Plant	17.0
Ford Pasture	21.5	2.3	78.8	361.3	643.8	1.25	Slurry Prep Plant	2.7
Mill Creek	34.9	70.3	128.8	128.8	130.8	20.5	Slurry Prep Plant	5.0
Subtotal	114.4	216.4	455.7	738.3	1,028.8	67.25	N/A	N/A
UTAH TOTAL	374.9	481.6	1,654.4	1,988.9	2,323.3	218.5	N/A	N/A
<u>Western Colorado</u>								
Paonita D Seam	78.0	0	40.0	40.0	40.0	0.75	Paonita	4.0
Cedar edge	31.0	0	40.0	40.0	40.0	0	Delta	14.0
COLORADO TOTAL	109.0	0	80.0	80.0	80.0	0.75	N/A	N/A
GRAND TOTAL	483.9	481.6	1,734.4	2,068.9	2,403.3	219.25	N/A	N/A

(continued)

TABLE 2-1 (concluded)

Tract	Average Coal Haul		Average Service Truck	Maximum Employment	Additional				
	Trucks Round	Trips/day			Visits/day	Permanent	1987	1990	1995
<u>Central Utah: Book Cliffs Area</u>									
Alkali Creek	62.5	12.0	185	28	10	74	185	185	
Coal Creek	120.0	23.0	358	73	18	144	358	358	
Dugout-Pace	57.8	11.0	86	0	5	35	86	86	
Graves	72.9	14.0	0	0	0	0	0	0	
Hoffman Creek	15.9	3.1	0	0	0	0	0	0	
Soldier Creek	96.4	18.5	163	95	9	63	163	163	
Whitmore Park	39.6	7.6	0	0	0	0	0	0	
Subtotal	465.1	89.2	792	196	42	316	792	792	
<u>Central Utah: Wasatch Plateau Area</u>									
Acord	8.6	1.7	15	0	1	6	15	15	
Castle Valley Ridge	91.1	17.5	289	241	16	116	289	289	
Ferron Canyon	52.1	10.0	183	147	10	73	183	183	
Gooseberry	41.7	8.0	229	100	12	92	229	229	
Ivite	14.6	2.8	30	0	2	12	30	30	
Mudcreek	26.0	5.0	69	19	4	28	69	69	
North Trough Springs	31.2	6.0	114	26	6	46	114	114	
Quitcupah	299.5	57.5	1,125	175	57	450	1,125	1,125	
Skumpah	5.2	1.0	30	128	2	12	30	30	
The Pines	182.3	35.0	637	110	32	225	637	637	
Trail Mountain	104.2	20.0	337	55	17	135	337	337	
Subtotal	856.5	164.5	3,058	1,001	159	1,195	3,058	3,058	
<u>Central Utah: Emery Area</u>									
Blue Trail Canyon	7.5	0.9	12	0	1	5	12	12	
Walker Flat	0	12.5	30	0	2	12	30	30	
Subtotal	7.5	13.4	42	0	3	17	42	42	
<u>Southern Utah: Alton Area</u>									
Alton Amphitheater	62.5	12.0	210	50	11	84	210	210	
Fisher Canyon	140.6	27.0	330	70	17	132	330	330	
Flax Lakes	78.1	15.0	400	100	20	160	400	400	
Ford Pasture	104.2	20.0	330	70	17	132	330	330	
Mill Creek	169.3	32.5	550	140	28	220	550	550	
Subtotal	554.7	106.5	1,820	430	93	728	1,820	1,820	
UTAH TOTAL	1,883.8	373.6	5,712	1,627	297	2,256	5,712	5,712	
<u>Western Colorado</u>									
Paonia D Seam	0.0	30.0	0	150	150	0	0	0	
Cedaredge	62.5	12.0	160	100	100	100	160	160	
COLORADO TOTAL	62.5	42.0	160	250	250	100	160	160	
GRAND TOTAL	1,946.3	415.6	5,872	1,877	547	2,356	5,872	5,872	

a Million tons.
b Only production from Federal lands is considered. Production from fee lands and/or existing leases may increase the amount or length of production.
c Does not include approximately 159 acre-feet per year for exploratory drilling from 1987 through 1989.
d Approximately 100 additional acres would be required for coal loadout facilities.
e U is underground; S is surface mining.

TABLE 2-2

COAL QUALITY

Tract Name	Coal Ranking	Volatile			Fixed			Sulfur (%)	Ash (%)	Heat Value (btu/lb)
		Moisture (%)	Matter (%)	Carbon (%)	Carbon (%)	Sulfur (%)	Ash (%)			
Alkali Creek	High volatile B bituminous	- ^a	-	-	-	-	0.68	10.3	13,665	
Coal Creek	High volatile B bituminous	5.12	37.81	51.64	51.64	0.63	5.42	12,593		
Dugout-Pace Canyon	High volatile B bituminous	6.25	38.6	50.3	50.3	1.0	10.1	12,250		
Graves	High volatile B bituminous	5.12	37.81	51.64	51.64	0.63	5.42	12,593		
Hoffman Creek	High volatile B bituminous	5.1	37.5	51.7	51.7	0.63	5.5	12,149		
Soldier Creek	High volatile B bituminous	-	-	-	-	0.68	10.3	13,665		
Whitmore Park	High volatile B bituminous	-	-	-	-	0.68	10.3	13,665		
Acord	High volatile C bituminous	-	39.36	41.35	41.35	0.37	8.58	10,750		
Castle Valley Ridge	High volatile B bituminous	6.5	40.8	46.3	46.3	0.8	6.3	12,286		
Ferron Canyon	High volatile B bituminous	<7	42	44	44	0.6	9	12,500		
Gooseberry	High volatile B bituminous	8	-	45	45	0.6	13	12,200		
Ivlie	High volatile C bituminous	11.00	36.04	42.07	42.07	0.49	10.41	10,063		
Mud Creek	High volatile B bituminous	7.2	41.8	45.9	45.9	0.6	4.9	12,459		
North Trough Springs	High volatile B-C bituminous	<6.5	<43	<45	<45	<1.0	<10	<12,000		
Quitcupah	High volatile C bituminous	7.23-7.97	31.54-39.13	43.29-49.5	43.29-49.5	0.56-0.86	10.35-10.89	11,950-12,000		
Skumpah	High volatile C bituminous	10.7	39.36	41.35	41.35	0.37	8.58	10,750		
The Pines	High volatile C bituminous	7.26-8.88	38.02-38.56	44.83-47.61	44.83-47.61	0.46-0.88	6.37-10.74	11,625-12,640		
Trail Mountain	High volatile B bituminous	4.58	40.14	47.15	47.15	0.55	8.13	12,575		
Blue Trail Canyon	High volatile B or C bituminous	6	35.6-43.9	45.2-51.0	45.2-51.0	0.5	24.0	9,800		
Walker Flat	High volatile B or C bituminous	5.11-11.8	35.6-43.9	42.2-51.0	42.2-51.0	-	5-20.0	10,000-13,000		
Alton Amphitheater	Subbituminous A	17.2	39.5	49.3	49.3	1.4	9.5	9,959		
Fisher Canyon	Subbituminous A	17.2	39.5	49.3	49.3	1.4	9.5	9,959		
Flax Lakes	Subbituminous A-B	15.7-16.7	31.2-32.8	29-39.0	29-39.0	1.4-1.7	11.6-29.0	7,321-9,539		
Ford Pasture	Subbituminous A, B, or C	11.4-20.6	31.8-35.2	40.2-47.8	40.2-47.8	0.4-0.9	5.6-7.4	9,530-10,910		
Mill Creek	Subbituminous C	18.5	37.2	36.8	36.8	0.9	7.5	8,208		
Paonia D Seam	High volatile C bituminous	5-15	-	-	-	0.4-0.7	5-15	9,600-12,300		
Cedarledge	High volatile C bituminous to subbituminous A	9.8-20.0	-	-	-	0.5-1.8	2.1-16.1	9,360-11,670		

^a Indicates that data are not available.

TABLE 2-3

TRACTS INCLUDED IN THE UINTA-SOUTHWESTERN
UTAH REGION: ROUND TWO ALTERNATIVES

Tract	Alternatives			
	One ^a	Two ^b	Three ^c	Four ^d
<u>Central Utah</u>				
Alkali Creek	*	*	*	
Coal Creek	*	*	*	
Dugout-Pace	*		*	
Graves	*	*	*	
Hoffman Creek	*	*	*	
Soldier Creek	*	*	*	
Whitmore Park	*	*	*	
Acord	*	*	*	
Castle Valley Ridge	*	*	*	
Ferron Canyon	*	*	*	
Gooseberry	*	*	*	
Ivie	*	*	*	
Mud Creek	*			
North Trough Springs	*		*	
Quitcupah	*	*	*	
Skumpah	*	*	*	
The Pines	*	*	*	
Trail Mountain	*	*	*	
Blue Trail Canyon	*			
Walker Flat	*		*	
<u>Southern Utah</u>				
Alton Amphitheater	*	*		
Fisher Canyon	*	*		
Flax Lakes	*	*		
Ford Pasture	*	*		
Mill Creek Canyon	*	*		
<u>West Central Colorado</u>				
Paonia D Seam	*	*	*	
Cedaredge	*	*	*	

a Maximum Level, 1.907 billion tons

b High Level, 1.668 billion tons

c Medium Level, 1.316 billion tons

d No Competitive Federal Leasing (No Action)

TABLE 2-4
ALTERNATIVE ONE SUMMARY

Number of Tracts:	27			
Total Acres:	<u>82,208.48</u>			
Total In-Place <u>Federal</u> Coal Resource:	1,906.9 million tons			
Total Recoverable Coal Resource:	732.6 million tons			
a. Surface Mining:	13.3 million tons			
b. Underground Mining:	719.3 million tons			
Average Annual Production ^a :	20.78 million tons			
Total Water Requirements: (acre-feet/year)	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Water Required for Mining:	159.0	359.0	483.9	483.9
Water Required for Community Development:	<u>1,333.0</u>	<u>2,438.0</u>	<u>5,980.1</u>	<u>7,041.8</u>
Totals: (acre-feet/year)	<u>1,492.0</u>	<u>2,797.0</u>	<u>6,464.0</u>	<u>7,525.7</u>
Total Acres Disturbed:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Mining Operations ^b :	481.6	1,834.4	2,168.9	2,503.3
Community Development ^c :	530.7	971.6	2,341.9	2,753.7
Totals:	<u>1,012.3</u>	<u>2,806.0</u>	<u>4,510.8</u>	<u>5,257.0</u>
Employment:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Construction Workers:	547	1,877	-	-
Mining Workers ^d :	-	479	5,872	5,872
Total Workers:	<u>547</u>	<u>2,356</u>	<u>5,872</u>	<u>5,872</u>

^a Assumes maximum production for each tract.

^b Includes exploration activities, surface facility construction and access, powerline access, loadout facilities, and ventilation construction and access.

^c Includes acres retired from irrigation to provide water for community development.

^d Includes coal transportation employees.

Alternative Two: (Preferred Alternative) High Level(1.668 Billion Tons)

Alternative Two considers leasing 22 of the 27 tracts in Utah and Colorado (Table 2-3). The Dugout-Pace, Mud Creek, North Trough Springs, Blue Trail Canyon, and Walker Flat tracts in central Utah are not considered in this alternative. About 72,814.22 acres with an in-place Federal coal resource of 1,667.5 million tons would be leased. About 659.7 million tons are estimated to be recoverable. BLM and Forest Service administer 47,560.06 surface acres of the lease area, while 25,253.96 acres are in non-Federal ownership. All coal on the tracts is owned by the Federal Government with the exception of 40 acres of private surface and State coal on the North Trough Springs tract.

Coal would be mined underground by room and pillar and/or longwall methods except for 622 acres of surface mining on the Ford Pasture tract. Up to 15 new portals and five new coal loadouts would be required. Maximum annual coal production from the tracts would be 19.01 million tons per year. Approximately 2,308 acres of surface disturbance (Table 2-5) would be required for mine development by the year 2000, including exploratory drilling, portal areas, ventilation shafts, coal storage, required access, and coal loadouts. Approximately 59.9 miles of existing access roads would be improved and 201.1 miles of new road construction would be needed in the region. The average number of additional coal haul truck round trips per day in the region would be 1,824 in addition to 380 trips per day by service vehicles.

Approximately 5,561 permanent employees (including truckers) would be needed by 1995 and about 1,832 temporary employees would be needed for construction from 1987 through 1989.

Exploratory drilling would require a total of about 402 acre-feet of water between 1987 and 1990 and the estimated water requirement for mining would be 445.8 acre-feet per year. Table 2-5 summarizes the high level alternative.

Alternative Three: Medium Level (1.316 Billion Tons)

Alternative Three considers leasing 20 of the 27 delineated tracts in Utah and Colorado (Table 2-3). The southern Utah tracts (Alton Amphitheater, Fisher Canyon, Flax Lakes, Ford Pasture, and Mill Creek Canyon) and the Mud Creek and Blue Trail Canyon tracts in central Utah would not be offered for lease. About 58,610.66 acres with an in-place Federal coal resource of 1,316.2 million tons would be leased. About 528.7 million tons are estimated to be recoverable. BLM and Forest Service administer 40,533.48 surface acres of the lease area while 18,077.18 acres are in non-Federal ownership. All coal on the tracts is owned by the Federal Government with the exception of 40 acres of private surface and State coal on the North Trough Springs tract.

TABLE 2-5
ALTERNATIVE TWO SUMMARY

Number of Tracts:	22			
Total Acres:	<u>72,814.02</u>			
Total In-Place <u>Federal</u> Coal Resource:	1,667.5 million tons			
Total Recoverable Coal Resource:	659.7 million tons			
a. Surface Mining:	12.4 million tons			
b. Underground Mining:	647.3 million tons			
Average Annual Production ^a :	19.01 million tons			
Total Water Requirements: (acre-feet/year)	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Water Required for Mining:	134.0	324.0	445.8	445.8
Water Required for Community Development:	<u>1,298.7</u>	<u>2,341.3</u>	<u>5,806.6</u>	<u>6,963.9</u>
Totals: (acre-feet/year)	<u>1,432.7</u>	<u>2,665.3</u>	<u>6,252.4</u>	<u>7,409.7</u>
Total Acres Disturbed:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Mining Operations ^b :	439.1	1,680.2	1,997.4	2,308.0
Community Development ^c :	<u>428.1</u>	<u>933.9</u>	<u>2,275.4</u>	<u>2,723.4</u>
Totals:	<u>867.2</u>	<u>2,614.1</u>	<u>4,272.8</u>	<u>5,031.4</u>
Employment:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Construction Workers:	529	1,832	-	-
Mining Workers ^d :	<u>-</u>	<u>398</u>	<u>5,561</u>	<u>5,561</u>
Total Workers:	<u>529</u>	<u>2,230</u>	<u>5,561</u>	<u>5,561</u>

a Assumes maximum production for each tract.

b Includes exploration activities, surface facility construction and access, powerline access, loadout facilities, and ventilation construction and access.

c Includes acres retired from irrigation to provide water for community development.

d Includes coal transportation employees.

Coal would be mined underground by room and pillar and/or longwall methods. Twelve new portals and five new coal loadouts would be required. Maximum annual coal production would be 15.16 million tons per year. Approximately 1,373.2 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, portal areas, ventilation shafts, coal storage, required access, and loadout areas. Approximately 49.4 miles of existing access roads would be improved and 147.6 miles of new road construction would be needed in the region. The average number of additional coal haul truck round trips per day would be 1,358 in addition to 303 trips per day by service vehicles.

Approximately 3,971 permanent employees (including truckers) would be needed by 1995 and about 1,428 temporary employees would be needed for construction from 1987 through 1989.

Exploratory drilling would require a total of about 328 acre-feet of water from 1987 through 1989 and the estimated water requirement for mining after 1995 would be 363.1 acre-feet per year. Table 2-6 summarizes the medium level alternative.

Alternative Four: No Action (No Competitive Federal Leasing)

Alternative Four is the No-Action Alternative. If implemented, no Federal coal from the 27 described tracts would be offered for lease in 1984.

Even with no additional leasing, portions of the Uinta-Southwestern Utah Coal Region will continue to be active coal producing areas, particularly central Utah. This anticipated growth and development for central Utah was first analyzed in the Central Utah Coal Development Environmental Statement (ES) prepared in 1979 by Geological Survey (GS). The mid-level annual production rate of 24 million tons by 1990 analyzed in that ES was further considered in the first Uinta-Southwestern Utah Coal Region EIS. Full production from 10 proposed underground mines, for which leases had been issued, added to the 1976 coal production in central Utah, plus a moderate increase in production from existing mines, was analyzed.

GS also analyzed various levels of coal production in southern Utah. This analysis was published in the Development of Coal Resources in Southern Utah ES in 1979.

Consultation with the State of Utah Office of the State Planning Coordinator resulted in a slight downward modification of the baseline production figures discussed above. The Planning Coordinator's Office now projects an annual 21.6 million ton production rate for the State by the year 2000 which is some 4 million tons over Utah's record estimated production of 17.6 million tons in 1982. All of this projected production would come from fee lands and existing State and Federal leases in central Utah and the possible re-offering of some or all of the four tracts offered but not leased in the Uinta-Southwestern Utah Round One leasing effort. No production is projected for southern Utah.

TABLE 2-6
ALTERNATIVE THREE SUMMARY

Number of Tracts:	20			
Total Acres:	<u>58,610.66</u>			
Total In-Place <u>Federal</u> Coal Resource:		1,316.2 million tons		
Total Recoverable Coal Resource:		528.7 million tons		
a. Surface Mining:		0.0 million tons		
b. Underground Mining:		528.7 million tons		
Average Annual Production ^a :		15.16 million tons		
Total Water Requirements: (acre-feet/year)	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Water Required for Mining:	109.3	259.3	363.1	363.1
Water Required for Community Development:	<u>948.1</u>	<u>1,726.5</u>	<u>4,181.6</u>	<u>4,854.6</u>
Totals: (acre-feet/year)	<u>1,057.4</u>	<u>1,985.8</u>	<u>4,544.7</u>	<u>5,217.7</u>
Total Acres Disturbed:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Mining Operations ^b :	255.1	1,313.0	1,350.1	1,373.2
Community Development ^c :	<u>381.7</u>	<u>697.2</u>	<u>1,648.1</u>	<u>1,909.6</u>
Totals:	<u>636.8</u>	<u>2,010.2</u>	<u>2,998.2</u>	<u>3,282.8</u>
Employment:	<u>1987</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Construction Workers:	449	1,428	-	-
Mining Workers ^d :	-	<u>167</u>	<u>3,971</u>	<u>3,971</u>
Total Workers:	<u>449</u>	<u>1,595</u>	<u>3,971</u>	<u>3,971</u>

a Assumes maximum production for each tract.

b Includes exploration activities, surface facility construction and access, powerline access, loadout facilities, and ventilation construction and access.

c Includes acres retired from irrigation to provide water for community development.

d Includes coal transportation employees.

However, if mining development occurs in the Alton area, it would be on existing leases which were analyzed in the Southern Utah Regional EIS (GS, 1979b) and the Allen-Warner Valley EIS (BLM, 1980a).

Baseline assumptions and figures used in this EIS for west-central Colorado were calculated from data obtained from Delta County, State of Colorado, and local coal related industries. This information is available for review at the BLM Colorado State Office and Uncompahgre Resource Area Office in Montrose, Colorado.

The annual production rate considered in this document is subject to change as additional data are obtained and as local and national trends develop. However, to this point, the production rate planned from existing leases and private mines has not been significantly altered.

Mitigating Measures and Monitoring Program

In addition to the laws and regulations which govern land management and coal leasing in general, several additional measures have been identified which would mitigate some anticipated impacts and are listed in Appendix 3. These measures would be made stipulations to leases as applicable. Additional mitigating measures may be made stipulations as a result of further analysis and public review. Measures may also be modified as deemed necessary by appropriate Federal officials. Further details are available for review in a technical report prepared for this EIS by the Uncompahgre Basin Resource Area Office personnel and the individual tract profiles.

Surface Mine Reclamation

Mining plans have not been prepared for proposed surface mining operations analyzed in this statement; therefore, it is assumed that a typical surface mining sequence would occur and that requirements for operating and reclamation plans and mining permits would be met. Figure 2-2 shows a scenario for a potential surface mining operation. Since the surface mines would disturb and reclaim areas in stages, only part of the potential mining area would be disturbed annually. Table 2-7 and Figure 2-3 illustrate the assumed reclamation sequence and maximum area of unreclaimed land at any one period of time.

As shown in Figure 2-2, vegetation would be established on initially disturbed acreage after 3 years. This does not imply that a total return to original vegetation would occur in that time period, but vegetation cover sufficient to retard wind and water erosion of soil would be established. Depending upon the original vegetation type in the area, restoration to original conditions would require a much longer period of time (15 to 20 years or more).

A detailed reclamation plan based on permanent program performance standards for surface mining (30 CFR Chapter VII, Subchapter K) must be submitted and approved by Office of Surface Mining prior to mining activity.

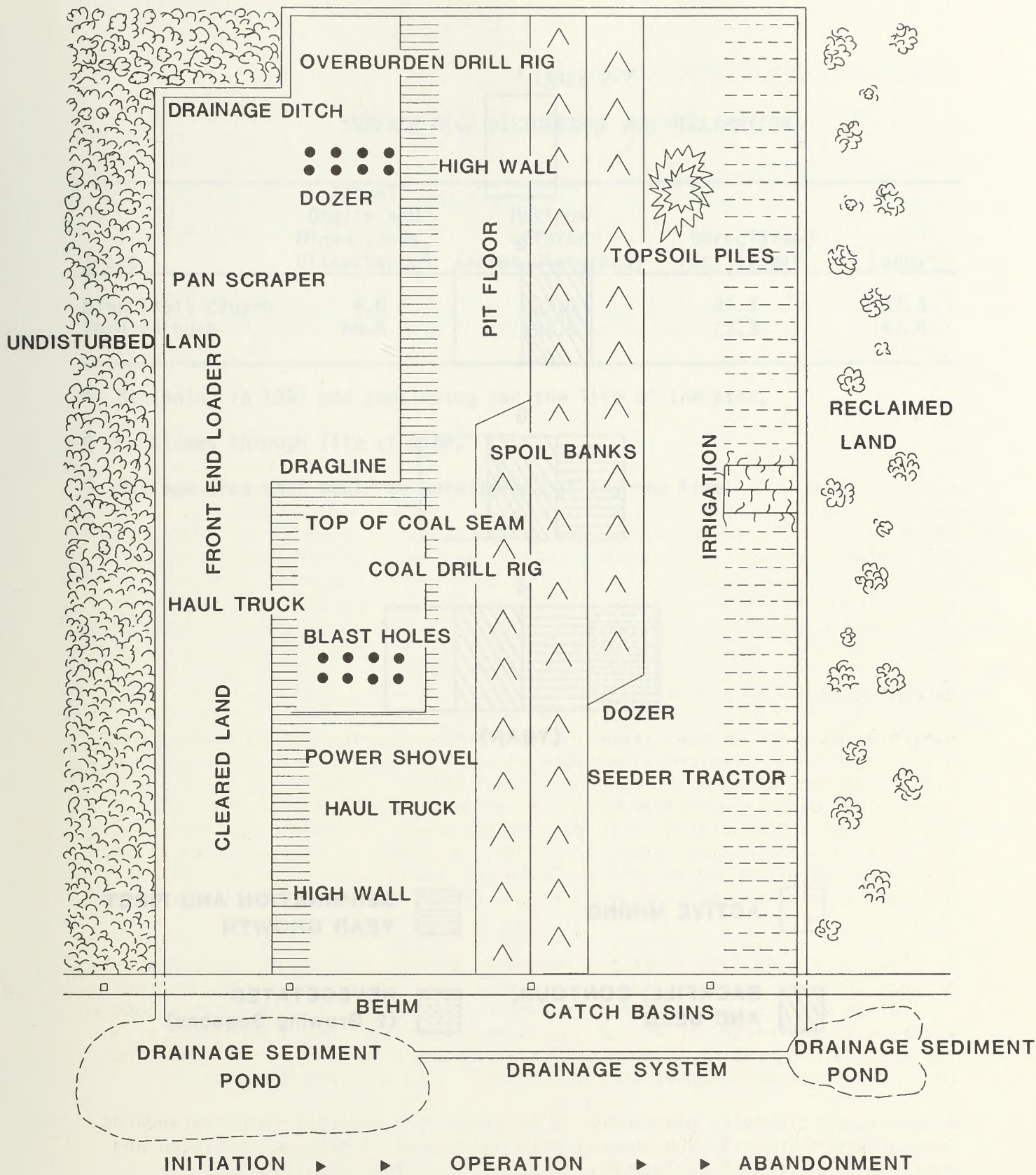
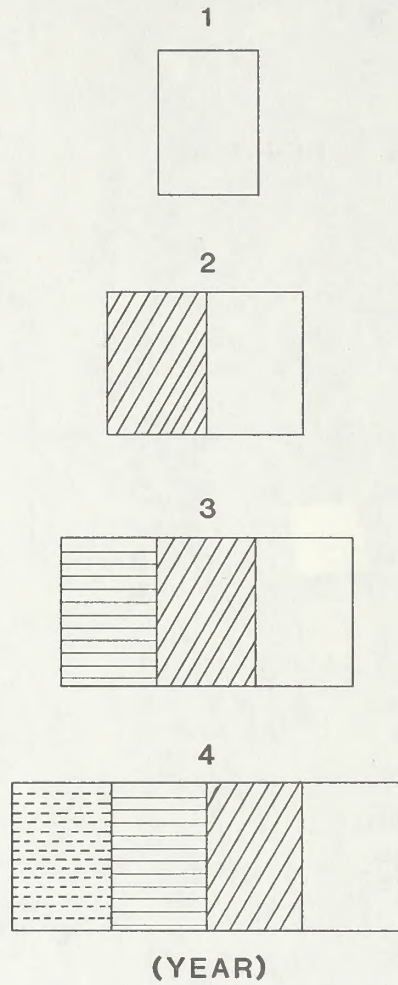


FIGURE 2-2

TIME PHASED SCENARIO OF A POTENTIAL STRIP MINE



ACTIVE MINING



GERMINATION AND FIRST
YEAR GROWTH



BACKFILL, CONTOUR,
AND SEED



REVEGETATED
(2 Growing Seasons)

FIGURE 2-3
RECLAMATION SEQUENCE

TABLE 2-7

SURFACE MINE DISTURBANCE AND RECLAMATION

Tract	Annual Onsite and Mined Lands Disturbance ^a	Maximum Offsite (Acres Disturbed)	Unreclaimed Facilities ^b	Lands ^c
Blue Trail Canyon	4.0	20.0	27.3	47.3
Ford Pasture	56.5	135.5	22.3	157.8

a Beginning in 1987 and continuing for the life of the mine.

b Continues through life of mine.

c Maximum area that would be unreclaimed at any one time.

Comparative Analysis Matrix

A comparative summary of major impacts for Alternatives One through Four is presented in Table 2-8. Alternative Four is the No Action Alternative and no new competitive coal leasing is proposed. The future environment (projected baseline) without the proposed alternatives is analyzed in Chapter Four, Alternative Four. Significant cumulative impacts associated with individual leasing alternatives and the projected baseline are discussed separately for each alternative in Chapter Four.

The analysis shown for Alternatives One, Two, and Three is that anticipated from tract development only and does not include the baseline described under Alternative Four.

TABLE 2-8

COMPARATIVE SUMMARY OF MAJOR IMPACTS

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Climate, Air Quality	<p>Four areas near Price, Castle Dale, Mt. Pleasant, and Alton, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. <u>TSP emissions due to Alternative One would increase by 34 percent over 1981 conditions and 19 percent over the projected baseline.</u> Secondary NAAQS would be exceeded in a 2,845 square mile area by the year 2000, of which 1,275 square miles would be attributed to Alternative One. The greatest impact contribution would come from vehicular traffic on unpaved roads and growth in population centers.</p>	<p><u>Four</u> areas near Price, <u>Castle Dale, Mt. Pleasant</u> and Alton, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. <u>TSP emissions due to Alternative Two would increase 31 percent over 1981 conditions and 17 percent over the projected baseline.</u> Secondary NAAQS would be exceeded in a 2,730 square mile area by the year 2000, of which 1,160 square miles would be attributed to <u>Alternative Two.</u> The greatest impact contribution would come from vehicular traffic on unpaved roads and growth in population centers.</p>	<p>Three areas near Price, Castle Dale, and Mt. Pleasant, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. <u>TSP emissions due to Alternative Three would increase by 26 percent over 1981 conditions and 14 percent over the projected baseline.</u> Secondary NAAQS would be exceeded in a 2,605 square mile area by the year 2000, of which 1,035 square miles would be attributed to Alternative Three. The greatest impact contribution would come from vehicular traffic on unpaved roads and growth in population centers.</p>	<p>Even though no new Federal coal would be developed, the region would continue to be an active coal producing area and the following impacts would be expected.</p> <p>Three areas near Price, Castle Dale, and Mt. Pleasant, Utah, and two areas near Delta and Cedaredge, Colorado, may exceed the primary NAAQS for TSP. Currently, 245 square miles exceed the secondary NAAQS, this would increase to 1,570 square miles by the year 2000.</p>
Soils	<p>Cumulatively, 5,257 acres of surface disturbance would occur by the year 2000. 2,503 acres disturbance would result from mining activi-</p>	<p>Cumulatively, 5,125 acres of surface disturbance would occur by the year 2000. 2,308 acres disturbance would result from mining activi-</p>	<p>Cumulatively, 3,353 acres of surface disturbance would occur by the year 2000. 1,373 acres disturbance would result from mining activi-</p>	<p>Cumulatively, over 5,500 acres of surface disturbance would occur. Over 4,600 acres disturbance would occur in central Utah and</p>

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Soils (continued)	ties and would eventually be reclaimed. 2,754 acres disturbance would result from community development (including retiring irrigated croplands) and would not be reclaimed <u>as agricultural land</u> . An undetermined amount of soil would be lost prior to reclamation.	ties and would eventually be reclaimed. 2,723 acre disturbance would result from community development (including retiring irrigated croplands) and would not be reclaimed <u>as agricultural land</u> . An undetermined amount of soil would be lost prior to reclamation.	ties and would eventually be reclaimed. 1,910 acres would be used for community development (including retiring irrigated croplands) and would not be reclaimed <u>as agricultural land</u> . An undetermined amount of soil would be lost prior to reclamation.	would be attributable to coal mining and related community expansion. The remaining acres disturbed would also be attributable to community growth and would not be reclaimed <u>as agricultural land</u> .
Mineral Resources	732.6 million tons of coal would be recovered by underground and surface mining methods, leaving 1,174.3 million tons (62%) in the ground and unrecoverable by current mining technologies. Annual production would be 20.78 million tons by the year 2000. Conflicts with oil and gas operations could occur in some areas.	659.7 million tons of coal would be recovered by underground and surface mining methods, leaving 1,007.8 million tons (60.4%) in the ground and unrecoverable by current mining technologies. Annual production would be 19.01 million tons by the year 2000. Conflicts with oil and gas operations could occur in some areas.	528.7 million tons of coal would be recovered by underground mining methods, leaving 787.5 million tons (59.8%) in the ground and unrecoverable by current mining technologies. Annual production would be 15.16 million tons by the year 2000. <u>Conflicts with oil and gas operations could occur in some areas</u> . No coal would be developed in southern Utah.	Over 500 million tons of coal would not be mined from existing leases and would be unrecoverable by current mining methods. Coal in seven of the tracts proposed for leasing in this round may also not be mined and could be bypassed by existing operations. No coal mining would occur in southern Utah. 21.6 million tons would be produced annually in central Utah and 1.35 million tons annually in west-central Colorado.
Topography, Geology, Paleontology	Up to 16 feet of subsidence would occur on portions of the <u>81,266</u> acres that would be mined by underground methods. Surface mining would alter topography on 687 acres. Significant plant	Up to 16 feet of subsidence would occur on portions of the <u>72,192</u> acres that would be mined by underground methods. Surface mining would alter topography on 630 acres. Significant plant	Up to 16 feet of subsidence could occur on portions of the <u>58,610</u> acres that would be mined by underground methods. Significant plant fossils could be destroyed by coal mining in the	<u>Up to 70,588 acres could be subject to</u> subsidence of up to 16 feet on areas currently under lease. In central Utah, plant fossils could be destroyed by mining in the Blackhawk Formation.

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1,907 billion tons)	ALTERNATIVE TWO (1,668 billion tons)	ALTERNATIVE THREE (1,316 billion tons)	ALTERNATIVE FOUR (No Action)
Topography, Geology, Paleontology (continued)	fossils could be destroyed by coal mining in the Blackhawk (central Utah) and <u>Dakota Sandstone (southern Utah) Formations.</u>	fossils could be destroyed by coal mining in the Blackhawk (central Utah) and <u>Dakota Sandstone (southern Utah) Formations.</u>	Blackhawk Formation (central Utah).	
Water Resources	Annual water requirements for community development would increase by 7,041 acre-feet annually by the year 2000. An additional 484 acre-feet would be required annually for mine development. Development of certain central Utah tracts would result in an increase in annual sediment flow into local reservoirs and streams used for recreation and community water supply. Subsidence could cause changes in ground and surface water movement. Overall, salinity contribution to the Colorado River would actually decrease.	Annual water requirements for community development would increase by 6,964 acre-feet annually by the year 2000. An additional 446 acre-feet would be required annually for mine development. Development of certain central Utah tracts would result in a slight increase in annual sediment flow into local reservoirs and streams used for recreation and community water supply. Subsidence could cause changes in ground and surface water movement. Overall, salinity contribution to the Colorado River would actually decrease.	Annual water requirements for community development would increase by 4,855 acre-feet annually by the year 2000. An additional 363 acre-feet would be required annually for mine development. Development of certain central Utah tracts would contribute to a slight increase in annual sediment flow into local reservoirs and streams used for recreation and community water supply. Subsidence could cause changes in ground and surface water movement. Overall, salinity contribution to the Colorado River would actually decrease.	Over 9,000 acre-feet of water would be consumed by mining and population growth annually by the year 2000. Of that total, nearly 8,000 acre-feet would be consumed in central Utah. Mining could disrupt local aquifers and cause some redistribution of natural ground water discharge points. Water required to meet population growth or community development would result in the loss of approximately 2,934 acres of irrigated cropland by the year 2000, 2,125 acres of which would be lost in central Utah.
Vegetation	Vegetation production on 2,503 acres would be lost for the life of the mines. Production on an additional 2,754 acres lost to community development would be permanently lost, of which 1,978 acres	Vegetation production on 2,308 acres would be lost for the life of the mines. Production on an additional 2,723 acres lost to community development would be permanently lost, of which 1,956 acres	Vegetation production on 1,373 acres would be lost for the life of the mines. Production on an additional 1,910 acres lost to community development would be permanently lost, of which 1,375 acres	Vegetation production on 5,092 acres would be lost as a result of mining and community growth. Acreage lost to community growth would not be reclaimed. Nearly 2,500 acres lost would be irrigated

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Vegetation (continued)	would be irrigated croplands. This is less than 1% of the total cropland in the region.	would be irrigated croplands. This is less than 1% of the total cropland in the region.	would be irrigated croplands. This is less than 1% of the total cropland in the region.	croplands.
Wildlife	<u>1,923 acres of big game habitat would be lost, an insignificant amount in the region. The loss of 1,978 acres of irrigated croplands would have some significant impacts locally on pheasant and other small game. However, overall populations would not be significantly reduced. Increased pressures on wildlife through harvest, harassment, and displacement would occur contributing to the instability of wildlife populations. Highway related mortality would increase especially for deer.</u>	<u>1,771 acres of big game habitat would be lost, an insignificant amount in the region. The loss of 1,956 acres of irrigated croplands would have some significant impacts locally on pheasant and other small game. However, overall populations would not be significantly reduced. Increased pressures on wildlife, through harvest, harassment, and displacement would occur contributing to the instability of wildlife populations. Highway related mortality would increase especially for deer.</u>	<u>1,018 acres of big game habitat would be lost, an insignificant amount in the region. The loss of 1,375 acres of irrigated croplands would have some significant impacts locally on pheasant and other small game. However, overall populations would not be significantly reduced. Increased pressures on wildlife, through harvest, harassment, and displacement would occur contributing to the instability of wildlife populations. Highway related mortality would increase especially for deer.</u>	<u>Habitat losses on 1,600 acres could reduce the regional deer populations by 260. Another 95 deer would be lost annually from increased highway traffic. The total of 355 deer is less than one percent of the total population. Community expansion and loss of irrigation water could reduce the pheasant population by 1,560 or 10%, a significant loss. The increased population would exert greater pressures on wildlife through harvest, harassment, and displacement. The illegal taking of wildlife could increase by 151%.</u>
Land Use	1,978 acres would be changed from irrigated croplands to community use, 1,232 acres of which would be located in central Utah. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.	1,956 acres would be changed from irrigated croplands to community use, 1,210 acres of which would be located in central Utah. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.	1,375 acres would be changed from irrigated croplands to community use, 1,213 acres of which would be located in central Utah. Grazing could be adversely affected by water loss, increased traffic on stock driveways, and direct loss of grazing lands.	Land use on approximately 2,434 acres would change from agriculture use to community use either by direct community expansion or acres retired to provide water for community growth. An undetermined number of AUM's would be lost as a result of vegetation disturbance.

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Land Use Plans, Controls, and Constraints.	Development of three tracts in central Utah would conflict with Carbon County's zoning ordinances which currently do not allow coal mining on certain portions of the Wasatch Plateau. Tract development in southern Utah could conflict with protection of irrigated croplands and development of water resources provisions of the Kane County Master Plan.	Development of the Castle Valley Ridge tract in central Utah would conflict with Carbon County's zoning ordinances which currently do not allow coal mining on certain portions of the Wasatch Plateau. Tract development in southern Utah could conflict with protection of irrigated croplands and development of water resources provisions of the Kane County Master Plan.	Development of three tracts in central Utah would conflict with Carbon County's zoning ordinances which currently do not allow coal mining on certain portions of the Wasatch Plateau.	No significant conflicts would exist between coal development of existing holding and county zoning in central Utah or west-central Colorado. No coal development is projected for southern Utah.
Socioeconomics	Employment in the region would be increased by 11,237 jobs (20 percent) over the baseline by the year 2000. Population in the region would increase by 23,117 persons (21 percent) by the year 2000. Coal development would bring added revenues into affected counties, however, these counties would experience significant infrastructure impacts. The elements most affected would be housing, education facilities, social services, water and sewer capacities, and law enforcement.	Employment in the region would be increased by 9,577 jobs by the year 2000. This would result in an overall population increase in the region by 22,272. Increased employment would be in additional revenues to the affected counties. The most significant infrastructure impacts would be overcrowding in the county schools and needs for additional housing, social services, water and sewer capacities, and law enforcement.	Employment in the region would be increased by 7,842 jobs (14 percent) by the year 2000. This would result in an additional 19,765 people (14 percent) living in the region by 2000. Increased employment would bring in additional revenues to affected counties. The most significant infrastructure impacts would be overcrowding in the schools and the needs of additional housing, social services, water and sewer capacities, and law enforcement.	A 44 percent population increase in central Utah, 34 percent in southern Utah, and 4 percent in west-central Colorado is projected by the year 2000 over the estimated 1982 population. Much of this growth would be coal related. Wastewater treatment facilities would need to be constructed or upgraded in several communities. Some housing shortages could also be expected. Coal mining would produce jobs and income for local residents and revenues for central Utah and west-central Colorado counties.

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Transportation	More than 20,000 additional vehicles per day (21 percent increase) would be on roads in the region. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 across Soldier Summit. Secondary, unpaved roads would experience an undetermined amount of deterioration. Associated safety and maintenance problems would result.	More than 18,000 additional vehicles per day (19 percent increase) would be on roads in the region. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 across Soldier Summit. Secondary, unpaved roads would experience an undetermined amount of deterioration. Associated safety and maintenance problems would result.	More than 13,000 additional vehicles per day (14 percent increase) would be on roads in the region. Traffic congestion would be acute in Price, Utah. Portions of Highway 10 near Price would be overloaded as well as US-6 across Soldier Summit. Secondary, unpaved roads would experience an undetermined amount of deterioration. Associated safety and maintenance problems would result.	The potential exists for overcrowding on Highway 10 south from Price, Utah, as well as US-6 across Soldier Summit. Price would also experience traffic congestion during rush hours. Secondary, unpaved roads would experience an undetermined amount of deterioration. No traffic related problems are anticipated for southern Utah or west-central Colorado.
Cultural Resources	Some uninventoried sites could be destroyed. Increased vandalism and collecting would occur.	Some uninventoried sites could be destroyed. Increased vandalism and collecting would occur.	Some uninventoried sites could be destroyed. Increased vandalism and collecting would occur.	Some uninventoried sites could be destroyed. Increased vandalism and collecting would occur.
Recreation	Local demand for recreation in the region would increase by approximately 18 percent in central Utah, 71 percent in southern Utah, and an undetermined but slight amount in west-central Colorado. Some developed sites would experience overcrowding and deterioration. Some facilities in towns would be overcrowded.	Local demand for recreation in the region would increase by approximately 17 percent in central Utah, 71 percent in southern Utah, and an undetermined but slight amount in west-central Colorado. Some developed sites would experience overcrowding and deterioration. Some facilities in towns would be overcrowded.	Local demand for recreation in the region would increase by approximately 18 percent in central Utah and an undetermined but slight amount in west-central Colorado. Some developed sites would experience overcrowding and deterioration. Some facilities in towns would be overcrowded. There would be a reduction in hunter	Local demand for recreation would increase by 44 percent in central Utah, 34 percent in southern Utah, and a slight but unquantified percent in west-central Colorado. Some developed sites could experience overcrowding and deterioration. Some facilities in towns would be overcrowded. There would be a reduction in hunter and

CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

TABLE 2-8
(cont'd.)

RESOURCE CATEGORY	ALTERNATIVE ONE (1.907 billion tons)	ALTERNATIVE TWO (1.668 billion tons)	ALTERNATIVE THREE (1.316 billion tons)	ALTERNATIVE FOUR (No Action)
Recreation (continued)	There would be a reduction in hunter and fisherman success. Traffic congestion on recreation roads would occur. Coal development related noise would be noticeable on certain days from the Yovimpa Point area of Bryce Canyon National Park.	There would be a reduction in hunter and fisherman success. Traffic congestion on recreation roads would occur. Coal development related noise would be noticeable on certain days from the Yovimpa Point area of Bryce Canyon National Park.	and fisherman success. Traffic congestion on recreation roads would occur.	fisherman success. Traffic congestion on some recreation roads would occur.
Visual Resources	Development of some tracts would be visible from highly traveled recreation roads. Fugitive dust from the two surface mines would be visible from I-70 and from Bryce Canyon's Yovimpa Point. In certain cases, VRM standards would not be met.	Development of some tracts would be visible from highly traveled recreation roads. Fugitive dust from the two surface mines would be visible from I-70 and from Bryce Canyon's Yovimpa Point. In certain cases, VRM standards would not be met.	Development of some tracts would be visible from highly traveled recreation roads in central Utah. VRM objectives would not be met in some areas.	Coal development would continue to modify the natural landscape in isolated portions of the region. VRM objectives would probably not be met in some areas. However, because development would be localized, the average visitor would probably note little change in the region's overall scenic character.
Special Designation Areas	No direct impacts would occur, however, the large increase in population would result in increased recreation demand in these areas. Some values could be degraded. Land management agencies would be under stress to protect these values.	No direct impacts would occur, however, the large increase in population would result in increased recreation demand in these areas. Some values could be degraded. Land management agencies would be under stress to protect these values.	No direct impacts would occur, however, the large increase in population would result in increased recreation demand in these areas. Some values could be degraded. Land management agencies would be under stress to protect these values.	No direct impacts would occur, however, the expected population increase would result in increased recreation demand in these areas. Some values could be degraded.

CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

Introduction

This chapter describes the existing environment of the Uinta-Southwestern Utah Coal Region that would be affected by implementation of any of the alternative levels of coal leasing described in Chapter 2. The information provided is commensurate with the significance of the anticipated impacts and no attempt has been made to describe all components of the environment in detail. Less important data are summarized, consolidated, or referenced.

Central Utah

Climate, Air Quality

Climate

The central Utah study area is basically semiarid and annually receives almost 70 percent of the total possible sunshine (U.S. Environmental Data Service, 1968). The higher elevations generally experience cooler temperatures and receive adequate moisture while the lower elevations east of the Wasatch Plateau and along the Colorado River are much drier. The precipitation pattern for the region closely follows elevation contours. Highest annual precipitation totals occur at the higher elevations and portions of the Wasatch Plateau receive over 30 inches per year. This contrasts with less than 8 inches observed near the Emery tracts and other areas east of the Wasatch Plateau. The Book Cliffs receive 12 to 16 inches of precipitation annually. Most precipitation on the Wasatch Plateau occurs in the colder months (October to March). The areas east of the plateau experience a peak in monthly precipitation totals during the summer as a result of thunderstorm activity.

Average January Fahrenheit temperatures range from the teens at higher elevations to the high 20s in the valleys. Average July temperatures range from the high 50s in the mountains to the high 70s at lower elevations along the Colorado River. The average frost-free period ranges from less than 60 days at higher elevations to 150 days at lower elevations along the Green and Colorado Rivers.

Air Quality

Air Quality Standards

The national primary and secondary ambient air quality standards (NAAQS) were developed to identify air pollutants of concern and establish maximum ground level concentration limits which are allowable, with an adequate margin of safety, to protect human health (primary standards) and public welfare (secondary standards).

The prevention of significant deterioration of (PSD) air quality regulations have been established to protect air quality in those areas which are presently better than the NAAQS. PSD incremental limitations have been established for sulfur dioxide and total suspended particulates (TSP) and are shown in Table 3-1. All areas to which the PSD regulations apply are classified as Class I, II, or III. Class I allows the least increase in pollutant levels, while Class III allows the greatest increase. Class I areas also are protected against adverse impacts to air quality related values, including visibility, odors, and impacts to flora, fauna, soils, water, geologic, and cultural structures. All areas in central Utah are classified as Class II, with the exceptions of Capitol Reef, Canyonlands, and Arches National Parks, which are Class I areas.

The PSD increments do not apply to any area until a major air quality modification source submits a complete PSD permit application, at which time an air quality baseline is established. After that time, any area impacted by a PSD permitted source with an annual average concentration of 1 microgram per cubic meter or more is subject to the PSD increments. All new sources in the area must be counted toward those increments. At this time, a baseline concentration has been established in only a small portion of Emery County.

The central Utah region is principally rural with light or dispersed industrial activity and existing air quality is generally excellent. TSP at monitoring sites within the region are shown in Table 3-2. With the exception of TSP, concentrations of pollutants are 20 percent or less of the NAAQS.

The 24-hour TSP standard has been exceeded at Price, Castle Dale, and Green River, and the annual secondary standard has been exceeded at Price and Green River. The exceedences resulted from dust raised by travel on unpaved roads and soil particles suspended during windy conditions. Price had been classified as a non-attainment area for TSP, but was granted an exemption under EPA's rural fugitive dust policy. Annual average baseline TSP concentrations throughout central Utah were estimated for 1981 by air quality modeling. The model ISCLT, Cedar Mountain meteorological data, and 1981 emissions data were used. The results are shown in Figure 3-1. The predicted concentrations compare well with measured TSP levels, especially near Price and Castle Dale. The model predicts 1981 TSP levels slightly greater than the secondary annual average NAAQS over a small area in and near Price. The 1977 and 1978 monitoring data in Price also showed exceedences of the secondary annual average NAAQS.

Carbon monoxide, ozone, lead, and hydrocarbons were not monitored in the region. Due to the lack of major industrial sources of these pollutants and the relatively low vehicle population, it is expected that their concentrations are within the NAAQS.

Visibility

Visibility measurements taken at Capitol Reef and Canyonlands National Parks indicate that average visual ranges between 1978 and 1981 were 113 miles at Capitol Reef and 118 miles at Canyonlands. These figures probably represent the maximum for the region.

TABLE 3-1
PREVENTION OF SIGNIFICANT DETERIORATION INCREMENTS

Pollutant	Averaging Time	Maximum Allowable Concentrations Micrograms Per Cubic Meter		
		Class I	Class II	Class III
Sulfur Dioxide	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
Total Suspended Particulates	Annual	5	19	37
	24-hour	10	37	75

TABLE 3-2
CENTRAL UTAH
MEASURED PARTICULATE (TSP) CONCENTRATIONS

Monitoring Location	Year	TSP Concentrations Micrograms Per Cubic Meter		
		Maximum 24-hour Average	Second Maximum 24-hour	Annual Geometric Mean
Castle Dale	1977	265	225 ^a	49
	1978	170	157 ^a	40
	1979	121	120	44
	1980	125	114	38
	1981	312	108	36
Green River	1979	196	169 ^a	64 ^a
	1980	163	154 ^a	53
	1981	196	172 ^a	58
Huntington Canyon	1977	144	140	34
	1978 ^b	93	74	33
Price	1977	406	346 ^a	69 ^a
	1978	303	246 ^a	61 ^a

^a Indicates violation of standard

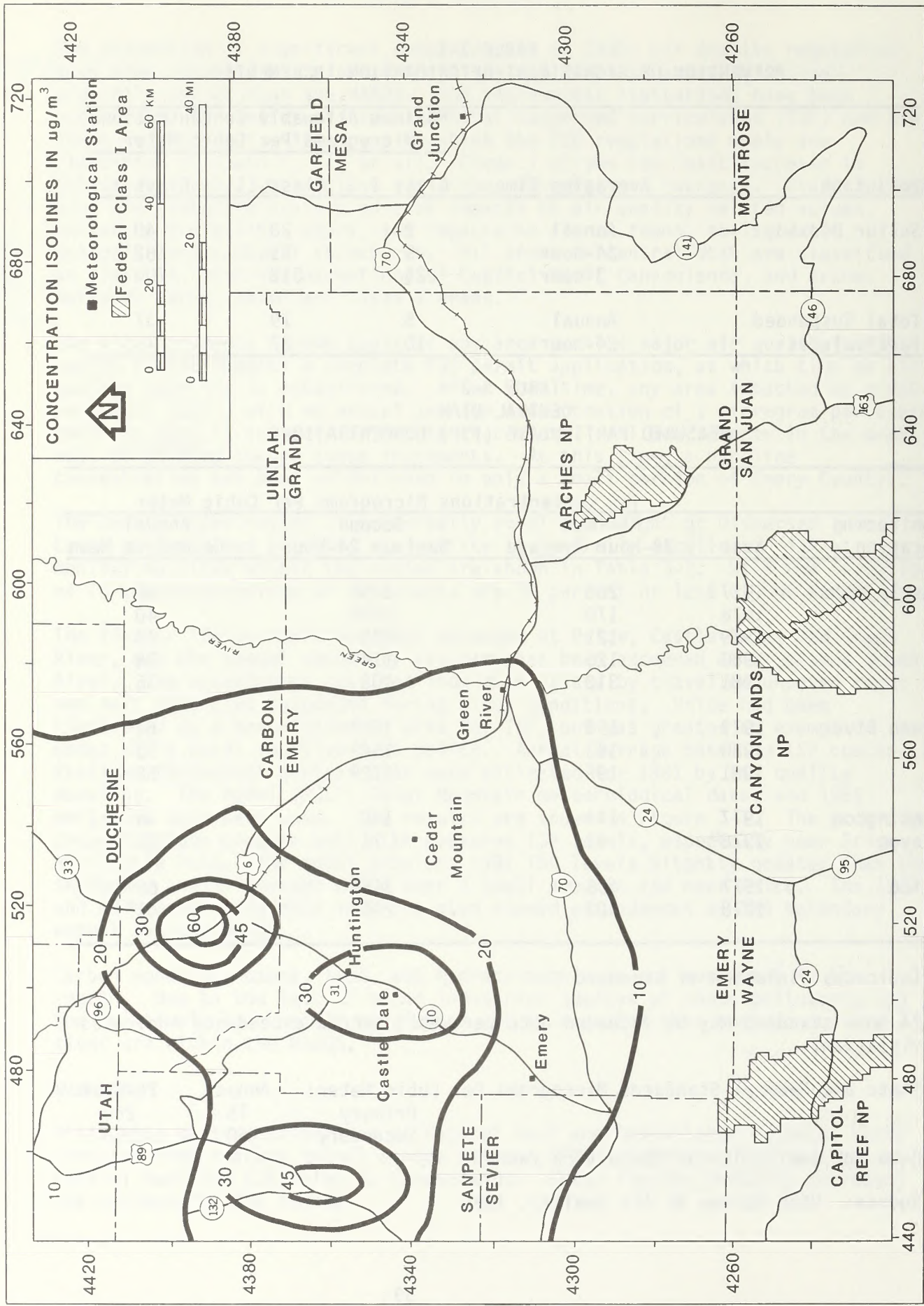
24 hour standard may be exceeded once per year; second exceedence indicates violation.

State and Federal Standards Micrograms Per Cubic Meter:

Annual	24-hour	
Primary	75	260
Secondary	60	150

^b Data not available for the entire year.

Source: Utah Bureau of Air Quality, 1980



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 3-1
ESTIMATED ANNUAL AVERAGE TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 1981

Soils

Special soil management concerns, natural sediment yields, and soil loss tolerance values for soil on the central Utah coal tracts are presented in Tables 3-3 and 3-4. The following narrative addresses soil characteristics and limitations. Reclamation potentials for the soils of central Utah are discussed in the Vegetation section of this chapter.

The potential use of soils along the escarpments and in associated canyons of the Book and Roan Cliffs is limited by steep slopes, rockiness, and low available moisture. Water erosion potential on the steep slopes is high.

Above the Book Cliffs the slopes form gentle to rolling benches. Soils in this area are dominantly dark-colored soils of the mountains and plateaus and are usually somewhat moist during the summer. The water and wind erosion potential is low to moderate.

Soils along the eastern front of the Wasatch Plateau are very rocky, occur on steep slopes, and support very little vegetation. Water erosion potential on these slopes is high. Westward from this erosional escarpment, the elevation increases to 11,000 feet. Typically, soil development and vegetation density increases with elevation to about 9,800 feet. Above that level temperature and growing seasons become limiting to soil development and plant growth. Water erosion potential is moderate to high. Some soils primarily on the North Horn Formation, have a high potential for mass movement and most slopes on this formation are generally unstable. Where other formations are on the surface, occasional instability occurs although most of the slopes are generally stable.

Most soils in the Emery area are well drained, calcareous, loamy or coarse loamy in texture, and range from shallow to deep. Finer textured soils occur on floodplains or valley sideslopes where the parent material is residuum weathered from shale. On some sites, soils have developed from marine shale and are high in soluble salts.

Miscellaneous land types including Badlands also occur in the Emery area. Little soil exists in these areas and most are moderately to severely eroded. Included are areas having excessive slopes (50 to 80 percent) where 50 to 70 percent of the surface is covered by stone.

More than 50 percent of the Blue Trail Canyon tract is comprised of Rockland and Shaley Colluvial soils with limited topsoil, shallow to very shallow plant rooting depths, and high salt content. The erosion hazard potential is high on the majority of soils which comprise the tract. Potentially limiting characteristics identified in overburden samples include nitrogen, potassium, and phosphorous deficiencies, high sodium concentrations, excessive boron and selenium levels, and high arsenic, nickel, pH, and salinity levels.

Minerals Resources

Coal resources and quality on the proposed coal tracts are summarized in Chapter 2. The coal beds of the Book Cliffs field have a moderate to high

TABLE 3-3
CENTRAL UTAH
SPECIAL SOIL MANAGEMENT CONCERNS

Physiographic Area and Coal Tract	Management Concern
Book Cliffs Area	
Graves, Coal Creek, Soldier Creek, Alkali Creek, and Dugout-Pace	On steep slopes (greater than 30 percent) revegetation attempts of disturbed areas have been less than 30 percent successful (BLM, 1982b).
Coal Creek, Alkali Creek and Dugout-Pace	Slight to moderate wind erosion hazard potential exists over portions of tracts (surface of the plateau especially near the crest of the Book Cliffs, 1,679 acres of 4,198 acres). Roads, utility lines, and portal locations would be located on steep rocky slopes (50 percent +); high water erosion hazard and low soil productivity potentials exist on these slopes.
Wasatch Plateau	
North Trough Springs	Portions of North Hughes Canyon drainage in parts of Sections 7, and 17-20, T.14S., R7E., are currently experiencing severe natural water erosion.
Mud Creek	Soil-disturbing activities on the steep escarpments in Mud Creek Canyon drainage cause revegetation and soil stabilization difficulties.
Castle Valley Ridge	Soil disturbing activities on the steep slopes of the northern three-fourths of the tract cause revegetation and soil stabilization difficulties. Sheet erosion, soil creep, gully formation, and slope failures presently occur or exist in that portion of the tract.
Trail Mountain and Ferron Canyon	Portions of roads, utility lines, and portal locations <u>could</u> be on steep (30-60 percent) sideslopes. Most of the tracts are located on the North Horn Formation which is high in shale content and yields highly erodible soils. Soil disturbing activities on these slopes may cause revegetation and soils stabilization difficulties. Portions of the tracts are located on areas that have been mechanically contoured and trenched for watershed erosion control. Erosion and sediment have been substantially controlled in these areas.
Pines and Qultchupah	The potential portal site and access road locations are on steep canyon side-slopes. The soils on these slopes are highly erosive. The soils have a high rock fragment content, are dry, usually hot, and have a relatively low productivity.
Emery Area	
Blue Trail Canyon	Soils on the Blue Trail Canyon tract have a moderate to high wind and water erosion potential and a low revegetation and soil reconstruction potential.

Source: Book Cliffs - Roan Plateau Area - Uinta-Southwestern Utah Coal Region, Site Specific Analyses for Graves, Coal Creek, Soldier Creek, Alkali Creek, and Dugout-Pace Coal Tracts, June 1980. Bureau of Land Management, Moab District, Price River Resource Area.

Wasatch Plateau Area - Uinta-Southwestern Utah Coal Region, Site-Specific Analysis for North Trough, Mud Creek, Castle Valley Ridge, Trail Mountain, Ferron Canyon, Pines and Qultchupah, July 1982. Forest Service, Manti-LaSal and Fishlake National Forests, Price and Richfield, Utah.

TABLE 3-4
CENTRAL UTAH
NATURAL SEDIMENT YIELDS AND SOIL LOSS TOLERANCE VALUES
FOR COAL TRACTS WITH SPECIAL SOIL MANAGEMENT CONCERNS
(Water erosion rates unless otherwise indicated)

Coal Tract Area	Natural Sediment Yield ^a (Tons per acre per year)	Soil Loss Tolerance Values ^b (Tons per acre per year)
Book Cliffs Area	-Slopes in excess of 30% (Exposed soil) = 0.5 to 3.0 ^c	Slopes in excess of 30% = 2 to 5 ^d
	-Plateaus (Rolling benches = 0.5 to 1.0 ^c exposed soil)	Plateau Areas (Rolling benches) = 3 to 5 ^d
Wasatch Plateau Area		
Gooseberry, North Trough Springs, Mud Creek, and Castle Valley Ridge	-Slopes in excess of 25% (Vegetation covered surface) = 0.2 ^e (Exposed soil) = up to 22.0 ^e	Slopes in excess of 25% = 1 to 3 for soils with rooting depth of 10-40 inches ^f = 2 to 5 for soils with rooting depth of 40-50 inches ^f
Trail Mountain, Ferron Canyon, The Pines, and Quitcupah	-Slopes in excess of 25% (Exposed soil) = 20.0+ ^g	Slopes in excess of 25% = 1 to 3 ^f
	-Plateaus (Rolling benches Exposed soil) = 0.5 to 1.0	Plateaus (Rolling benches) = 3 to 5 ⁵
Emery Area		
Blue Trail Canyon	-All Slopes (Water Erosion) = 0.5 to 1.0 ^h (Wind Erosion) = 20.0+	All slopes = 1 to 2

SOURCES:

- ^a Natural Sediment Yield = The amount of soil an area loses every year through natural processes. This is a result of the normal and ongoing processes.
- ^b Soil Loss Tolerance Values = Maximum rate of soil erosion that can occur and still remain a productive soil (1 ton per acre per year is approximately equivalent to 0.0063 inches per year).
- ^c Final Environmental Statement Site-Specific Analysis - Part 2 - Development of Coal Resources in Central Utah, U.S. Department of the Interior, Geological Survey, 1979, p. FD-11-4 (GS, 1979b).
- ^d Personal Communication, Hansen, BLM-Moab, Utah, 1982.
- ^e Final Environmental Statement, Site-Specific Analyses - Part 2 - Development of Coal Resources in Central Utah, U.S. Department of the Interior, Geological Survey, 1979, p. BO-11-3 (GS, 1979b).
- ^f Personal Communication, Iaquina, FS, Manti-LaSal National Forest, Price, Utah, 1982.
- ^g Uinta-Southwestern Utah, Coal Region, Site-Specific Analyses for Trail Mountain, Ferron Canyon, The Pines and Quitcupah Coal Tracts, 1982 (FS/BLM, 1982).
- ^h Reclaimability Analysis of the Emery Coal Field, Emery County, Utah, EMRIA Report 16, Bureau of Land Management, 1979 (BLM, 1979b).

methane content (Doelling et al., 1979). Methane is being extracted in advance of coal mining operations in the Soldier Creek Mine.

There are no Known Geologic Structures (KGS) for oil and gas within the boundaries of the Book Cliffs or Emery coal fields. Five KGSs (Clear Creek, Joe's Valley, Gordon Creek, Ferron, and Flat Canyon) are within the boundaries of the Wasatch coal field. Portions of the North Trough Springs and Mud Creek tracts are within the Clear Creek KGS. Gas is being extracted from the Ferron Sandstone and two producing gas wells, Deck 1A and Walton #1, are adjacent to the North Trough Springs tract. Two producing gas wells south of the Flat Canyon gas field have prompted a request for the drilling of additional wells in the Cottonwood Canyon area northeast of the Trail Mountain tract. Other possible drill sites have been identified. No data are available on the reserves or production potential of oil and gas under any of the proposed lease tracts.

None of the tracts in central Utah are expected to contain significant minerals other than oil, gas, or coal.

Topography, Geology, Paleontology

The Book Cliffs coal field lies slightly east of the central part of Utah in Carbon and Emery Counties adjacent to and east of the Wasatch Plateau coal field (Figure 3-2).

The southern and western edge of the Book Cliffs coal field is a cliff line with relief varying from 1,000 to 2,000 feet. The elevation at the base of the cliffs near Green River is 5,000 feet but increases to 7,000 feet from Soldier Canyon westward. Behind the cliffs are mountains with more gentle slopes and elevations up to 10,285 feet (Bruin Point).

Rock formations of the Book Cliffs coal field range in age from the early most late Cretaceous to the Tertiary. Formations ranging from Cretaceous Mancos Shale to Tertiary Green River Formation outcrop in the Book Cliffs and associated highlands. Each formation is described in the stratigraphic section in Figure 3-3. Colluvial and alluvial deposits have accumulated along the drainages, benches, and gentle slopes. The coal-bearing formation is the Blackhawk. The most important coal seams and zones in ascending order are Spring Canyon, Castlegate, Kenilworth, Gilson, Rock Canyon, and Lower Sunnyside. The first three are important in the Castlegate area, the next two in the Soldier Creek area, and the last in the Sunnyside area (Doelling, 1972).

The Book Cliffs are a gently dipping homocline (3 to 7 degrees), dipping into the Uinta Basin. The cliff line roughly parallels the strike of the beds. Most faulting has occurred in the Sunnyside area where two steeply dipping fault sets occur. One fault set trends north-northwest, the other east-northeast. Within the coal beds the maximum displacement is 200 feet. The faults that occur within the rest of the field are unimportant because displacement is small.

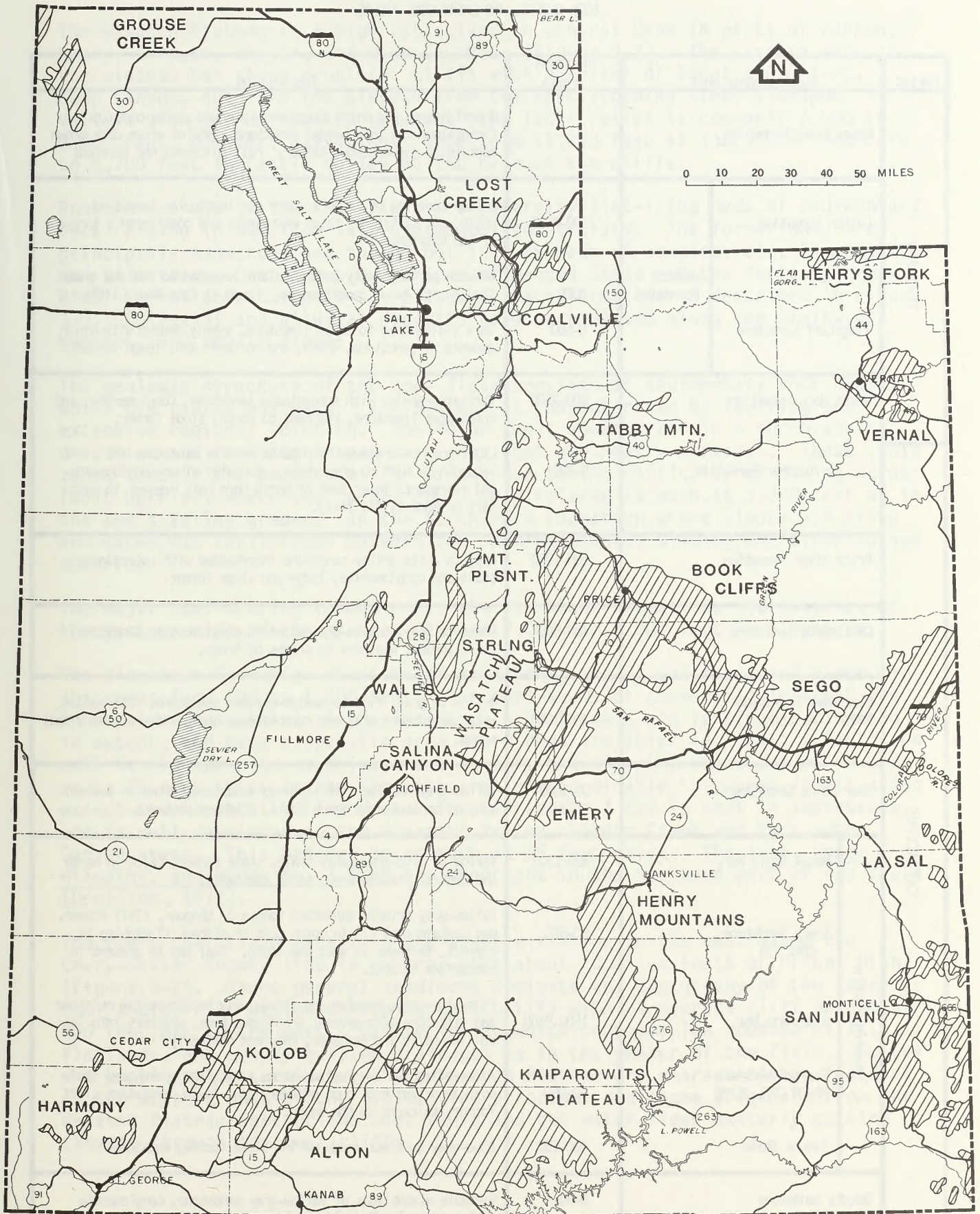


FIGURE 3-2
UTAH COAL FIELDS

FIGURE 3-3

GENERALIZED STRATIGRAPHIC COLUMN OF THE WASATCH PLATEAU,
BOOK CLIFFS, AND EMERY COAL FIELDS

Period	Stratigraphic Unit		Thickness (Feet)	Description	
TERTIARY	Green River Formation		--	Greenish gray and white claystone and shale, also contains finegrained and thin-bedded sandstone. Shales often dark brown containing carbonaceous matter. Full thickness not exposed.	
	Colton Formation	Wasatch Formation	300-2000	Colton consists of brown to dark red lenticular sandstone, shale, and siltstone, thins westwardly and considered a tongue of the Wasatch.	
	Flagstaff Limestone		3000	Wasatch predominantly sandstone and interbedded red and green shales with basal conglomerate. Found in East Book Cliffs.	
			0-500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale, and volcanic ash, ledge former.	
	North Horn Formation		500-2500	Varigated shales with subordinate sandstone, conglomerate, and freshwater limestone, thickens to north, slope former.	
CRETACEOUS	Tuscher Formation		0-200	Light gray to cream-white friable massive sandstone and subordinate buff to gray shale. Contains minor conglomerate and represents lower part of North Horn only present in east part of Book Cliffs field.	
	Price River Formation		600-1000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former.	
	Castlegate Sandstone		150-500	White to gray, coarse-grained often conglomeratic sandstone, cliff former, weathers to shades of brown.	
	Blackhawk Formation MAJOR COAL SEAMS		700-1000	Yellow to gray, fine to medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick coal seams.	
	Star Point Sandstone		90-1000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale, thickens westward.	
	Mancos Shale	Masuk Shale Mbr.		300-1300	Yellow to blue-gray sandy shale, slope former, thick in north and central plateau area, thins southward.
		Emery Sandstone COAL (?)		50-800	Yellow-gray friable sandstone tongue or tongues, cliff former, may contain coal (?) in south part of plateau if mapping is correct, thickens to west and south. Coal may be present in subsurface to west.
		Blue Gate Mbr.		1500-2400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands, thickens northerly.
		Ferron Sandstone MAJOR COAL SEAMS		50-950	Alternating yellow-gray sandstone, sandy shale and gray shale with important coal beds of Emery coal field, resistant cliff former, thickens to the south.
		Tununk Shale		400-650	Blue-gray to black sandy marine slope forming mudstone.
Dakota Sandstone MINOR COAL		0-60	Variable assemblages of yellow-gray sandstone, conglomerate shale and coal. Beds lenticular and discontinuous.		

Modified from Doelling, 1972.

The Wasatch Plateau is a high table land in central Utah in parts of Carbon, Emery, Sanpete, Sevier, and Utah Counties (Figure 3-2). The eastern edge of the plateau has steep erosional cliffs with a relief of about 1,000 feet. Deep canyons cut into the plateau from the east, forming steep V-shaped valleys with narrow summits between. The local relief is commonly 2,000 to 3,000 feet, however, elevations range from 11,283 feet at South Tent Mountain to 5,700 feet in Castle Valley at the base of the cliffs.

Rock formations of the coal field are generally flat-lying beds of sedimentary rock ranging in age from late Cretaceous to Tertiary. The formations, are principally sandstone and shale, but include beds of conglomerate, limestone and siltstone. Cretaceous Formations of Mancos Shale and the Tertiary Green River Formation outcrop in the plateau. Each formation is described in Figure 3-3. Colluvial and alluvial deposits have accumulated along the drainages, benches, and gentle slopes.

The geologic structure of the coal field consists of sedimentary rock beds which dip gently westward. The plateau is characterized by faulting and extensive regional jointing. The major fault zones trend in a north-south direction and faulting occurs on planes that are nearly vertical. These fault zones dictate the boundaries for mining due to the difficulty of mining across fault barriers where coal seams could be displaced as much as 3,000 feet as in the Joe's Valley graben. In the North Horn Formation where slopes are steep and water has infiltrated between the bedding planes, sliding and slumping has occurred

The major coal-bearing formation is the Blackhawk Formation. It outcrops on the eastern side of the plateau between 7,000 and 8,000 feet in elevation.

The Blackhawk Formation consists of sandstone, shale, and coal, and ranges in thickness from 700 to 1,000 feet. The coal seams of commercial interest are in the lower one-third of the formation. Coal seams are lenticular, limited in extent, and have a specific area where beds are thick (at least 4 feet) and well developed. The most important seam is the Hiawatha which occurs in beds up to 28 feet thick in the Hiawatha area and in minable thickness in all areas except the Pleasant Valley area. The Castlegate A bed is next in importance and is well developed in the Pleasant Valley, Gordon Creek and Huntington Canyon areas. This bed can be as much as 19 feet thick. The Ivie, Upper Hiawatha, and Muddy No. 1 beds are important in the southern part of the field (Doelling, 1972).

The Emery coal field parallels the Wasatch Plateau to the east along the Emery-Sevier County line in central Utah about 70 miles south of Price, Utah (Figure 3-2). Three general landforms dominate the topography of the Emery coal field. The westward sloping coal cliffs with an average cliff height of 800 feet are to the east. Castle Valley which contains low rounded hills, flatlands, and deeply gullied drainages is in the center of the field. Buttes and knolls which terminate at the Wasatch Plateau are characteristic features of the western edge of the field. The principal drainages originate from the Wasatch Plateau west of the coal field and the water flows easterly cutting canyons through the coal cliffs.

The only rock formation which outcrops within the coal fields is the Mancos Shale which is represented by the Blue Gate Shale, Ferron Sandstone, and Tununk Shale members. Some Quaternary unconsolidated deposits cover the surface. The beds of the coal field gently dip to the northwest on the western flank of the San Rafael Swell. Each formation member is described in Figure 3-3.

The Joe's Valley-Paradise Fault zone is on the western margin of the field. According to Doelling (1972), the vertical displacement of the faults associated with the zone varies from a few hundred feet to 2,000 feet. Faults east of this zone are few and have small displacement.

The coal-bearing zone in the Emery coal field is the Ferron Sandstone. The coal is shallow enough for surface mining on the Blue Trail Canyon Tract. Of the 14 coal beds contained in this member approximately six coal beds have thicknesses greater than 4 feet. The most important beds are the A, C, and I beds. The C and I beds are located in the northern part of the field, while the A bed is located in the southern part of the field. The beds are lenticular and dip 3 to 5 degrees westward (Doelling, 1972).

Scientifically significant fossils are known to occur in the coal-bearing Blackhawk Formation in central Utah. Some of the plant fossils are used for correlation and paleoenvironmental guides (Parker, 1976). The potential is only moderate for finding mollusc, turtle, crocodile, fish, and dinosaur fossils (personal communication, Robison, FS, 1980). One insect fossil locality is also known and is scientifically significant (personal communication, Jensen, Brigham Young University 1978).

Several localities of scientifically significant fossil vertebrates are also found in the North Horn Formation. Unique dinosaur and other reptilian fossils have been reported by Gilmore (1946) and others. Rare fossilized dinosaur egg shells have been described by Jensen (1966). The mammalian fauna has been described by Gazin (1941) and others. Mammalian fossils of this age are considered significant as they are known only from the Rocky Mountain region of North America and Mongolia. A North American Land Mammal Age (Dragonian) is based on the fossil mammals from the North Horn Formation near North Horn Mountain.

Although some invertebrate fossils are common, the chance of finding significant fossils in the Mancos Shale, Starpoint Sandstone, Castlegate Sandstone, Price River Formation, and Flagstaff Limestone is small. There has been no comprehensive survey of the region for paleontological resources; however, several unrelated studies have been completed. A literature search was conducted to evaluate research completed in this region and identify as far as possible the known fossils and their association with the various formations in the region. The results of this literature search are compiled in a technical report on file at the BLM Utah State Office.

Water Resources

Surface Water

Most of the Acord and the Skumpah tracts are in the Sevier River basin and runoff from those tracts reaches the Sevier River by way of Salina Creek. All the other central Utah tracts are in the Upper Colorado River Basin and runoff from those tracts reaches the Colorado River by way of the Price, San Rafael, and Dirty Devil Rivers. The Dirty Devil empties directly into the Colorado at Lake Powell while the Price and San Rafael empty into the Green River, a major tributary of the Colorado. Each tract is listed in Table 3-5 according to the drainage basin and tributary sub-basins in which it is predominantly located.

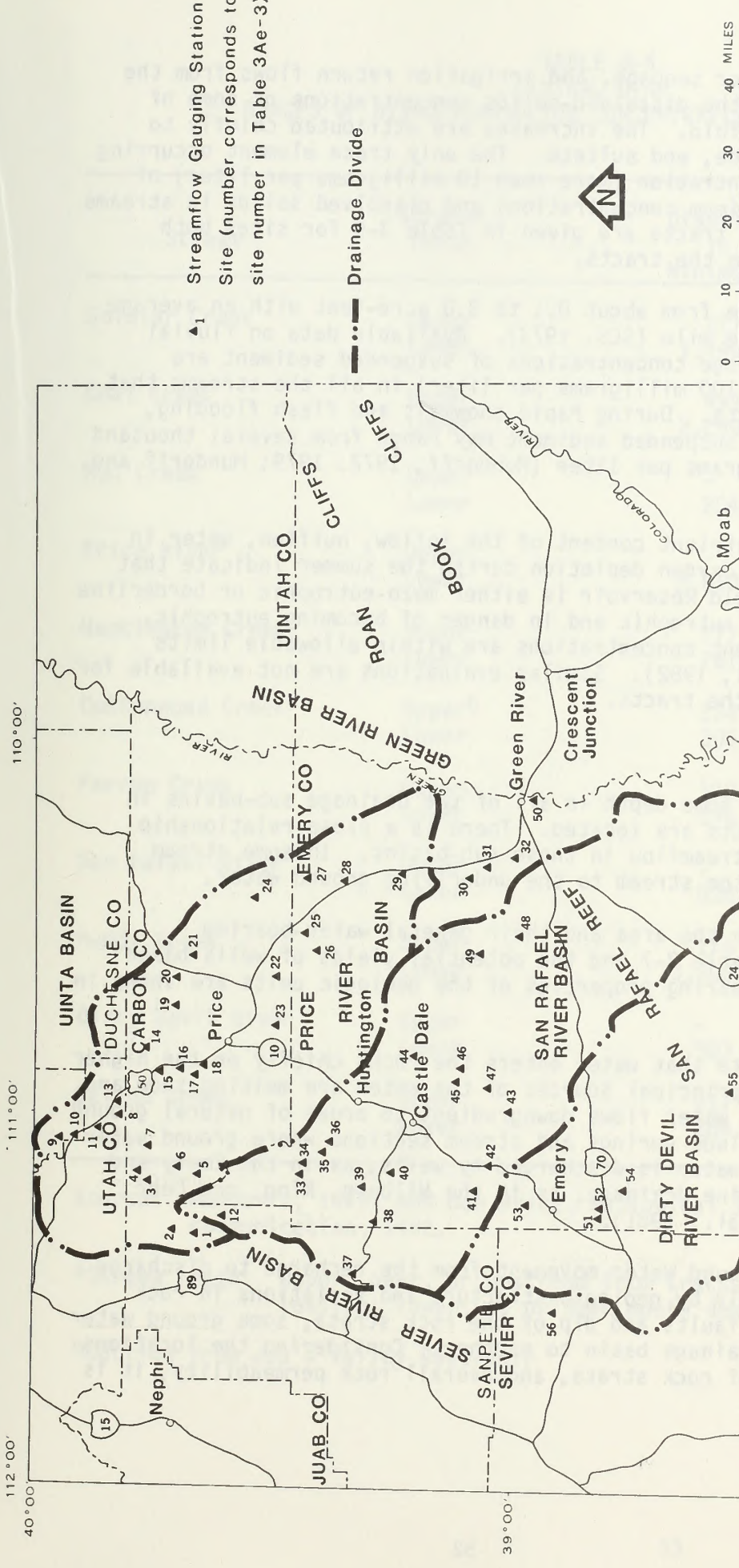
Estimated mean annual runoff from the central Utah tracts ranges from less than 1 inch (less than 50 acre-feet per square mile) in the vicinity of the Walker Flat, Blue Trail Canyon, and Emery tracts to about 18 inches (about 1,000 acre-feet per square mile) in the vicinity of the Gooseberry tract. Most runoff is generated on the highest parts of the Wasatch and Tavaputs Plateaus upstream from the tracts where it is estimated to locally exceed 20 inches (1,060 acre-feet per square mile) (Bagley et al., 1964). The seasonal peak runoff period is generally May through June, chiefly in response to the melting of winter snowpacks. Some runoff is also generated by local torrential summer rainstorms. Flash floods resulting from such storms have been recorded throughout the Price, San Rafael, and Dirty Devil River basins. They have occurred in perennial, intermittent, and ephemeral stream channels, and in some cases have caused considerable property damage (Woolley, 1946; Butler and Marsell, 1972). Flood stages of the affected streams have ranged from several to more than 10 feet higher than the medium-flow stage.

Records of runoff (including annual peak discharges of some streams) have been collected by the Geological Survey at streamflow gauging stations throughout the Price, San Rafael, and Dirty Devil River basins. The gauging sites are shown in Figure 3-4. Principal average annual river basin discharges are 103,600 acre-feet for the Price River (site 18), 96,940 for the San Rafael River (sites 46 and 47), 16,820 for the Dirty Devil River (site 55), and 162,300 acre-feet for the Sevier River (site 58). Runoff data from the area of the central Utah tracts indicate that surface waters range from fresh to slightly saline. Dissolved-solids concentrations in the headwaters of the Price, San Rafael, and Dirty Devil Rivers are commonly less than 250 milligrams per liter during both high and low flow periods. The concentrations of the individual dissolved constituents are generally well within maximum allowable limits for drinking water as stated in the Utah Water Quality Standards (Utah Division of Health, 1978). However, in some samples some constituents have exceeded the Utah State water quality standards. Within the Wasatch Plateau, Clyde et al., (1981) detected excessive mercury in both surface and groundwater. Some water samples collected from streams on the Manti-LaSal National Forest have contained mercury concentrations that exceed water quality standards. Dissolved-solids concentrations of runoff generally increase downstream. This increase is most pronounced downstream of the proposed tracts where the streams emerge from the Wasatch and Tavaputs Plateaus and flow into the salt- and gypsum-bearing Mancos Shale. Natural

TABLE 3-5
CENTRAL UTAH
DRAINAGE BASINS AND TRIBUTARY SUB-BASINS

River Basin Tract	Principal Tributary Sub-basin	Principal Use of Streamflow
<u>Sevier River Basin</u>		
Sevier		
Skumpah	Salina Creek	Irrigation
Acord	Salina Creek	Irrigation
<u>Upper Colorado River Basin</u>		
Price		
Dugout-Pace Graves Hoffman Creek	Dugout Creek	Irrigation
Whitmore Park	Soldier Creek	Irrigation
Soldier Creek	Soldier Creek	Irrigation
Alkali Creek	Coal Creek	Irrigation
Coal Creek	Coal Creek	Irrigation
Mud Creek	Mud Creek Price River	Irrigation, municipal, industry, recreation
San Rafael		
Gooseberry	Huntington Creek Price River	Irrigation, industry, recreation, municipal
North Trough Springs	Huntington Creek	Irrigation, industry, recreation, municipal
Castle Valley Ridge	<u>Price River</u>	Irrigation, industry, recreation, municipal
Trail Mountain	Cottonwood Creek	Irrigation, municipal, industry, recreation
Ferron Canyon	Ferron Creek	Irrigation, municipal, industry, recreation
Dirty Devil		
The Pines	Muddy Creek	Irrigation, municipal
Quitcupah	Muddy Creek	Irrigation, municipal
Ivie	Muddy Creek	Irrigation
Walker Flat	Muddy Creek	Irrigation
Blue Trail Canyon	Muddy Creek	Irrigation

Source: GS Sub-basin Maps



(Base from U.S.G.S., 1969)

FIGURE 3-4
 U.S. GEOLOGICAL SURVEY GAUGING STATION SITES

overland runoff, ground-water seepage, and irrigation return flows from the Mancos to streams increase the dissolved-solids concentrations of some of those streams more than tenfold. The increases are attributed chiefly to increases in sodium, chloride, and sulfate. The only trace element occurring is an unusually large concentration (more than 10 milligrams per liter) of strontium. Maximum and minimum concentrations and dissolved solids in streams that drain the central Utah tracts are given in Table 3-6 for sites both upstream and downstream from the tracts.

Annual sediment yields range from about 0.1 to 3.0 acre-feet with an average of 0.75 acre-foot per square mile (SCS, 1973). Available data on fluvial sediment indicate that average concentrations of suspended sediment are generally small (less than 100 milligrams per liter) in all the streams that drain the central Utah tracts. During rapid snowmelt and flash flooding, however, concentrations of suspended sediment may range from several thousand to more than 100,000 milligrams per liter (Mundorff, 1972, 1979; Mundorff and Thompson, 1982).

Evaluations based on the nutrient content of the inflow, outflow, water in storage, and the dissolved oxygen depletion during the summer indicate that the trophic level of Scofield Reservoir is either mezo-eutrophic or borderline between mezo-eutrophic and eutrophic and in danger of becoming eutrophic. Heavy metal and trace element concentrations are within allowable limits recommended by EPA (Waddell, 1982). Similar evaluations are not available for the other reservoirs near the tracts.

Ground Water

Ground water is present at some depth in all of the drainage sub-basins in which the central Utah tracts are located. There is a close relationship between ground water and streamflow in those sub-basins. In some stream sections water seeps from the stream to the underlying ground water.

Principal geologic units in the area and their general water-bearing properties are listed in Table 3-7 and the potential yields of wells based largely on general water-bearing properties of the geologic units are shown in Figure 3-5.

Available data also indicate that water enters the rocks chiefly on the higher well-wetted plateaus; the principal sources of the water are melting snow and seeping from streams. The water flows downgradient to areas of natural ground water discharge, which include springs and stream sections where ground water joins surface flow. Some water is discharged by wells, as in the Emery and Salina areas and some by mine drainage, as in the Wilberg, King, and Deer Creek Mines (Danielson et al., 1981).

Directions and rates of ground water movement from the recharge to discharge areas are controlled largely by geologic structure and variations in rock permeability. Because of faults and dip of the rock strata, some ground water passes from one surface drainage basin to another. Considering the locations of faults the gentle dip of rock strata, and overall rock permeability, it is

TABLE 3-6
CENTRAL UTAH
RANGES OF DISSOLVED-SOLIDS CONCENTRATIONS OF STREAMFLOW

Stream	Stream ^a reach	Dissolved-solids concentration, in milligrams per liter	
		Minimum	Maximum
Soldier Creek	Upper	277	696
	Lower	1,440	6,050
Coal Creek	Upper	499	625
	Lower	2,260	3,270
Mud Creek	Upper	-	-
	Lower	204	304
Price River	Upper	-	-
	Lower	2,610	6,270
Huntington Creek	Upper	177	193
	Lower	761	5,540
Cottonwood Creek	Upper ^b	224	226
	Lower	305	4,650
Ferron Creek	Upper	188	492
	Lower	574	9,630
San Rafael River	Upper	-	-
	Lower	526	6,030
Muddy Creek	Upper	175	409
	Lower	3,200	8,100
Dirty Devil River	Upper	-	-
	Lower	963	3,460
Salina Creek	Upper	217	447
	Lower	285	9,360

Source: Mundorff, 1979, and Don Price, Geological Survey, written communication, 1982.

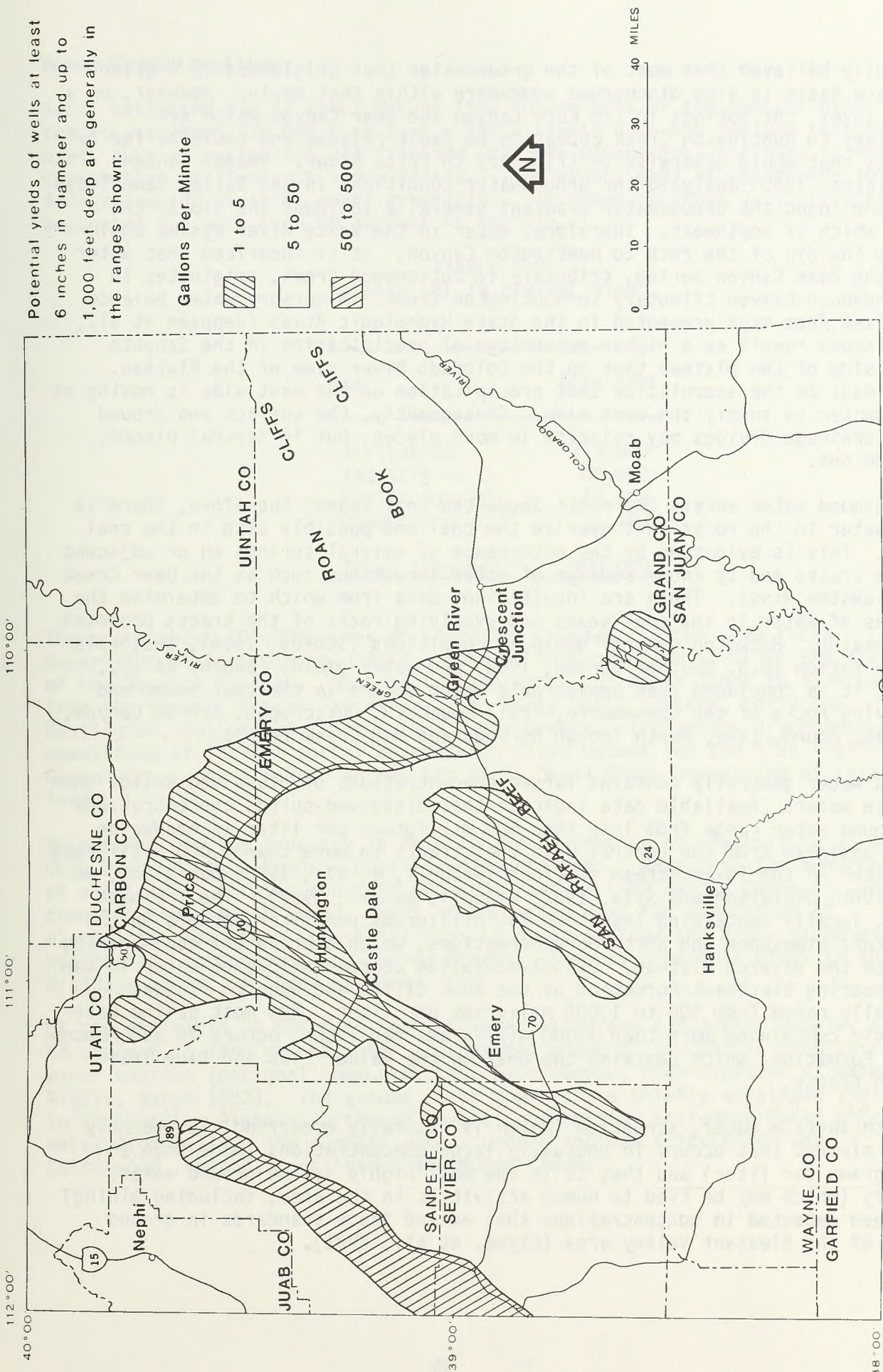
^aStream reach: Upper, near, or upstream from tracts proposed for leasing; lower, at or near mouth downstream from tracts.

^bOutflow from Joe's Valley Reservoir

TABLE 3-7
CENTRAL UTAH
GENERAL WATER-BEARING PROPERTIES OF PRINCIPAL GEOLOGIC UNITS

Formation	Lithology and Water-Bearing Characteristics
Holocene and Pleistocene Formations	Alluvium and colluvium; clay, silt, sand, gravel, and boulders; yields water to springs that may cease to flow in late summer.
Flagstaff Limestone	Dark yellow gray-to-creme, dense, cherty, lacustrine limestone with some interbedded thin gray and green-gray shale; light-red or pink calcareous siltstone at base in some places; yields water to springs in upland areas.
North Horn Formation	Variegated shale and mudstone with interbeds of tan-to-gray sandstone; all of fluvial and lacustrine origin; yields water to springs.
Price River Formation	Gray-to-brown, fine-to-coarse, and conglomeratic fluvial sandstone with thin beds of gray shale; yields water to springs locally.
Castlegate Sandstone	Tan-to-brown fluvial sandstone and conglomerate; forms cliffs in most exposures; yields water to springs locally.
Blackhawk Formation	Yellow-to-gray discontinuous sandstone and gray carbonaceous shales with coal beds; all of marginal marine and paludal origin; locally scour-and-fill deposits of fluvial sandstone within less permeable sediments; yields water to springs and coal mines, mainly where fractured or jointed.
Star Point Sandstone	Yellow-to-gray, white, massive, and thin-bedded sandstone, grading downward from a massive cliff-forming unit at the top to thin interbedded sandstone and shale at the base; all of marginal marine and marine origin; yields water to springs and mines where fractured and jointed.
Masuk Member Mancos Shale	Yellow-to-blue-gray marine shale with thin, discontinuous layers of gray limestone and sandstone; yields water to springs locally.

Source: Danielson et al., 1982



(Base from U.S.G.S., 1969)

FIGURE 3-5
POTENTIAL YIELDS OF INDIVIDUAL WELLS

generally believed that most of the groundwater that originates in a given drainage basin is also discharged somewhere within that basin. However, on a local level, the springs in Tie Fork Canyon and Bear Canyon which are tributary to Huntington Creek appear to be fault related and could be fed by sources that would otherwise be tributary to Price River. Vaughn Hansen Associates (1980) analyzed the groundwater conditions in the Valley Camp lease area and found the groundwater gradient generally followed the dip of the rock, which is southwest. Therefore, water in the Price River system could follow the dip of the rock to Huntington Canyon. It is theorized that water from the Roan Canyon Spring, tributary to Cottonwood Creek, originates in Meetinghouse Canyon tributary to Huntington Creek. A cursory water balance localized from maps presented in the State Hydrologic Atlas (Jeppsen et al., 1981) shows runoff as a higher percentage of precipitation in the Sanpete River side of the plateau than on the Colorado River side of the Plateau. This leads to the speculation that precipitation on the east side is moving as groundwater to supply the west side. Consequently, the surface and ground water drainage divides may coincide in most places, but in several places, they do not.

Most ground water enters the rocks above the coal seams; therefore, there is some water in the rocks that overlie the coal and possibly also in the coal seams. This is evidenced by the occurrence of several springs on or adjacent to the tracts and by known seepage of water into mines such as the Deer Creek and Hiawatha Mines. There are insufficient data from which to determine the volumes of water in the coal seams and overlying rocks of the tracts proposed for leasing. Based on general geologic conditions (Stokes, 1964), available precipitation (U.S. Weather Bureau, 1963) and water yields (Bagley et al., 1964), it is concluded that appreciable water occurs in the coal seams and overlying rocks of the Gooseberry, Trail Mountain, Quitchupah, Ferron Canyon, Skumpah, Acord, Ivie, North Trough Springs and Mud Creek tracts.

Ground water generally contains larger concentrations of dissolved solids than surface water. Available data indicate that dissolved-solids concentrations of ground water range from less than 500 milligrams per liter in headwater areas upstream from the central Utah coal tracts to more than 3,000 milligrams per liter in the lower stream sections (Waddell, et al., 1978; Danielson, et al., 1981; Danielson and Syla, 1982; Waddell, et al., 1982). The freshest water, locally containing less than 250 milligrams per liter, occurs in the Flagstaff Limestone and North Horn Formations, which overlie the coal-bearing beds on the Wasatch Plateau. Dissolved-solids concentrations of water in the coal-bearing Blackhawk Formation of the Book Cliffs and Wasatch Plateau generally range from 500 to 1,000 milligrams per liter. The most saline water, commonly containing more than 3,000 milligrams per liter, occurs in the Mancos Shale Formation, which contains the coal on the Walker Flat and Blue Trail Canyon tracts.

As with surface water, strontium (which is naturally occurring) is the only trace element that occurs in unusually large concentrations (more than 10 milligrams per liter) and that is in the most highly saline ground water. Mercury (which may be tied to human activities in the area, including mining) has been detected in concentrations that exceed State standards in ground water of the Pleasant Valley area (Clyde, et al., 1981).

Water Supply and Use

Total estimated use of water during 1980 in the area of the central Utah tracts was about 390,000 acre-feet. The estimate does not include instream uses, such as recreation and fish and wildlife management, nor does it include consumption by livestock and wildlife. The largest uses of water were for irrigation and electric power generation. As shown in Table 3-8, irrigation accounted for more than 80 percent of the use.

TABLE 3-8
WATER USE IN CENTRAL UTAH

Use	Acre-feet
Irrigation	315,000
Industry	62,000
Public Supply	12,600
Domestic	100
<u>Total (rounded)</u>	<u>390,000</u>

There are about 105,000 acres of irrigated cropland in the area (Utah Department of Agriculture, 1981). Most of that cropland is along the flanks of the Wasatch Plateau. Most irrigation water for these lands is diverted from the Sevier, Price, San Rafael, and Dirty Devil systems, including Huntington, Cottonwood, Ferron, and Muddy Creeks. Irrigation diversions are downstream of logical portal development sites except for the Blue Trail Canyon tract where runoff enters the Dirty Devil River downstream of irrigated lands.

Withdrawal use for industry is chiefly for generation of electricity at three Utah Power & Light Company coal-fired powerplants. Water use for generation of electricity totaled about 62,000 acre-feet in 1980 (Wayne Campbell, oral communication, March 1982). Most of the water used for generation of electricity and other industrial uses is diverted from the Price River and Huntington, Cottonwood, and Ferron Creeks. Some is from coal mines in the drainage basins of these streams.

Of the estimated 12,600 acre-feet of water withdrawn for public supply, about 63 percent is from ground water sources and about 37 percent is from surface water sources (personal communication, Dave Hooper, Utah Division of Water Rights, March 1982). The ground water sources are chiefly developed springs in the Wasatch Plateau, although several communities including Emery obtain water from wells. The surface water sources include Price River and Cottonwood, Ferron, Huntington, and Muddy Creeks.

Water Rights

The Utah State Engineer is responsible for the administration of all water rights within the State and for determining if proposed water right applications can be approved. The coal fields lay within State Basin 91, the Price River drainage; State Basin 93, the San Rafael River; and State Basin 95, Muddy Creek. There are essentially no unappropriated waters in basins 91, 93, and 95. All three basins are in the process of adjudication. Based on an estimated 6.3 million acre-feet per year available in the upper basin, Utah's annual share of Colorado River water is estimated to be about 1,438,000 acre-feet.

Vegetation

Vegetation Types

Vegetation varies considerably over the region, ranging from low desert shrubs to conifer stands and mountain meadows. Change in elevation, with associated moisture and temperature changes, is a major factor in the distribution of vegetation types. Topography, aspect, soils, and past and present land use are also important factors that have affected plant distribution.

Eleven major vegetation types are found within the region including: Agricultural, Riparian, Grassland, Desert Shrub, Sagebrush Grass, Pinyon-Juniper Woodland, Mountain Brush, Ponderosa Pine, Aspen, Conifer-Aspen, and other. A list of common species found in each vegetation type is in Appendix 4. The distribution of these general vegetation types in central Utah is shown in Figure 3-6.

Dominant vegetation types on the Wasatch Plateau and Book Cliffs tracts include Sagebrush-Grass, Ponderosa Pine, Mountain Brush, Pinyon-Juniper Woodland, Aspen, and Conifer-Aspen. The Riparian type, including cottonwood and willow trees, is found along perennial streams, as is the Mountain Brush type which is often interspersed with other types. The Book Cliffs and Wasatch Plateau areas also contains stands of Douglas fir which are too small to be shown on the vegetation distribution map. Little or no Douglas fir reproduction is occurring on these stands.

On the Emery coal field the shallow, saline soils and sparse precipitation have resulted in a plant distribution pattern made up of species adapted to this harsh environment. The dominant vegetation types in this area are Desert Shrub, Pinyon-Juniper Woodland, and Grassland. The Riparian type along perennial streams in the area includes greasewood, saltcedar, and saltgrass. A list of plant species in the Emery coal field is included in Energy Minerals Rehabilitation, Inventory and Analysis Report (EMRIA) No. 16 (BLM, 1979b). The EMRIA study indicates the following vegetation production in pounds per acre: Pinyon-Juniper 1,000, Riparian 2,000, Desert Shrub 525, and Grassland 245. Nonproductive areas such as cliffs, rocky outcrops, talus slopes, and Blue Gate Shale are also present in the Emery area.

VEGETATION TYPES

1. Non-productive
2. Agricultural
3. Riparian
4. Grassland
5. Desert Shrub
6. Sagebrush-Grass
7. Pinyon-Juniper Woodland
8. Mountain Brush
9. Ponderosa Pine
10. Aspen
11. Conifer-Aspen



**FIGURE 3-6
CENTRAL UTAH VEGETATION TYPES**

The acreage of agricultural lands associated with communities in the region, has been reduced by urban development, change of water use, and powerplant development in Emery County. These lands include some natural meadows (pastures) and irrigated croplands. The most common crops are alfalfa and small grains.

Threatened or Endangered Plants

Surveys in central Utah (Welsh, 1977; Welsh and Neese, 1980) have identified the presence of the candidate endangered species Townsendia aprica near the Blue Trail Canyon tract in the southern portion of the Emery coal field. The candidate species Hymenoxys helenioides has been located near the Castle Valley Ridge tract on the Wasatch Plateau (Castle Valley Ridge Tract Profile, FS, 1981). A second candidate species Hedysarum occidentale var. canone occurs along the escarpment near the east boundary of the Trail Mountain tract (Trail Mountain Tract Profile, FS, 1981). This species has also been located in the Book Cliffs near the Whitmore Park, Alkali Creek, and Dugout-Pace tracts (Welsh, Brigham Young University, 1982, personal communication). The Fish and Wildlife Service defines a candidate threatened or endangered species as one named in a status review announcement in the Federal Register and expected to be proposed for official listing in the near future.

No other officially listed or candidate threatened or endangered species are known to exist on or near any of the 20 proposed coal leasing tracts in the central Utah area discussed in this EIS. Rare or sensitive plant species not yet listed or considered candidates (by the above definition) also exist in the area. A list of these species is found in the Utah Native Plant Society List (1981).

Reclamation Potential

Successful reclamation potential for disturbed areas on the Book Cliffs coal field is expected to be fair to good. Annual moisture is about 16 inches. Soils are moderately deep to very deep. On steep slopes (greater than 30 percent) revegetation attempts would be 30 percent effective while on less steep slopes, 50 to 70 percent of revegetation attempts would be successful (Hagihara, et al., 1972).

The reclamation potential for disturbed areas on the Wasatch Plateau coal field is good. Soil moisture and temperature conditions are conducive to revegetation over most of the area with the exception of cold soils at high elevations and on some hot and dry southerly aspects. Average annual precipitation is 25.0 inches and good spring moisture is available (average 3.0 inches precipitation in March). Soils are shallow to deep, loamy-fine, with a rich organic surface layer; however, disturbance on 25 to 33-percent slopes and the presence of rocky inclusions would require special consideration during reclamation. Soil reconstruction potential for revegetation is fair to good (National Soils Handbook), and it is predicted that 50 to 80 percent of seeding attempts would be successful (Hagihara, et al., 1972). However, most disturbance associated with coal development would occur off the plateau in side canyons and on slopes where reclamation potential is not as good as on top of the Plateau.

Because of the lack of topsoil, nutrient deficient toxic overburden on some sites, and limited annual precipitation (6 to 8 inches) the reclamation potential for disturbed areas in the Emery coal field would be limited in parts of the area. Several authors question the success of reclamation on areas of less than 12 inches annual precipitation (Aldon and Springfield, 1975; Bleak, et al., 1965; Hagihara, et al., 1972). However, recent research on reclamation in arid environments shows that with intensive efforts success is possible (Thames, 1977; Vories, 1976; Frischknecht and Ferguson, 1980).

Wildlife

Introduction

A large variety of wildlife characteristic of life zones ranging from Lower Sonoran to Canadian are found in the region. A complete list of wildlife species that may be found in the region has been prepared by Utah Division of Wildlife Resources (UWDR) (Dalton et al., 1977). It includes approximately 90 species of mammals, 270 species of birds, 26 species of reptiles, 9 species of amphibians, and 25 species of fish.

Terrestrial

The distribution of game species in relation to elevation and vegetation types is presented in Figure 3-7.

Deer populations have been low, probably due to past deer harvest practices and severe winters. Recently fawn production has improved and an overall moderate population increase has been noted (UWDR, 1981). The available summer habitat could support more deer but competition with elk and livestock, encroachment by energy development, and urbanization on critical winter ranges has limited herd expansion. The locations of deer herd units and distribution of winter ranges are shown in Figure 3-8. The proposed coal tracts are located in deer herd units 32, 33, 34, 35, 36, 37, 44, and 45. The ranges within these herd units have the potential to support approximately 48,500 deer (UWDR, 1980). These units supported a hunter harvest of 3,400 bucks in 1979 and 4,863 in 1981. This represents an increase of 41 percent over three harvest seasons, or an average annual increase of 13.6 percent.

In the period from July 1, 1980, to June 30, 1981, a total of 292 deer were killed in the region by vehicles (UDWR, 1981a). The magnitude of this loss is compounded by the fact that 51.8 percent of the total reported casualties were mature does. A 33-mile stretch of I-70 from Fremont Junction to Salina is averaging 107 deer traffic mortalities annually with a high of 317 in 1978-79, a heavy snow year.

The region includes three elk herd units, Manti (12), Avantaquin (22), and Fishlake (11). The location of these herd units and distribution of other big game species (except deer) are shown in Figure 3-9. The units total 3,866 square miles, and include some of the most productive elk habitat in the State. Elk summer range is the Aspen and Conifer-Aspen type located at the higher elevations of the Wasatch Plateau and Book Cliffs. In the winter elk

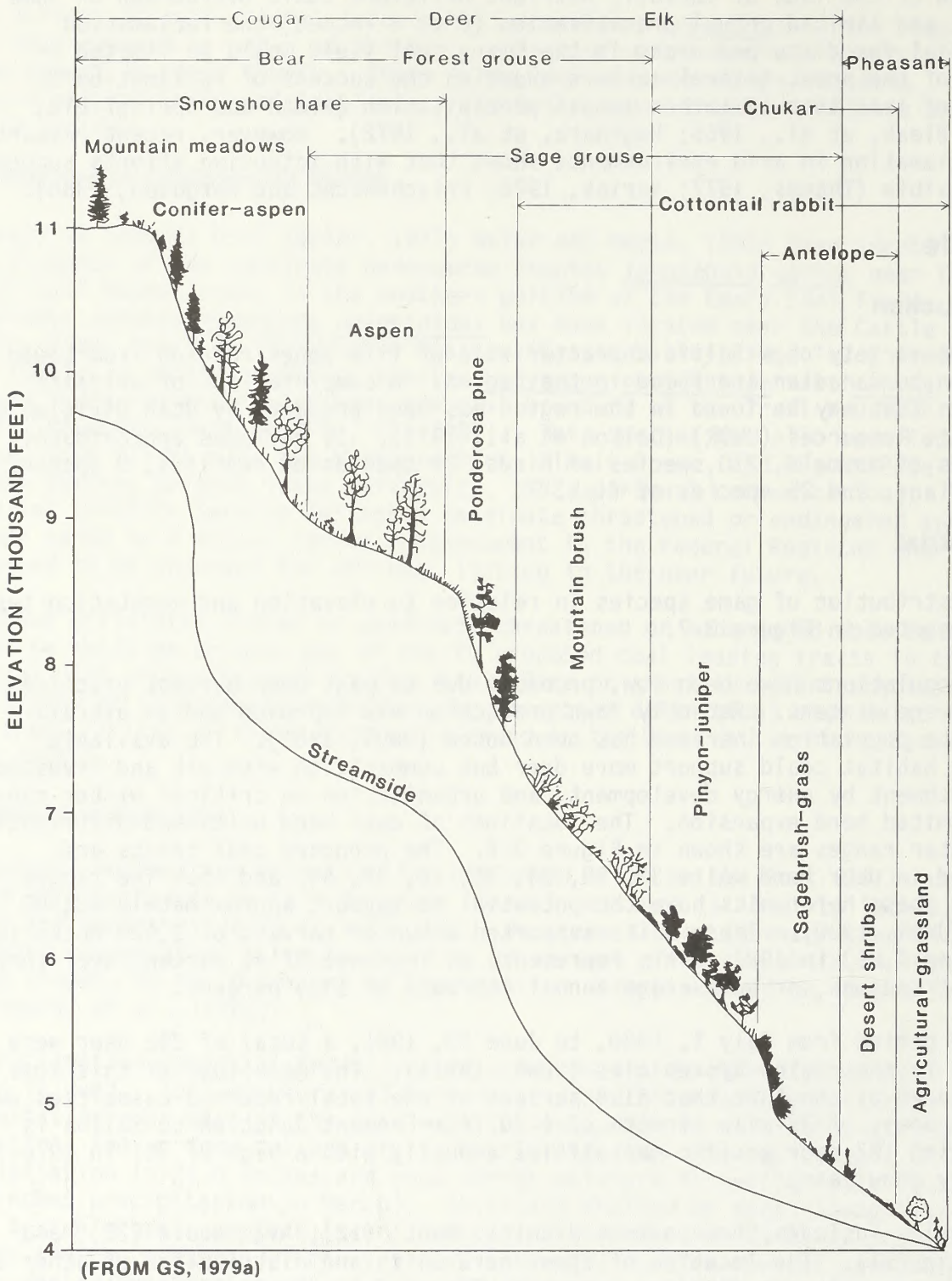
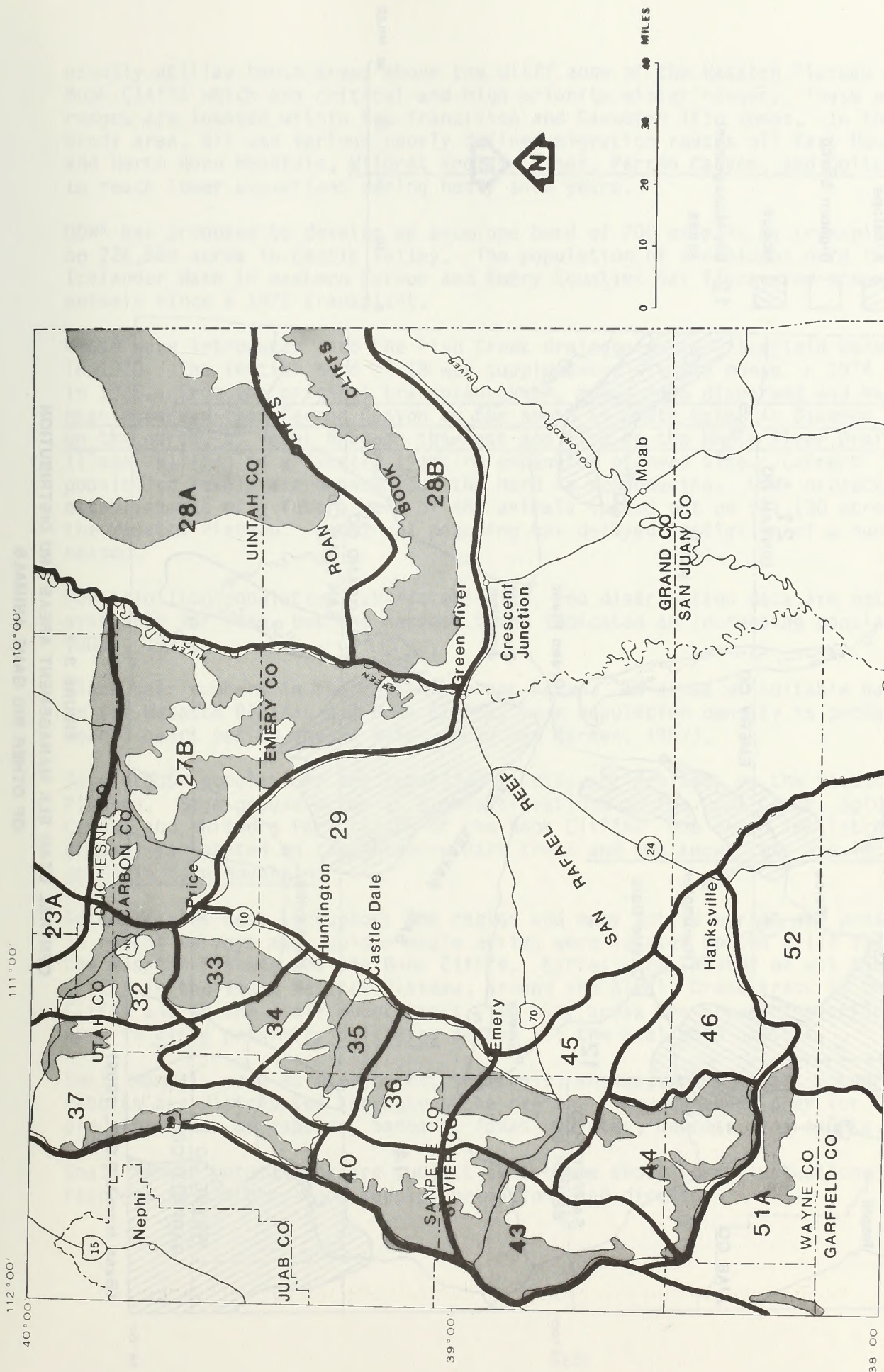


FIGURE 3-7

TYPICAL VEGETATION AND GAME DISTRIBUTION CHANGES WITH ELEVATION



(Base from U.S.G.S., 1969)

FIGURE 3-8
DEER MANAGEMENT AREAS (NUMBERED) AND
MULE DEER WINTER RANGE (SHADED)

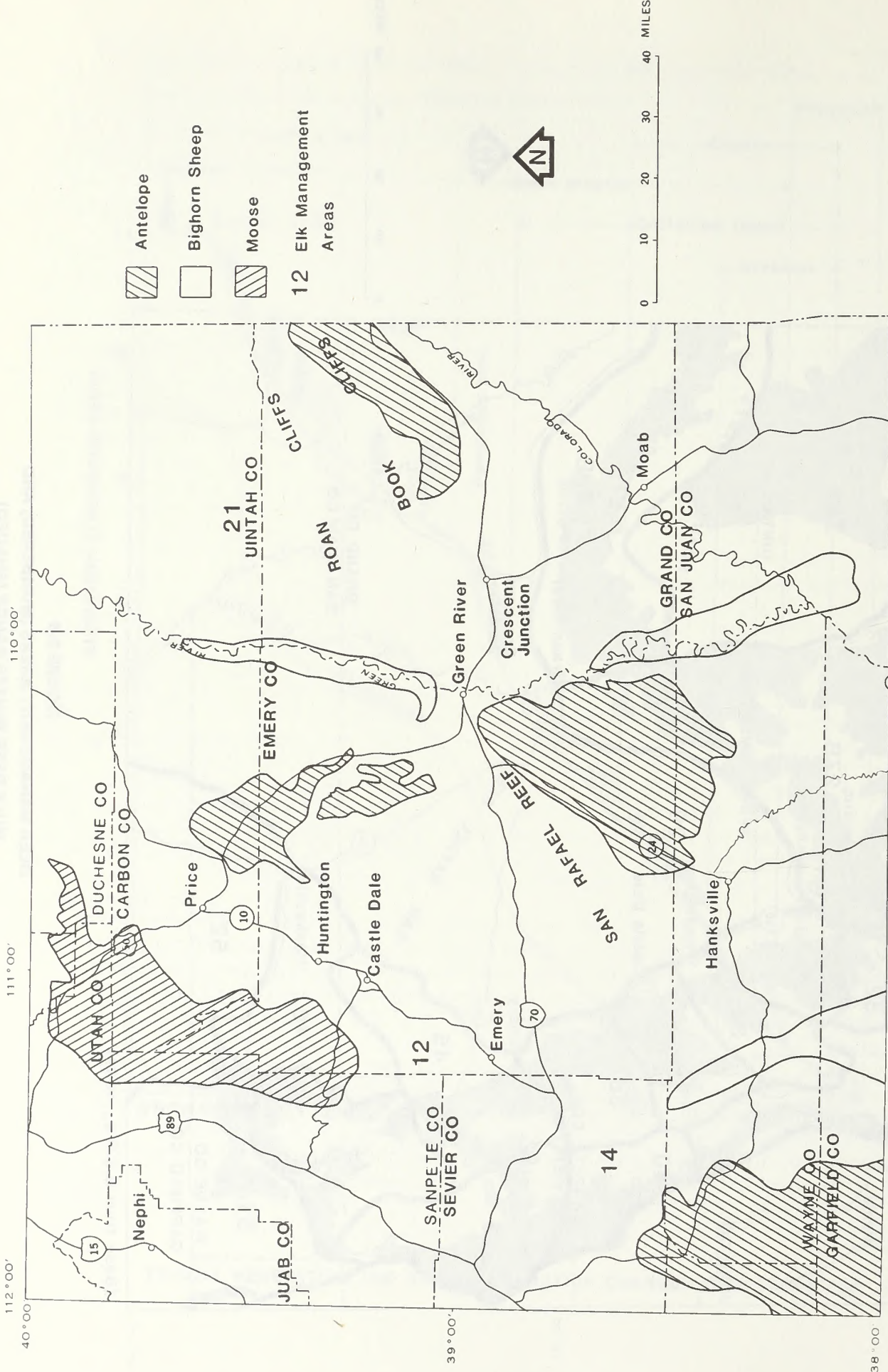


FIGURE 3-9
CENTRAL UTAH ELK MANAGEMENT AREAS AND DISTRIBUTION
OF OTHER BIG GAME ANIMALS

(Base from U.S.G.S., 1969)

usually utilize bench areas above the cliff zone of the Wasatch Plateau and Book Cliffs which are critical and high priority winter ranges. These winter ranges are located within the Transition and Canadian life zones. In the study area, elk use various poorly defined migration routes off East Mountain and North Horn Mountain, Wildcat Knolls, Pines, Ferron Canyon, and Quitcupah to reach lower elevations during heavy snow years.

UDWR has proposed to develop an antelope herd of 700 animals by transplanting on 226,560 acres in Castle Valley. The population of a resident herd in Icelander Wash in eastern Carbon and Emery Counties has fluctuated around 200 animals since a 1972 transplant.

Moose were introduced into the Fish Creek drainage west of Scofield Reservoir in 1973. The initial herd of 18 was supplemented with 19 moose in 1974 and 6 in 1978. From the original transplant site, moose have dispersed and have been observed from Ferron Canyon on the south to Sixth Water in Diamond Fork on the north, to Mount Nebo on the west and also in the White River Drainage. Illegal killing is presently limiting expansion of herd size. Current population levels are unknown but the herd is reproducing. UDWR projects establishment of a future herd of 487 animals spread out on 981,130 acres of the Wasatch Plateau. Continual poaching has delayed initiation of a hunting season.

Mountain lion population, characteristics, and distribution data are not available for Utah, but the harvest trend indicated an increasing population (UDWR, 1977).

Black bear numbers in the region are not known. In areas of suitable habitat on the Wasatch Plateau and Book Cliffs, bear population density is probably near 3 bears per 20 square miles (Bray and Barnes, 1967).

Sage grouse populations are localized in disjunct habitats on the Wasatch Plateau. Sage grouse occur at higher elevations on the Coal Creek, Soldier Creek, and Whitmore Park tracts of the Book Cliffs. One known lek (strutting ground) is located on the Whitmore Park tract and two known leks are located on North Horn Mountain.

Golden eagles nest throughout the region and many active eyries are present. In recent surveys many golden eagle eyries were located on the cliff faces of the Wasatch Plateau and the Book Cliffs. Eyries were located on all the tracts in the south Wasatch Plateau, around the Alkali Creek tract in the Book Cliffs and on the Trail Mount tract. In many areas the breeding territories were in close proximity utilizing nearly all the available habitat.

Small mammals such as mice, rats, squirrels, shrews, moles, bats, gophers, and rabbits are distributed throughout the region. They serve as prey for larger predators such as raptors, badgers, foxes, coyotes, bobcats, and skunks.

Small mammal populations are subject to extreme short-term fluctuations in response to weather, food supply, predation, and disease.

A total of 26 species of reptiles and 9 species of amphibians are known to occur in the region. They feed on vegetation, insects, fish, small mammals, reptiles, and amphibians, and are in turn prey for predatory mammals and birds.

Fisheries

Twenty-five species of fish are known to inhabit waters within the region. Some of the more common game species are rainbow, cutthroat, brown, and brook trout; channel catfish; and largemouth bass. Fish habitat in the region is shown in Figure 3-10.

Threatened or Endangered Species

The endangered American peregrine falcon has been sighted in the region. These birds are probably migrants although a few may be residents. The only known active eyrie is located adjacent to a historical eyrie along the San Rafael River in Emery County. Historically, at least four to five eyries existed in Carbon and Emery Counties (Porter and White, 1973).

Bald eagles, an endangered species, are annual winter visitors to the region between November and March. They often congregate in groups at roost areas near food sources. A survey in January and February 1977 of known areas recorded 31 bald eagles at 4 roost sites (Boner et al., 1977). None of the roost sites are near (within 5 miles) any of the proposed coal lease tracts or proposed access routes.

The Uinta-Southwestern Utah region includes the historical range of the endangered black-footed ferret (Snow, 1972; Scott et al., 1977). The Blue Trail Canyon tract is located within their historical range. The nearest sighting of possible black-footed ferret sign occurred in 1977 and was 12 miles east of Ferron, Utah, approximately 15 miles northeast of the Blue Trail Canyon tract (Boner et al., 1977).

No threatened or endangered reptiles or amphibians are known to occur in the region. No threatened or endangered fish are known to exist in waters on or downstream of the tracts within a distance that would be affected by mining of these tracts.

Land Use

Agriculture and Range

The Book Cliffs and Wasatch Plateau are tributary to several streams that are used for irrigation of cropland in Clark Valley between Price and Sunnyside, Utah and for several thousand acres in Castle Valley and areas near Salina. Overall, approximately 105,000 of the 227,069 acres of irrigated cropland in Carbon, Emery, Sevier, and Sanpete Counties receive water that originates on or passes through the proposed tracts. No agricultural lands, intake structures, canals or ponds associated with irrigation systems are found on any of the proposed tracts. Surface water from the Blue Trail Canyon and Walker Flat tracts and streams passing through the tracts are not used for downstream irrigation in Emery County.

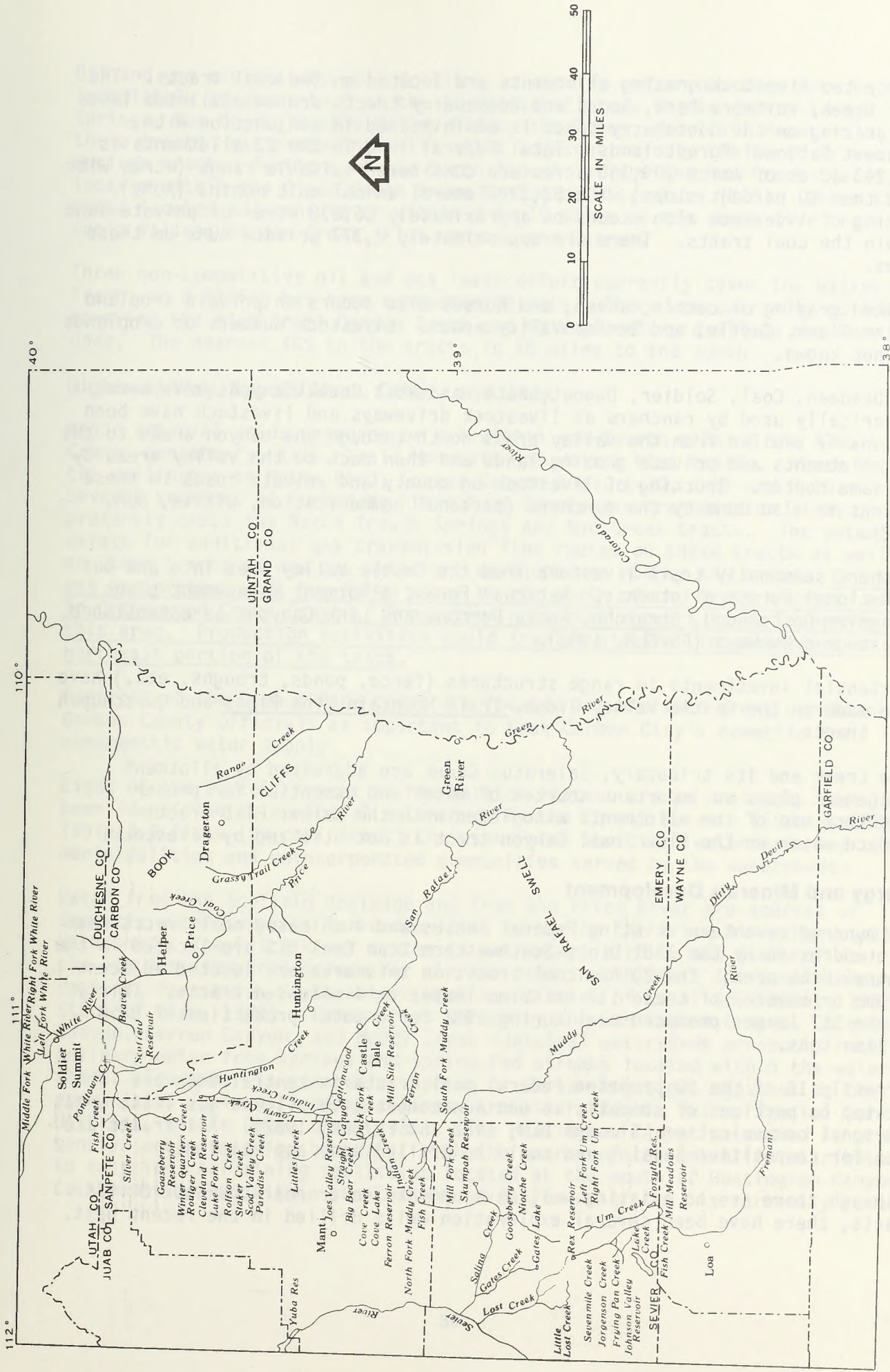


FIGURE 3-10

CENTRAL UTAH RIVERS, STREAMS AND LAKES OF IMPORTANCE TO WILDLIFE

Twenty-two livestock grazing allotments are located on the coal tracts. The Coal Creek, Whitmore Park, Acord and Gooseberry tracts are on unallotted lands but grazing on the Gooseberry tract is administered in conjunction with adjacent National Forest lands. Total Federal land in the 22 allotments is 450,243 acres of which 299,360 acres are considered suitable range (acres with less than 50 percent slope) with 52,130 Federal animal unit months (AUMs). Grazing of livestock also occurs on approximately 16,838 acres of private land within the coal tracts. There are approximately 2,377 private AUMs on these acres.

Limited grazing of cattle, sheep, and horses also occurs on private cropland in the Clark, Castle, and Sevier Valley areas. Livestock numbers on croplands are not known.

The Deadman, Coal, Soldier, Dugout, Pace, and Rock Creek Canyons have been historically used by ranchers as livestock driveways and livestock have been seasonally trailed from the valley areas north through the canyon areas to the BLM allotments and private grazing lands and then back to the valley areas by the same routes. Trucking of livestock on county and private roads in these canyons is also done by the ranchers (personal communication, Willis, BLM, 1982).

Ranchers seasonally trail livestock from the Castle Valley area into and out of National Forest allotments. National Forest allotment management plans recognize Cottonwood, Straight, Rock, Ferron, and Link Canyons as established livestock driveways (FS/BLM, 1982).

Substantial investments in range structures (fence, ponds, troughs, etc.) have been made on the Castle Valley Ridge, Trail Mountain, The Pines and Quitcupah coal tracts.

Ivie Creek and its tributary, Saleratus Creek are addressed by allotment management plans as important sources of water and essential for proper livestock use of the allotments associated with the Walker Flat tract. Surface water on the Blue Trail Canyon tract is not utilized by livestock.

Energy and Minerals Development

One hundred seventeen existing Federal leases and 4 unleased coal tracts that were addressed by the 1981 Uinta-Southwestern Utah Coal EIS are located in the central Utah area. The 20 new coal tracts in this area are located adjacent to one or several of these 117 existing leases or 4 unleased tracts. Thirty of the 117 leases produced coal during 1981 for a total production of 8.58 million tons.

Currently 18 of the 20 proposed Federal coal tracts in central Utah are located on portions of competitive and non-competitive oil and gas lease areas (personal communication, Simmons BLM, 1982 and FS/BLM, 1982). All tracts are open for competitive leasing and could be drilled upon application.

Although there are no existing well developments on or near the Book Cliffs tracts, there have been several exploration wells drilled in the recent past.

Oil and gas exploratory well drilling is ongoing and/or has been done on or immediately adjacent to 5 of the 11 Wasatch Plateau tracts (North Trough Springs, Mud Creek, Castle Valley Ridge, the Pines, and Trail Mountain). Of these tracts, gas producing wells exist adjacent to only the North Trough Springs tract. Portions of the North Trough Springs and Mud Creek tracts are located within the Clear Creek Known Geological Structure (KGS). Other KGS areas located adjacent to or within 3 to 10 miles of the above five tracts are Joe's Valley, Gordon Creek, Flat Canyon, and Ferron.

Three non-competitive oil and gas lease offers currently cover the Walker Flat Tract; no drilling has been conducted to date. There are currently no leases covering the Blue Trail Canyon Tract and no exploratory drilling has been done. The nearest KGS to the tracts is 16 miles to the south.

Rights-of-Way, Special Uses, Other Land Uses

Major arterial roads pass over or are within one-fourth mile of the Alkali Creek, Gooseberry, Ivie, Trail Mountain and Walker Flat tracts. These include the Wellington to Myton Road, Eccles Canyon Road, I-70, U-29 and U-10. Several segments of buried Mountain Fuel Supply gas transmission lines presently cross the North Trough Springs and Mud Creek tracts. The potential exists for additional gas transmission line routes on these tracts as well as on other tracts as new gas wells are developed in nearby KGS areas. Oil and gas exploration work has taken place to the north of the Trail Mountain tract in Cottonwood Creek Canyon. Production potential appears to be favorable in this area. Production activities could involve pipeline installations on the northeast portion of the tract.

Portions of the Dugout-Pace tract are located in watershed areas considered by Carbon County officials as important to East Carbon City's domestic and nondomestic water supply.

Eight of the 11 coal tracts in the Wasatch Plateau are in drainages that have been identified as municipal watersheds by the Forest Service (FS/BLM, 1982). Table 3-9 lists (by coal tract) the associated municipal watersheds and the municipalities and unincorporated communities served by the watersheds.

Water from the Scofield drainage and from the Price River are sources of domestic water supplies for communities served by the Price River Municipal Watershed. The Price River system is currently rated by the State of Utah as the 6th most impaired stream for current uses in the State (personal communications, Paraskeva, Southeastern Utah Association of Local Government, 1982; State of Utah, 1982). Communities served by the Huntington Canyon, Cottonwood Canyon, Ferron Canyon, and Muddy Creek municipal watersheds presently receive culinary water from springs and spring-fed streams located within the watersheds. The water is treated at spring or stream locations adjacent to the communities (personal communications, Leamaster, Castle Valley Special Service District, Castle Dale, Utah, 1982). The Huntington Canyon watershed is presently contaminated by bacteria, with the source of contamination attributed to existing coal mining facilities located at the mouth of Huntington Canyon. Cottonwood Creek, within the Cottonwood Canyon watershed, is currently rated

TABLE 3-9
MUNICIPAL WATERSHEDS ASSOCIATED WITH COAL
TRACTS IN THE WASATCH PLATEAU AREA

Coal Tract	Municipal Watershed
Gooseberry, North Trough Springs, Mud Creek, and Castle Valley Ridge	<u>Price River</u> - providing water to municipalities of Helper, Price, and Wellington and unincorporated communities of Kenilworth, Spring Glen, Carbonville, Miller Creek, West Price, and South Price (20,000 residents).
	<u>Huntington Canyon</u> - providing water to municipalities of Cleveland, Elmo, and Huntington and the unincorporated community of Lawrence (4,617 residents).
Trail Mountain	<u>Cottonwood Creek</u> - providing water to municipalities of Orangeville and Castle Dale (3,192 residents).
Ferron Canyon	<u>Ferron Canyon</u> - providing water to municipalities of Ferron and Clawson (1,673 residents).
The Pines, Quitcupah	<u>Muddy Creek</u> - providing water to the municipalities of Emery and the unincorporated community of Moore (432 residents).

Source: Uinta-Southwestern Utah Coal Region - Site-Specific Analyses, 1982. Richard Walker, Carbon County Planning and Zoning, Price, personal communication, Utah, 1982. Dan S. Hunter, Emery County Commission, Castle Dale, personal communication, Utah, 1982.

by the State of Utah as the thirteenth, most impaired stream for current uses in the State (personal communication Paraskeva, Southeastern Utah Association of Local Governments, 1982; State of Utah, 1982).

Land Use Plans, Controls, and Constraints

Federal Plans

BLM and FS land management and land use plans which address coal development in central Utah are identified in Table 3-10. National Forest System lands are currently being reevaluated and new land use plans are being prepared as detailed in Chapter One. These plans will not be completed before late 1985.

County Plans

Carbon County

All of the Book Cliffs tracts and portions of the North Trough Springs, Mud Creek, and Castle Valley Ridge tracts on the Wasatch Plateau are in Carbon County. The Carbon County Land Use Plan addresses planning for coal development. The coal planning effort is centered around mine siting and county government participation in the costs of managing coal mining related growth.

The planning philosophy of the county is that coal mining proponents will assess project impacts to various county sectors and identify plans to mitigate these impacts (personal communication, Walker, Carbon County Planning and Zoning, 1982).

The Whitmore Canyon watershed in eastern Carbon County and the Scofield drainage are considered a prime protection area. County zoning ordinances are written to address watershed protection and the mitigation of mine interception of water, subsidence, erosion, sediment, and the enforcement of regulations.

Relevant county zoning ordinance reference, specifically related to coal mining in the Book Cliffs are as follows (Carbon County, 1981):

1. At least portions of all the Book Cliffs tracts are within Critical Environmental Zone 1 (CE-1). This zoning does not allow for coal mining. The Carbon County position is that rezoning of disturbed areas to Critical Environmental Zone 2 (CE-2) would be required before coal mine development could occur. Coal mining developments are classified as "Permitted Conditional Uses" in the CE-2 Zone upon compliance with the requirements in the County ordinance code and after approval by the designated governmental agency.
2. Major coal mining developments are required to meet codes established for socioeconomic assessments and associated mitigation plans and for on- and off-site mine reclamation.

TABLE 3-10
BUREAU OF LAND MANAGEMENT AND FOREST SERVICE PLANS ADDRESSING
DEVELOPMENT OF COAL RESOURCES IN CENTRAL UTAH

BLM Management Framework Plans (MFP) and Supplements and FS Land Management/Use Plans		Coal Tracts
Agency/Office	Plan	
FS - Manti-LaSal N.F.	Ferron-Price Land Management Plan (FS, 1979)	Gooseberry North Trough Springs Mud Creek, Castle Valley Ridge Trail Mountain ^a , Ferron Canyon, The Pines ^a , Quitcupah ^{a,b}
FS - Fishlake N.F.	Salina Land Use Plan and Amendments (FS, 1976 & 1980)	Quitcupah ^{a,b} , Skumpah ^c Ivle ^c
BLM - Moab District - San Rafael Resource Area	San Rafael Area MFP and Supplement (BLM, 1979c)	Trail Mountain ^a , The Pines ^a , Quitcupah ^a , Blue Trail Canyon
Moab District - Price River Resource Area	Price River/Range Creek Coal Area Land Use Plan Amendment (BLM, 1981b)	Alkali Creek, Coal Creek, Dugout-Pace, Graves, Hoffman Creek, Soldier Creek, Whitmore Park
Richfield District - Sevier River Area	Forest MFP and Supplement (BLM, 1977 and 1980)	Skumpah ^c , Acord ^c , Ivle ^c Walker Flat ^c

Source: Site-Specific Analyses for Coal tracts to be Included in the Uinta-Southwestern Utah Coal Region, Environmental Impact Statement: Round Two Leasing.

^a Tracts containing both BLM and FS surface.

^b Tracts containing lands administered by both the Manti-LaSal and Fishlake National Forests.

^c Tracts included in a joint BLM-FS coal unsuitability study completed in 1980; unsuitability study results became part of the referenced land use plans and management framework plans.

3. Each new coal mine or mine increase in production requiring 75 employees or more is required to go through the planning commission and through the approval process outlined in specific ordinance codes established for large scale developments.
4. Cash performance guarantees for work required under applicable code provisions are addressed in the ordinance codes.
5. The Wasatch Plateau coal tracts in Carbon County are zoned as CE-1. Coal mining developments are not allowed in this zone. The position taken by the county is that no development of mines can occur in this zone without rezoning of the potentially disturbed areas to the CE-2 zone (personal communications, Walker, Carbon County Planning and Zoning, 1983). After rezoning, "permitted conditional use" requirements and the code requirements for "major coal mining developments" and approval processes for "large scale developments" would apply.

Emery County

Portions of the North Trough Springs, Mud Creek, Castle Valley Ridge, Ferron Canyon, the Pines and all of the Trail Mountain and Blue Trail Canyon tracts are in Emery County. The Emery County Land Use Plan addresses planning for coal developments, with the main focus on attaining a maximum cost-effective use of the land within the county.

The plan specifically addresses coal developments and the resulting effects on the cost of government and costs to the residents, landowners, and businesses within the county. Coal development impacts on watershed and other natural resource values are also addressed. County zoning ordinances (applicable to coal mines) are written to address protection of the areas that have historically served as primary watershed for most of the irrigation and culinary water supply needs in the Castle Valley area (personal communication, Johansen, Emery County Attorney, 1982).

Relevant county zoning ordinance references, specifically related to coal mining on the Wasatch Plateau tracts are as follows: (Emery County, 1979):

1. The coal areas are zoned as Critical Environmental Zones 1 and 2 (CE-1 and CE-2). Coal mining developments in these zones are classified as "permitted conditional uses", permitted when approved by the County Commission in accordance with code provisions dealing with "Large Scale Developments".
2. Controls in the location and operation of coal mine activities and the requirements for reclamation of lands subjected to such activities are outlined in the specific ordinance codes established for "Large Scale Developments".
3. Supplementary regulations pertaining to the CE-1 and CE-2 zones are outlined in specific ordinance codes. These codes deal mainly with pollution prevention and the construction, operation, and maintenance of transportation and utility routes.

4. Cash performance guarantees for work required under applicable code provisions are also outlined in the ordinance codes.

The Blue Trail Canyon tract in the Emery area is zoned as Mining and Grazing Zone 1 (M&G-1). County ordinances for this zone encourage coal mining developments, provided that adequate guarantees for the protection of the area are incorporated. Major underground and surface coal mine developments are classified as a "permitted conditional use" in this zone, permitted when approved by the County Commission in accordance with code provisions dealing with "Large Scale Developments". The discussion for reclamation requirements and supplementary regulations as presented for Emery County in the Wasatch Plateau area also apply to the M&G Zone.

Sanpete County

The Ferron Canyon and Gooseberry tracts are in Sanpete County. The Sanpete County Development Plan identifies issues and concerns relative to the development of coal activities (Sanpete County, 1981a). Specific issues and concerns addressed in the county planning process center around the hauling of coal west from the Gooseberry tract on State Highway U-31 to U.S. Highway 89 at Fairview and the resulting impacts to public road use, and the increase in county population from increased coal mine employment and the resulting impacts on small rural community socioeconomics and infrastructural needs. Highway U-31, as presently located, designed and constructed, is considered unsuitable for coal hauling,

The development plan also addresses (in general terms) the need to protect existing watershed values, to maintain water quality and protect existing appropriated water rights and uses (personal communication, Fawcett, Six-County Association of Governments, 1982).

The Sanpete County Development Code establishes specific procedures for mitigation of coal development related impacts as generally addressed in the Development Plan (Sanpete County, 1981b). References to county development codes relevant to coal mining on the Gooseberry and Ferron Canyon Tracts are as follows:

1. The tracts are zoned as Forestry and Watershed 10 (FW-10). Coal mining developments are a "permitted conditional use" in this zone. Special code provisions for the zone afford protection to soil and water resources by regulating development activities on steep and moderately steep slopes and excavation, grading, filling, and drainage proposals for all areas within the zone.
2. Supplementary regulations and general provisions of the Development Code dealing with fire protection, health and safety, air and water pollution, and transportation and utility routes will be applied to coal development activities.
3. The Development Code also specifies "development standards", which include performance bonds and fees, for all permitted conditional uses.

Sevier County

Portions of the Pines and all of the Acord, Ivie, Quitchupah, Skumpah and Walker Flat tracts are in Sevier County. General planning direction is given for "mining areas" in the Sevier County and Cities Master Plan Report (Sevier County, 1976). Specific report references to coal development activities are not made. The general direction, applicable to coal mining development activities, is in the form of planning guidelines for the protection of soil and water resources in "forest areas" and for properly located and designed transportation routes. County ordinances address general regulatory provisions for the forest areas. There are no specific ordinances for regulation of coal mining activities (personal communication, Fawcett, Six-County Association of Governments, 1982).

Sevier County ordinance provisions applicable to coal development activities in the Wasatch Plateau and Emery tracts area are as follows (Sevier County, 1979):

1. The tracts are zoned as Grazing, Recreation, and Forestry Zone 1 (GRF-1). Coal mining developments are permitted in this zone; no conditional use permit is needed. The regulation of coal development activities is based on existing ordinances; such ordinances cover all uses permitted in the GRF-1 Zone, i.e., the ordinances are not site-specific or specific to one use.
2. Ordinance provisions address the regulation of land use activities for the protection of air and water quality and for the enhancement of values associated with forestry, grazing, wildlife, and recreation.

Socioeconomics

The socioeconomic material presented in this EIS including the various tables used, was provided by the State of Utah, Office of the State Planning Coordinator and Department of Community and Economic Development (Social and Economic Impact Analysis - Uinta Southwestern Utah Coal Environmental Impact Statement, July, 1983).

Population, Income, and Employment

The area of analysis for the central Utah region includes four Utah counties--Carbon, Emery, Sanpete, and Sevier. These four counties are contiguous and had a 1980 census population of 62,977 residents. The estimated 1982 population is 69,598 residents. (Unless otherwise noted, this discussion will rely on data from the 1980 Census.) These counties are typical of rural counties in Utah with populations concentrated in small communities along major roads. The largest community in the area is Price with 9,086 residents; it is nearly twice the size of Richfield, the second largest with 5,482 people.

Emery County has an average household size of 3.48 persons which is significantly higher than the State average of 3.2 persons. Carbon County has 3.03 persons per household. Sanpete and Sevier Counties have 3.17 and 3.19 respectively.

The mean household income of the four counties varies widely. The State figure is \$20,320. Sevier and Sanpete Counties have mean household incomes of \$17,517 and \$14,570, respectively. Carbon and Emery Counties are slightly higher with \$20,823 and \$20,536, respectively. The income differentials are largely explained by the predominant employment sectors of each county and relative wage levels. In the higher income counties, mining is the primary employment sector.

In Emery County, 46 percent of wage and salary employment was in coal mining in 1980, and in Carbon County 27 percent of its total employment was in mining. Carbon County's other major employment sectors are trade, 21 percent, and government, 22 percent. Total wage and salary employment was 8,509 and the unemployment rate was 5.1 percent in 1980. Unemployment nearly doubled by 1982 with layoffs in the coal mining industry. In Emery County the sectors of government, construction, and transportation-communication-public utilities are the next largest sectors but together account for only 39 percent of the total employment of 4,503. The unemployment rate was 4.5 percent in 1980; in 1982 this rate rose to 5.4 percent. In Sevier County the trade and government sectors accounted for 50 percent of total wage and salary employment of 4,617. Coal mining employment represented 9 percent of the total. This is much lower than Carbon or Emery Counties, but significantly higher than the State proportion of 3 percent of total employment in mining. The unemployment rate was 4.7 percent in 1980 but rose to 7.9 percent in 1982. Total wage and salary employment in Sanpete County was 3,340; of this total the largest employment sectors were government 37 percent, manufacturing 27 percent, and trade 15 percent. Sanpete County has historically experienced high rates of unemployment; in 1980 it was 8.8 percent as compared to the State rate of 5.4 percent. In 1982 the Sanpete County rate was 12.7 percent.

Infrastructure

Housing

The majority of housing units in each of the four counties are conventional single family houses. However, in Emery County about 34 percent of these units are mobile homes. Carbon, Sanpete, and Sevier Counties all have about 7 percent of their housing units in mobile homes.

Information concerning the existing housing supply is presented in Table 3-11.

Education

Carbon and Emery Counties had 1981 enrollments of 4,486 and 3,372 students, respectively. This resulted in a pupil/teacher ration of 24.68 to 1 for Carbon County and 23.09 to 1 for Emery County.

The school districts, which have experienced boom/bust cycles in the past, have developed a growth plan that utilizes temporary classrooms to avoid overbuilding in boom times and to allow the tax base to be in place before incurring new debt for additional school construction. Carbon County has bonded for 13 million dollars for construction of new schools.

TABLE 3-11
CENTRAL UTAH
EXISTING DWELLING UNITS MIX BY COUNTIES

County	Conventional	Mobile	Multi-Family
Carbon	4,120 (85.7%)	342 (7.1%)	345 (7.0%)
Emery	1,516 (62.7%)	830 (34.4%)	67 (2.8%)
Sanpete	3,682 (81.9%)	336 (7.6%)	467 (10.6%)
Sevier	2,538 (80.8%)	183 (5.8%)	419 (13.3%)
Total	11,797 (79.8%)	1,691 (11.4%)	1,298 (8.8%)

Sanpete County has two school districts, North Sanpete and South Sanpete. One hundred and fifty-nine teachers currently instruct the 3,656 students in the County. This 23 to 1 pupil teacher ratio compares favorably to the State guideline of 25 pupils per teacher.

The Sevier School District is a county-wide district that in 1982 had 158 teachers instructing 4,049 students.

Water and Sewer

Adequacy of culinary water systems is determined by the Utah Department of Health based on three components: water rights, supply/flow, and storage.

The majority of communities in the study area are deficient in at least one of these categories. However, only in Carbon and Emery Counties are there present deficiencies of sufficient magnitude as to present general, county-wide constraints on future development. Most of the communities where deficiencies exist are pursuing programs to bring their systems up to standards.

Collective sewage treatment facilities are used within most of the larger communities while smaller communities rely on individual household septic tanks. In Carbon County the Price River Improvement District maintains the regional plant serving Price and Helper; the plant is operating at rates seriously over design capacity. Additional data are presented in Tables 3-12 and 3-13.

The lagoon-type treatment facilities in Emery County are experiencing infiltration problems. In Sanpete County, Mount Pleasant is approaching the design capacity of its wastewater treatment facility. Salina, in Sevier County, is also approaching its system capacity.

TABLE 3-12
CENTRAL UTAH
SUMMARY OF WATER SYSTEM CHARACTERISTICS

County	Source	Number of Connections	Storage Capacity Gallons per day	Connections	Water Rights	Flow Gallons per minute
<u>Carbon</u>						
East Carbon	springs, wells, res.	830	784,000	(980)		409
Helper	springs, wells	1,035	4,000,000	(5,000)		1,100
Hiawatha	tunnel	50	125,000	(156)		
Price	springs, well, Price river	3,010	7,500,000	(9,375)		3,100
Scofield	spring	175	58,000	(72)		22
Sunnyside	reservoir, tunnel	200	850,000	(1,062)		100
Wellington	Price River Water Improvement District	527	300,000		433.3 acre-feet	245
<u>Emery</u>						
Castle Dale	Joe's Valley Res.	827	750,000	(932)	864 acre-feet	900
Cleveland	springs				2,654 shares	220
Elmo	springs	636	360,000	(450)		
Emery	well	155	1,000,000	(1,250)	Total well	40
Ferron	Mill Site Res.	510	750,000	(937)	635 acre-feet	260
Huntington	springs	1,057	1,000,000	(1,250)	839 acre-feet	650
Orangeville	Joe's Valley Res.	435	500,000	(628)	401 acre-feet	760
<u>Sanpete</u>						
Centerfield		300	500,000	(1,600)		450
Ephraim		800	2,500,000	(4,250)	city	NA
Fairview	springs, wells	480	700,000	(825)	3,996 acre-feet	
Fntn. Green	springs, wells	251	250,000	(312)	799 acre-feet	
Gunnison		475	1,500,000	(2,500)	city	NA
Manti		800	1,000,000	(5,000)	city	NA
Moroni	wells, springs	409	300,000	(375)	1,918 acre-feet	
Mt. Pleasant	springs, wells	937	1,750,000	(2,187)	2,029 acre-feet	
Richfield		1,900		(6,000)	city	NA
Spring City	spring	260	450,000	(562)	879 acre-feet	
Wales	spring	64				
<u>Sevier</u>						
Aurora	wells, springs	360	572,000	(712)	665 acre-feet	
Redmond	wells	210	300,000	(375)	624 acre-feet	
Salina	springs	810	1,700,000	(2,125)	1,998 acre-feet	
Richfield	well, spring	1,900	1,000,000	(1,250)	4,235 acre-feet	

TABLE 3-13
CENTRAL UTAH
SUMMARY OF SEWAGE CHARACTERISTICS

County	Capacity	Flow	System Type	Plans for Expansion
<u>Carbon</u>				
Sunnyside				
East Carbon			clarigester	
Helper		1,800,000 ^a	trickling filter	
Hiawatha			septic tank	
Price		3,200,000 ^{a,b}	trickling filter	yes
Scofield			septic tanks	
Wellington				
Design Capacity 1,800,000				
<u>Emery</u>				
Castle Dale	7,000	750,000 ^a	lagoon	no
Orangeville				
Cleveland	1,400	98,000 ^a	lagoon	new
Elmo	700	49,000 ^a	lagoon	new
Emery	1,300	200,000 ^a	lagoon	no
Ferron	1,700	700,000 ^{a,b}	lagoon	no
Huntington	3,000	700,000 ^a	lagoon	no
Design Capacity - Huntington 300,000, Ferron 93,000				
<u>Sanpete</u>				
Centerfield	NA	NA	septic tank ^d	
Ephraim	7,000 ^e	4.86 ^c	lagoon ^d	
Fairview	NA	NA	septic tank	no
Fountain Green	NA	NA	septic tank	no
Gunnison	4,000	2.78 ^c	lagoon ^e	
Manti	8,000	5.55 ^c	lagoon ^d	
Moroni	10,000	NA	aerating system	no
Mt. Pleasant	6,000	NA	lagoon	
Spring City	NA	NA	septic tank	no
Wales	NA	NA	septic tank	no
<u>Sevier</u>				
Aurora	NA	NA	septic tank	no
Redmond	NA	NA	septic tank	no
Richfield	1 million	694 ^c	trickling filter	yes
Salina	3,000	NA	enc. digester system	no

^a Gallons/day

^b Severe infiltration

^c Gallons per minute

^d Engineers Report for Manti City Wastewater System

^e Application to the Community Impact Account for the renovation of Richfield's Sewage Treatment Facility, Eckhoff, Watson and Preator Engineering

Public Safety

In general the affected counties rely on the County Sheriff for the major portion of their law enforcement capacity. The larger communities in each county generally have a separate police force and facilities, while Sanpete and Sevier Counties have at least a part-time marshal in the majority of their small communities. Summary law enforcement data for each of these counties are presented in Table 3-14.

Fire protection in the area is provided on a community level and is manned almost entirely by volunteer fire fighters. Average response times range between 3 to 5 minutes with maximum response times from 30 to 45 minutes. Equipment availability ranges from six fire fighting vehicles in Sevier County to three vehicles per community in Emery County. Additional data are presented in Table 3-14.

The four counties are currently served by four hospitals (two in Sanpete County, one in Carbon County, and one in Sevier County) with utilization rates ranging from a low of 49.5 percent for the one in Gunnison to a high of 69.9 percent for the Sevier Valley Hosital. Ratios of doctors, dentist, and nurses to population are generally below national standards. Emergency and ambulance service is provided by emergency medical technicians. Additional data are presented in Table 3-14.

Solid Waste

Much of the solid waste disposal in the area is accomplished with open dumps that are not State approved; however, there are several areas that have approved landfills, which are generally considered to be adequate for the present and immediate future.

Carbon County has a new landfill that serves most communities in the county with the exception of East Carbon which has an approved land fill and Sunnyside which has an open dump. Emery County has a newly established county landfill that is less than 10 percent filled. All communities in the study are participating in this service district.

Sanpete County does not operate a landfill or any other facility for solid waste. All communities, except Fairview, maintain open dumps. Individuals are responsible for handling trash and refuse to the dump site. Capacities are limited by the available acreage for the dump. None of the communities in the study area are meeting State minimum standards.

Sevier County operates three approved landfills, which are described as adequate for the immediate needs of the County; an additional landfill is under construction. Salina operates a city landfill which also serves Redmond.

TABLE 3-14
CENTRAL UTAH
EXISTING EDUCATION, HEALTH, AND LAW ENFORCEMENT SERVICES (1982)

Service	<u>County</u>			
	Carbon	Emery	Sevier	Sanpete
<u>Education</u>				
Enrollment	4,486	3,302	4,049	3,656
Excess Capacity	N/A	N/A	N/A	N/A
Student/Teacher	N/A	N/A	N/A	N/A
Ratio	24.68/1	23.09/1	25.62/1	23.03/1
Teachers	182	143	158	159
<u>Health Facilities</u>				
Hospital Beds	70	0	28	46
Doctors	17	2	8	11
Dentists	10	3	5	5
Nurses	141	21	56	44
Emergency Medical				
Technicians	49	128	91	87
Ambulances	8	7	4	3
Nursing Home Beds	57	48	98	37
Clinical Psych.	<u>3</u>	<u>1</u>	<u>2</u>	<u>2</u>
Master's Degree in				
Social Work	<u>11</u>	<u>5</u>	<u>5</u>	<u>6</u>
<u>Law Enforcement</u>				
Police	44	19	14	14
Police Cars	31	20	10	15
Fire Trucks	15	21	6	15
Number of Firemen	NA	84	38	77
Jail Capacity	20	48	30	4

Social/Attitudes

Emery County has experienced negative effects of rapid population growth from powerplant construction in the 1970s. This resulted in some opposition to further development; however, the emergence of this opposition has not eroded all support for additional coal leasing. It has added cautiousness to the local government entities' approach to growth. Local opinion leaders have expressed a strong commitment to the orderly development of the area's coal resources, and local elected officials have organized themselves into an impact mitigation team to assure that they are adequately prepared for growth. A review of local master plans and subsequent planning and zoning ordinances is currently underway by the local municipalities and the Six-County Association of Government. There appears to be ample sensitivity by the local officials to the issues surrounding rapid growth and a commitment to work toward the minimization of the negative aspects of rapid growth.

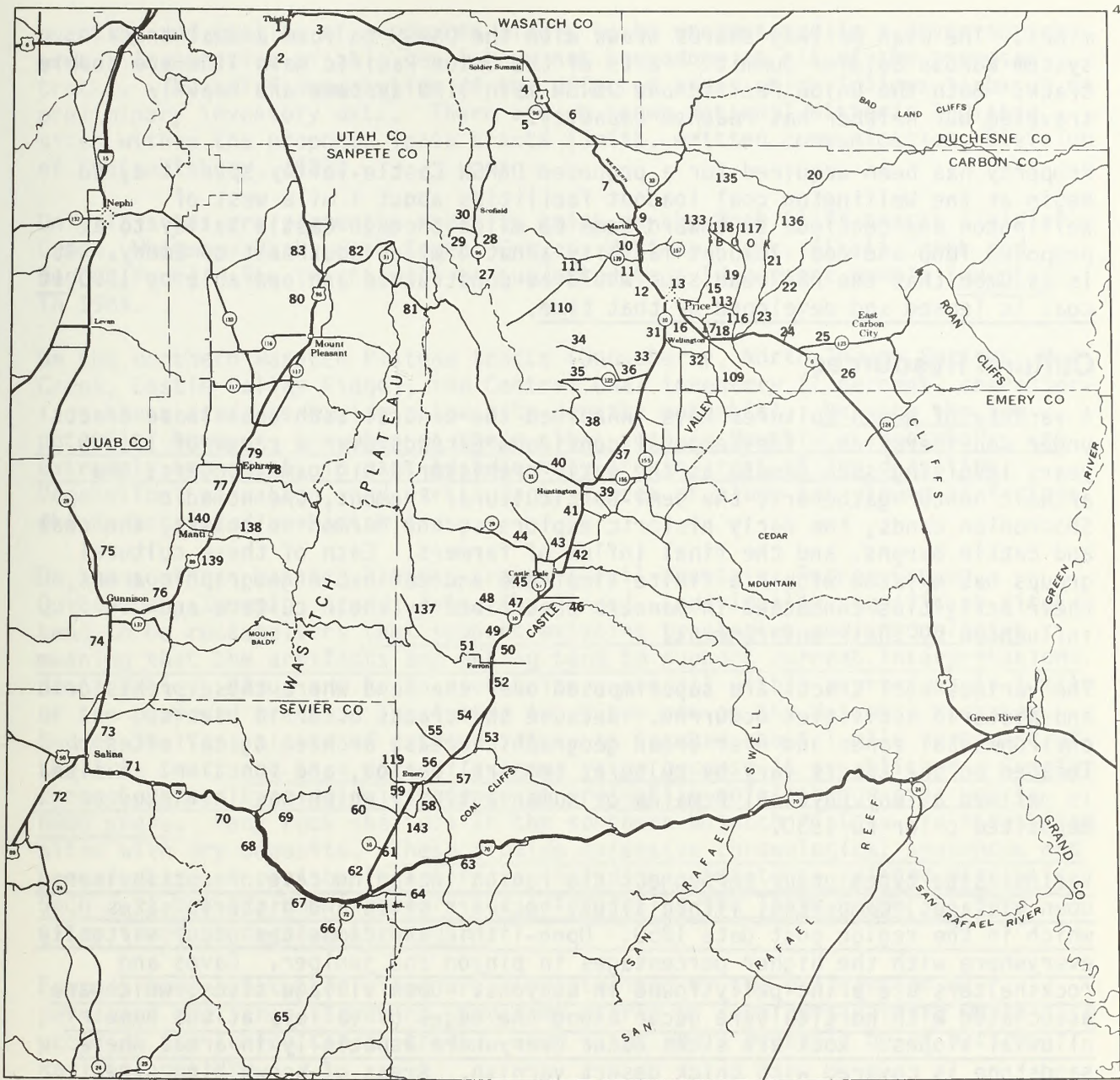
Transportation

Vehicular traffic within the central Utah area is carried on four major highways which form a loop (Figure 3-11). The north leg is formed by US 6, the east leg by U-10, the south leg by I-70, and the west leg by US 89. In addition, there is some local traffic across the Wasatch Plateau on U-29 between Orangeville and Joe's Valley and the county road between Joe's Valley and Ephraim, on U-31 between Huntington and Fairview, and on the county road between Ferron and Mayfield. Recently, the road from U-96 at Eccles Canyon across to U-31 east of Fairview was improved and paved. These roads are not always passable at higher elevations in the winter.

Average annual daily traffic (AADT) values for 1981, as determined by the Utah Department of Transportation, show that traffic is heaviest on the four-lane portion of US 6 north and west of Price (segments 9, 10, 12). A bypass south of Price (segment 16) has been completed and has relieved some traffic congestion in Price. Highway U-10 south of Price (segments 31, 33, 37) is reaching a practical maximum for a two-lane highway, considering the number of trucks it is carrying.

The main roads in this area are paved with asphalt. Highway U-10, while paved with asphalt, was built for lighter duty use than it is now getting from construction and increased coal mine development; furthermore, it was built on bentonitic Mancos Shale, which has a very high shrink-swell coefficient so continuing maintenance of this road is necessary. Highway U-29 west of Orangeville has been paved as far as Joe's Valley Reservoir. The county road connecting with Ephraim has a gravel surface.

The Denver & Rio Grande Western (D&RGW) Railroad main line passes through Price and Helper, ascends to Soldier Summit, and descends through Spanish Fork Canyon into the Provo area. A D&RGW spur from Thistle to Salina is too light to accommodate 100-ton coal cars. The Union Pacific Railroad main line passes 2 miles west of Levan in Juab County. A coal loadout at this point is being used by Southern Utah Fuels in Convulsion Canyon. In addition, the Utah Railway goes southward from a point near Helper to serve Hiawatha and Wattis



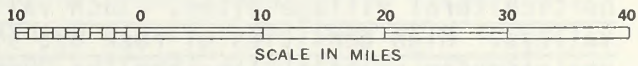
40° 00'

39° 00'

112° 00'

111° 00'

110° 00'



000 - TRAFFIC SEGMENT NUMBERS



FIGURE 3-11
CENTRAL UTAH REGIONAL TRAFFIC MAP

mines. The Utah Railway shares track with the D&RGW to form a dual track system across Soldier Summit. Parts of the Union Pacific main line are double track. Both the Union Pacific and D&RGW main line systems are heavily traveled but neither has reached capacity.

Property has been acquired for a proposed D&RGW Castle Valley spur line, to begin at the Wellington coal loadout facilities about 1 mile west of Wellington and continue southward some 65 miles through Castle Valley to a proposed loop and coal loadout facility about 4 miles southeast of Emery. It is assumed that the railroad spur would be constructed and operable by 1990 if coal is leased and developed by that time.

Cultural Resources

A variety of human cultures have inhabited the central Utah coal lease tracts under consideration. The temporal continuum extends over a range of 12,000 years involving such groups as the early prehistoric big game hunters, the archaic hunter-gatherers, the semi-horticultural Fremont, the nomadic Shoshonian bands, the early historic explorers, the Mormon colonists, the coal and cattle barons, and the final influx of farmers. Each of these cultural groups has existed within a finite timeframe and definable geographic areas, their activities conducted in manners prescribed by their culture and influenced by their environment.

The various coal tracts are superimposed over the land where these prehistoric and historic activities occurred. Because the tracts occur in diverse environmental zones and over broad geographic areas, archaeological sites located on the tracts vary by culture, temporal period, and function. A site is defined as any physical remains of human activity which was initiated or deposited prior to 1930.

Various site types occur throughout the region including cave or rockshelters, open villages, campsites, lithic sites, rock art sites and historic sites which in the region post date 1850. Open-lithic and campsites occur virtually everywhere with the higher percentages in pinyon and juniper. Caves and rockshelters are principally found in canyons. Open village sites, which are associated with horticulture occur along the edges of valleys at the base of alluvial slopes. Rock art sites occur everywhere especially in areas where sandstone is covered with thick desert varnish. Areas of known high site densities include both Castle Valley and Trough Hollow where the broad range of site types are found. A number of the well-watered valleys both in and at the base of the front range of the eastern Great Basin contain numerous horticultural village sites. Such valleys include the Sevier and Parowan valleys. High densities of rock art sites occur in the Colorado River drainage for example along the San Juan River in southeastern Utah. The significance of sites is assessed in terms of size, antiquity, and condition, but, most importantly what sites may contribute to our understanding of prehistory.

Random and stratified sample inventories that examine 10 to 20 percent of an area are the BLM and FS methodology for obtaining archaeological data on potential coal lease tracts. These data allow an estimate of both the

quantity and quality of resources likely to be encountered in a given survey area. Inventories of this level have not been done on all of the proposed tracts. The brief description of the affected areas which follows is based on preliminary inventory data. There are no known National Historic Register sites within the proposed lease tracts (Smith, written communication, Division of State History, 1983).

Only 12 sites are presently known to exist on the Book Cliff tracts (Soldier Creek, Whitmore Park, Coal Creek, Graves, Hoffman Creek, Alkali Creek and Dugout-Pace). The tracts will be subjected to a 10 percent sample inventory in 1984.

On the northern Wasatch Plateau tracts (Gooseberry, North Trough Springs, Mud Creek, Castle Valley Ridge), the Central Coal Inventory (1 percent) characterizes these areas as having a low site density potential. Despite the low potential however, a number of these sites such as Nawthis at Gooseberry are extremely important, in part because they are in areas of low densities. Vegetation, elevation, and particularly degree of slope are viewed as factors which restricted prehistoric use.

On the southern Wasatch Plateau tracts (Trail Mountain, Ferron Canyon, Quitcupah, Skumpah, Acord, Ivie, The Pines), individually significant sites tend to be rockshelters that support existing typologies and chronologies meaning that the artifacts and dating tend to support current interpretations. Joe's Valley, Cloud and Aspen rockshelters are all within approximately 1 mile of the proposed tracts. The latter two sites are on the National Register. Sudden Shelter, a site of extreme value, is located about 1 mile northwest of the Ivie tract and is a site of extreme value because it established a lengthy chronology and typological sequence of projectile point change over nearly 6000 years. Many rock shelters in the southern Wasatch Plateau are stratified sites with dry deposits. These provide extensive chronological sequences and preservation of perishable artifacts including subsistence related materials. Such data provide the framework for interpreting the large number of open sites found throughout the region.

Fremont Open habitation sites are characterized by the utilization of permanent dwellings, ceramics, and some degree of corn horticulture which also occur on the Ferron Canyon tract. Such sites would probably be of National Register quality.

Cultural resources on the Pines and Quitcupah tracts occur on canyon rims and ledges, along smaller tributaries and above springs which occur in cliff faces. These sites include a large number of Fremont habitation sites and various lithic scatters of Archaic or unknown association; they tend to be camps and limited activity areas. Although cultural affiliation for most sites is undetermined, Archaic, Fremont, and Ute cultures are represented.

In the Emery area the Blue Trail Canyon tract has an estimated density of 20 to 50 Fremont and Archaic sites. These would generally be lithic scatters and rockshelters.

The Walker Flat tract, particularly along the Trough Hollow drainage, contains a high density of Fremont habitation sites. Such sites are generally accorded high significance rating due to research potential. Densities along the drainage may run as high as 50 sites per square mile.

The history of the central Utah coal areas includes a route known as the Old Spanish Trail, traveled by the Spanish and American fur trappers, traders, and frontiersmen. By the 1830s the trail was well established; portions of its route can still be seen as several sets of well worn tracks. There are also other divergent trails in the central Utah area.

Recreation

Nearly all land in the four-county region is used for dispersed outdoor recreation (e.g., big and upland game hunting, waterfowl hunting, fishing, sightseeing, off-road vehicle use, camping, and picnicking). The Book Cliffs and Wasatch Plateau provide excellent big and upland game hunting opportunities. If overall statistics for the State of Utah are applied, approximately 18 percent or 12,200 residents of the four-county region presently hunt deer; approximately 2 percent or 1,185 residents hunt elk; 9 percent or 5,926 residents hunt upland game and 45 percent or 31,372 residents fish (Thayne and Hudson, 1978). The success rate for big game hunting in the region is down from early 1970 figures, but the success trend has been generally up since 1975. The success rate for upland game hunting (birds/hunter day) in the region has been trending upward from 1974. In 1981, the region provided the following approximate percentage of the Statewide upland game harvest: pheasant - 17 percent; mourning dove - 11 percent; chuckar - 15 percent; forest grouse - 9 percent (UDWR, 1981b). If Statewide figures are applied, the success rate for fishing (fish/hour/fisherman) has been decreasing gradually since 1967. This is probably due largely to the Statewide increase in fishermen (50 percent increase from 1967 to 1977) (UDWR, 1981a, 1981b). Of the total number of deer hunters in the four-county region in 1980, approximately 30 percent originated in the four-county region (UDWR, 1981a). The percentages of elk hunters, fishermen, and upland game hunters originating in the four-county region is unknown. Off-road vehicle travel is generally associated with hunting and fishing. Approximately 7 percent or 4,733 residents in the four-county region own motorcycles and approximately 25 percent or 17,400 residents presently own a 2-wheel drive truck or a 4-wheel drive vehicle (Utah Outdoor Recreation Agency (UORA), 1978). Camping and picnicking in dispersed areas, like off-road vehicle travel, is most often associated with hunting, fishing, and sightseeing. In general, the dispersed use areas have been able to absorb demands. A notable exception is the San Rafael/Buckskin Draw area in Emery County. This area of approximately 48,000 acres administered by BLM receives approximately 24,325 visitor days annually. Use is largely in the spring and fall months. Seventy percent of the users originate in Carbon and Emery Counties. The area is presently used far beyond the level for which it is being managed and in many locations recreational use is causing resource damage.

Developed recreation sites (campgrounds and picnic areas) within the Plateau and Swell areas and their current visitor use are listed in Table 3-15. Of the 37 developed sites, only three are now being used at or above their capacity. In general, Sevier and Sanpete Counties have camping and picnicking sites in excess of demand. Even so, Forest Service sites are often overcrowded during summer weekends. Carbon and Emery Counties have an excess of demand for camping and picnicking sites over the current supply (UORA, 1973).

There are not enough golf courses, playfields, and swimming pools in the four-county region to meet standards proposed by the State of Utah (UORA, 1973, 1978). The lack of available recreational facilities is particularly severe in Carbon and Emery Counties which have experienced rapid population growth mainly because of mining and energy development. A 1980 study by the Southeastern Utah Association of Local Governments (SEUALG) (including Carbon, Emery, San Juan, and Grand Counties) indicates that of 586 residents polled, 86 percent of the respondents rated local recreational facilities as poor. Fifty-six percent of the respondents indicated that recreational facilities should be either first or second priority for spending of local tax dollars. In the study, playgrounds and swimming pools were rated as the first and second recreational needs (SEUALG, 1980). According to a 1980 Centaur Associates study, some of the towns in the four-county region have identified needs for other diversified recreational facilities including handball and tennis courts, bowling alleys, skating rinks, city parks, and ball parks (Centaur Associates Inc., 1980).

None of the proposed lease tracts contain developed recreation sites. All of the tracts support intermittent dispersed recreational activities (e.g., big and upland game hunting, sightseeing, and ORV activity associated with hunting). On-tract opportunities for these activities are equivalent to opportunities provided off-tract in the region. On-tract big and upland game hunting opportunities are excellent in the Book Cliffs and Wasatch Plateau areas.

Existing roads (both paved and primitive) that would be used for mining access to the tracts currently provide recreational access. Important recreational access roads are described in Table 3-16. The average daily traffic on these roads, if available, is given under the Transportation section of this document.

Visual Resources

The scenic character of the four-county region is one of variation. The landscape includes sparsely vegetated desert valleys, forested plateaus, and colorful canyons. Rural towns, access roads, mining developments, power developments, transmission lines, recreational development, and livestock grazing have modified the landscape character in some of the area, especially valley locations, from natural to agrarian and/or industrial. The region as a whole, however, retains a feeling of vast open space.

Several Federal coal leases are situated in the vicinity of the proposed tracts in the Bookcliffs, Wasatch Plateau, and Emery areas. Coal mining developments have modified the natural landscape character adjacent to the

TABLE 3-15

RECREATION USE ON SELECTED DEVELOPED SITES IN THE
CENTRAL UTAH (FOUR-COUNTY) REGION

Managing Agency and Site	Visitor Days ^a	Percent of Theoretical Maximum Capacity ^b
<u>BLM</u>		
Price Canyon Recreation Area	14,600	NA ^c (perceived to be under capacity)
Cleveland Lloyd Dinosaur Quarry	3,200	NA (perceived to be under capacity)
Cedar Mountain Recreation Area	500	NA (perceived to be under capacity)
San Rafael Campground	1,852	NA (perceived to be under capacity)
Sand Ledges	5,000 ^d	NA (perceived to be at or over capacity)
Koosharem Campground	5,000 ^d	NA (perceived to be at or over capacity)
<u>FS</u>		
Fish Creek Campground	613	14
Flat Canyon Campground	8,098	33
Gooseberry Campground	3,501	19
Lake Hill Campground	2,824	14
Old Folk Flat Campground	4,934	15
Spring City Picnic Area	681	15
Indian Creek Campground	9,380	9
Manti Community Picnic Area	4,004	21
Pinchot Picnic Area	3,124	16
Joe's Valley Campground	11,113	18
Twelve Mile Campground	532	26
Ferron Canyon Picnic Area	803	4
Maple Canyon Campground	2,594	11
Maple Grove Campground	29,300	49
Gooseberry Campground	6,400	25
Doctor Creek Campground	16,600	34
Mackinaw Campground	36,800	35
Bowery Picnic Area	1,300	8
Doctor Creek Group Camping	6,600	20
Frying Pan Campground	6,800	22
Bowery Campground	25,900	30
Monrovia Picnic Area	5,300	14
Forks of Huntington Campground	2,599	19
Ferron Reservoir Campground	6,530	19
Twin Creek Picnic Area	4,000	18
Johnson Valley Reservoir Boatlaunch and Picnic Area	4,100	20

continued

Table 3-15 (cont'd.)

Managing Agency and Site	Visitor Days ^a	Percent of Theoretical Maximum Capacity ^b
<u>STATE OF UTAH</u>		
Scofield Lake State Recreation Area	73,897 ^d	NA
Huntington Lake State Beach	73,291 ^d	NA
Palisade Lake State Recreation Area	15,283 ^d	NA
Green River State Recreation Area	92,289 ^d	NA
Goblin Valley State Reserve	16,966 ^d	NA

Source: BLM, FS, State of Utah 1980-1981 visitor use figures through personal communication.

- a Recreation use reported in visitor days. (Visitor day consists of 12 visitor hours which may be aggregated by one or more persons.)
- b Beyond 40 percent use, sites deteriorate rapidly, require heavy maintenance, and user experience levels diminish from overcrowding (i.e., loss of privacy, increase in noise, etc.).
- c Not available. Perceived to be under capacity by local Federal officials.
- d Given in number of visits - visitor day estimates are not available.

TABLE 3-16
CENTRAL UTAH RECREATION ACCESS ROADS

Map ^a No.	Road	Tracts That Would be Assessed	Recreational Access Area
20, 23	Myton Road	Soldier Creek Whitmore Park Alkali Creek	Book Cliffs
19	Coal Creek Road	Coal Creek	Book Cliffs
22	Dugout Canyon Road	Dugout-Pace Canyon	Book Cliffs
28, 30	U-96 (Eccles-Clear Creek Canyons)	North Trough Springs Mud Creek	Wasatch Plateau - Scofield Reservoir
40	U-31 (Huntington Canyon)	Gooseberry	Wasatch Plateau - Electric Lake, Joe's Valley Reservoir
51	Ferron Canyon Road	Ferron Canyon	Wasatch Plateau - Ferron Canyon Picnic Area, <u>Ferron</u> <u>Reservoir Campground</u>
43,44	U-29 (Straight Canyon)	Trail Mountain	Wasatch Plateau - Joe's Valley Reservoir
141	Cottonwood Canyon Road	Trail Mountain	Wasatch Plateau

^a Map numbers correspond to Figure 3-11

tracts in all three areas. In most cases actual mining activities are located away from major travel routes and are seldom seen by individuals traveling through the region. Mining-related disturbance (including coal-fired powerplants, coal stock piles, and coal loading facilities) are highly visible from US Highway 6 from Woodside through Price Canyon, from the Wellington to Myton road, from Utah Highway 31 through Huntington Canyon, and from Utah Highway 10.

The tract lands are located on dissected plateaus or flat valley areas that are common to the region. In general, the tract lands have neither outstanding nor unique scenic values, although the Moab District, BLM, has given portions of the Blue Trail Canyon and Dugout-Pace tracts high scenic quality ratings when considered within the physiographic region.

The tract lands have been given visual resource management (VRM) ratings as shown in Table 3-17. Management objectives for each VRM classification allow a different degree of modification in the landscape. Management objectives are described in Appendix 5.

Portions of almost all of the tracts are visible at varying distances from primitive roads that are often used for dispersed recreation access. Portions of some of the tracts are visible from major recreation access roads or use areas as described below. Use figures, if available, are given in the Transportation or Recreation sections of this document.

Although portions of Alkali Creek, Soldier Creek, and Whitmore Park tracts are visible from the Wellington to Myton road, and although portions of the North Trough Springs tract are visible from Utah Highway 31, the logical surface development areas are not visible from these roads. The eastern escarpments of the Pines and Quitcupah tracts are visible from highway U-10 but surface development areas cannot be seen from the highway.

Portions of the Gooseberry tract and its logical portal location are visible at distances of less than 1.0 to 2.5 miles from segments of Utah Highway 31 and the Skyline Drive, from the Flat Canyon Campground and an area of summer cabins, and from roads that access the above attractions.

Portions of the Trail Mountain tract are visible from Utah Highway 29 and from the Cottonwood Creek road. Logical portal locations are visible at viewing distances of less than 1.0 mile for approximately 0.5 miles along Utah Highway 29, and for approximately 2.5 miles along the Cottonwood Creek Road.

Portions of the Ferron Canyon tract including the logical portal location are visible from the Ferron Canyon road at distances of approximately 1.0 to 4.0 miles. The Ferron Canyon road which would be reconstructed lies within a partial retention area.

Portions of the Ivie tract at a distance of less than 1.0 mile, and the Blue Trail Canyon tract at a distance of 2.0 to 3.0 miles, are visible from Interstate 70, a major scenic travel route to national recreational attractions. Because of intervening terrain, logical surface development areas on the tracts are probably not visible from the Interstate.

TABLE 3-17

VISUAL RESOURCE MANAGEMENT CLASSIFICATIONS
OF COAL TRACTS IN CENTRAL UTAH

Tract	Classification	General Location of Classification Area
<u>Book Cliffs Area</u>		
Alkali Creek ^a	VRM Class III	Area highly visible (foreground) from the Wellington to Myton road. Remainder of tract.
	VRM Class IV	
Coal Creek ^a	VRM Class IV	Entire tract.
Dugout-Pace ^a	VRM Class II	In general an area of high quality scenery along the northern boundary of the tract. Remainder of tract.
	VRM Class IV	
Graves ^a	VRM Class IV	Entire tract.
Hoffman Creek ^a	VRM Class IV	Entire tract.
Soldier Creek ^a	VRM Class III	Area highly visible (foreground) from the Wellington to Myton road. Remainder of tract.
	VRM Class IV	
Whitmore Park ^a	VRM Class III	Entire tract.
<u>Wasatch Plateau Area</u>		
Acord ^a	Partial Retention	Entire tract.
Castle Valley Ridge	Not Available	
Ferron Canyon	Partial Retention	Area highly visible (foreground) from the Ferron Canyon road.
Gooseberry ^a	Not Available	
Ivie	Partial Retention	Area highly visible (foreground) from I-70. Remainder of tract.
	Modification	
Mud Creek	Not Available	
North Trough Springs ^a	Not Available	

continued

Table 3-17 (cont'd.)

Tract	Classification	General Location of Classification Area
Quitcupah	Partial Retention Modification and Maximum Modification	Not available.
Skumpah ^a	Partial Retention	Entire tract.
The Pines	Not Available	
Trail Mountain	Partial Retention	Entire tract.
<u>Emery Area</u>		
Walker Flat ^a	VRM Class III	Entire tract.
Blue Trail Canyon	VRM Class II	Area of high quality rated scenery in the southeastern portion of the tract.
	VRM Class IV	Remainder of the tract.

^a This entire tract is either partially or entirely under private surface ownership. The VRM classification given indicates how the lands would be classified if entirely under Federal surface ownership. Although VRM classifications are not generally applied to private surface lands, they are applied here so that the effect of Federal coal leasing and development can be determined for private surface lands in the same manner as for Federal surface areas.

Utah Highway 10 transects the Walker tract from north to south, however, logical off-tract portal locations are not visible from the highway.

Special Designation Areas

The four-county region contains portions of one national park, one natural area, and one natural landmark. Although there are no officially designated wilderness areas or wild and scenic rivers within the four-county region, there are 12 areas presently under wilderness review and four rivers presently being inventoried for wild and scenic values. In total there are 17 areas in the region with special designation or potential for special designation. These areas are listed in Appendix 6. None of these areas are within the proposed lease tracts.

As a result of a 1979 Ninth Circuit Court decision (California vs. Block) the National Forests will reevaluate for possible wilderness designation in on-going Land and Resources Management Plans and EISs those areas that were identified in the Roadless Area Review and Evaluation II (RARE II) decision document for nonwilderness uses, and that remain essentially roadless and underdeveloped. Among the RARE II nonwilderness areas on the Manti-LaSal National Forest are six roadless areas (4-408, 4-415, 4-417, 4-423, 4-424 and 4-427) portions of which are located within one or more of the following five coal tracts: Castle Valley Ridge, Trail Mountain, Ferron Canyon, The Pines, and Quitchipah.

Southern Utah

Climate, Air Quality

Climate

General characteristics of the climate discussed under central Utah also apply to southern Utah.

Climate data collected at Alton, Utah represents the potential lease tracts. Wide diurnal variations in temperature are common, with an annual average diurnal variation of 29 F degrees at Alton. January is the coldest month with a mean temperature of 27 degrees F. July is the warmest month with an average temperature of 66 degrees F. Frost-free days or growing season averages 112 days at Alton. Annual precipitation at Alton averages 16 inches. Precipitation is spread evenly throughout the year, except for May and June when less than 1 inch occurs on the average. All other months average between 1 and 2 inches of precipitation. Precipitation north and east of the tracts on the Paunsaugunt Plateau averages about 25 inches per year. Annual average snowfall is 68 inches at Alton and up to 150 inches on the Paunsaugunt Plateau (Science Applications Incorporated, 1981).

The most frequent wind directions are north-northeast and northwest, occurring 34 percent of the time. These wind directions, associated with low wind speeds, result primarily from drainage flow off the Paunsaugunt Plateau.

Delta T measurements at the Bald Knoll meteorological tower indicates the frequency of unstable conditions is 11 percent, neutral stability conditions 28 percent, and stable conditions occur 61 percent of the time. Unstable conditions occur most frequently in summer and during afternoons, while stable conditions occur most frequently in fall and winter and during nighttime and early morning hours.

Air Quality

Air Quality Standards

The central Utah discussion explains the applicable air quality standards and objectives.

High particulate concentrations exceeding the 24-hour NAAQS have been measured at Bullfrog, Cedar City, Hurricane, and Wahweap (Table 3-18). These concentrations resulted primarily from windblown dust and dust from traffic on unpaved roads. Sulfur dioxide and nitrogen dioxide concentrations are less than 30 percent of the NAAQS. Monitoring of lead and ozone at Page, Arizona indicated concentrations well within the NAAQS. Although there is no information concerning carbon monoxide and hydrocarbons, concentrations should be well within the standards due to the rural setting and low traffic volumes.

The area near the proposed lease tracts is rural and has a very low population density; consequently the existing air pollutant levels are expected to be very low. Because TSP concentrations are expected to increase substantially

TABLE 3-18

SOUTHERN UTAH
MEASURED PARTICULATE CONCENTRATIONS

Monitoring Location	Year	Concentrations micrograms per cubic meter		
		Maximum 24-hour average	Second Maximum 24-hour	Annual Geometric Mean
Bullfrog Basin	1977	423	258 ^a	17
Cedar City	1977	151	132	51 ^a
	1978	262	245 ^a	47
	1979	162	162 ^a	51
	1980	154	151	57
	1981	161	140	53
Hurricane	1977	175	167 ^a	16
	1978	193	133	20
Page	1977	543	213 ^a	35
	1978	137	120 ^a	25
	1979	83	75	34
	1980	97	83	37
Wahweap	1977	661	322 ^a	24
	1978 ^b	186	143	11

Sources: Arizona Dept. of Health Services, 1977-1980
Utah Bureau of Air Quality, 1977-1981
ERT, 1980.

^a Indicates violation.

^b Incomplete year.

24 hour standard may be exceeded once per year; second exceedence indicates violation.

State and Federal Standards micrograms per			
	cubic meter:	Annual	24-hour
	Primary	75	260
	Secondary	60	150

due to coal mining, existing TSP levels in the potential impact area were estimated by air quality modeling. The models ISCLT and PALDS, Bald Knoll meteorological data, and 1981 emissions data were used. Figure 3-12 shows the annual average TSP concentrations estimated using ISCLT. An annual average background TSP concentration of 15 micrograms per cubic meter is assumed to be representative of southern Utah and should be added to the annual average concentrations.

The modeling results suggest that TSP concentrations are only slightly above background levels, except near Kanab, where annual TSP concentrations are predicted to approach 50 micrograms per cubic meter due to greater population density.

Visibility

Visibility measurements taken at Bryce Canyon National Park are shown in Table 3-19. The average visual range between summer 1978 and fall 1981 was 120 miles.

Soils

The dominant soils within the Alton area are formed on mountainous terrain from shale and sandstone parent material. Most soils are well drained and loamy or clay loam in texture. The dominant landscapes associated with these soils are dissected rolling and hilly uplands and rolling upland benches. Poorly drained, clayey, and sandy clay textured soils occur on fans and valley bottoms which are the next most dominant landscapes in the area. The parent materials for these fan and valley soils are residuum, weathered from shale, sandstone, and minor amounts of basalt. A dominant landscape in the northern half of the Ford Pasture tract is a lava flow, consisting of a complex of basaltic rockland with shallow to moderately deep loamy textured soil over a basalt bedrock; these soils are well drained and have a moderate to high wind and water erosion potential.

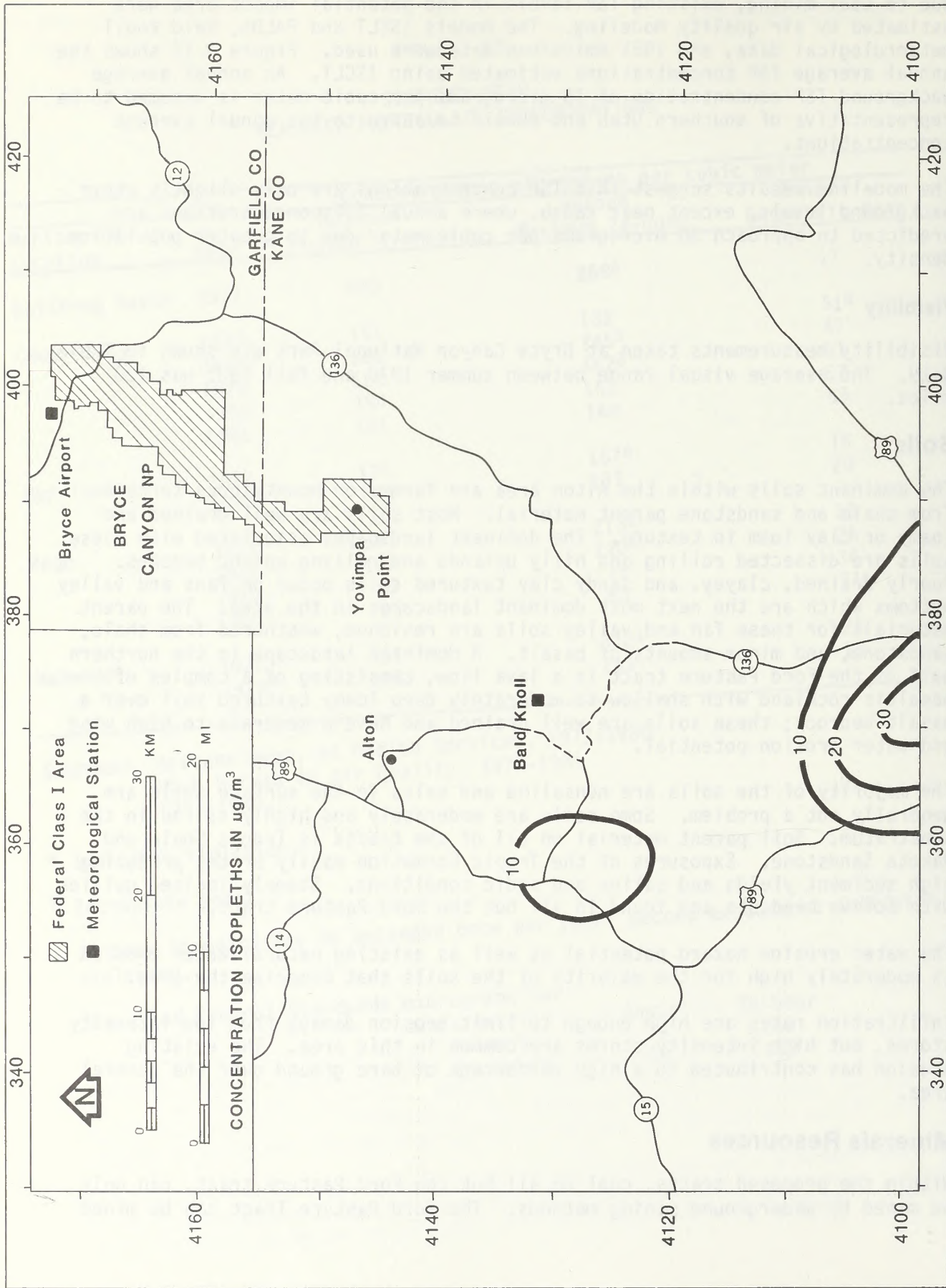
The majority of the soils are nonsaline and salts in the surface soils are generally not a problem. Some soils are moderately and highly saline in the substratum. Soil parent material on all of the tracts is Tropic Shale and Dakota Sandstone. Exposures of the Tropic Formation easily erode, producing high sediment yields and saline and sodic conditions. Steeply incised gullies with active headcuts are found in all but the Ford Pasture tract.

The water erosion hazard potential as well as existing natural water erosion is moderately high for the majority of the soils that comprise the area.

Infiltration rates are high enough to limit erosion damage from low intensity storms, but high intensity storms are common in this area. The existing erosion has contributed to a high percentage of bare ground over the general area.

Minerals Resources

Within the proposed tracts, coal on all but the Ford Pasture tract, can only be mined by underground mining methods. The Ford Pasture Tract can be mined



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 3-12
AVERAGE ANNUAL TSP CONCENTRATIONS IN SOUTHERN UTAH

TABLE 3-19
SOUTHERN UTAH
SEASONAL AVERAGE VISUAL RANGE (MILES) AT BRYCE NATIONAL PARK

Year	Season			
	Winter	Spring	Summer	Fall
1978	-	-	106	129
1979	157	93	104	119
1980	174	80	86	134
1981	160	119	95	122
4-Year Average	164	98	98	126

Source: National Park Service, 1978-1981

by both surface and underground mining methods. In-place coal reserves and coal quality data are given in Chapter 2 in the description of the alternatives.

There are no KGS for oil and gas within the Alton coal field. The tracts are not expected to contain significant minerals other than oil, gas, or coal.

Topography, Geology, Paleontology

The Alton coal field is situated in southwest Utah between the Kaiparowits and Kolob coal fields in Kane and Garfield Counties (Figure 3-2). The coal field is bounded by an erosional escarpment to the south, the Sevier Fault to the west, the Ahlstrom Hollow Faults to the north, and the Paunsaugunt Fault to the east (Doelling, 1972).

The topography of the field consists of benches and slopes, which reflect the stratigraphy and geologic structure of the area. The highest elevations are on the Paunsaugunt Plateau with a range of 7,500 to 9,000 feet. The Paunsaugunt Plateau is capped with the Claron Formation. Because the formation is more resistant to weathering, steep pink limestone cliffs border the plateau. The land slopes gently southward on the gray cliffs of the Dakota Formation.

The rock formations of the coal field range in age from the Jurassic Navajo Sandstone to the Tertiary Claron Formation. Alluvium and gravel of Quaternary age are present at the base of the Claron Formation cliffs. Quaternary igneous activity is evidenced by a few cinder cones and basalt flows. A complete description of each formation and relative age is contained in Figure 3-13.

The formations are within a syncline which bisects the plateau. The syncline strikes north 30 degrees east and plunges north. The flanks of the fold are gently dipping, usually 1 to 3 degrees. The Sevier Fault is the most important fault in terms of displacement. It strikes north 30 degrees east. The east block forms the plateau elevating the coal beds. The total displacement varies between 1,000 and 2,000 feet. The Paunsaugunt reverse fault strikes north 15 degrees east, marking the east boundary. The fault displaces the coal as much as 500 feet near Bryce Point to 100 feet near Deer Spring Point. The Ahlstrom Hollow Fault strikes east-west, north of the plateau. Displacement is approximately 500 feet. The Bald Knoll Fault parallels the Sevier and Paunsaugunt Fault. This normal fault is upthrown to the west for about 12 miles. It displaces the coal beds as much as 500 feet.

The major coal seams are located in the Dakota Sandstone. The Bald Knoll coal zone is located within 50 feet of the base of the formation, while the upper Smirl coal zone is located within 50 feet of the top of the formation. The coal beds outcrop at the elevation of 6,500 to 7,000 feet between the White Cliffs of the Jurassic Navajo Sandstone and the higher elevation Pink Cliffs of the Tertiary Claron Formation. The upper coal zone, the Smirl zone, has an average thickness of more than 12 feet and thins to the south. The lower coal zone, the Bald Knoll zone consists of several closely spaced beds. The bed

FIGURE 3-13

GENERALIZED STRATIGRAPHIC COLUMN OF THE
ALTON COAL FIELD

Period	Stratigraphic Unit		Thickness (Feet)	Description	
Cretaceous	Claron Formation		1000-1300	Pink, white, and varicolored limestone, cliff former, conglomerate of quartzite and limestone cobbles and pebbles.	
	Kaiparowits Formation		265-700	Unconformity Dark gray to gray-green arkosic sandstone, friable, calcareous cementation.	
	Wahweap Formation MINOR COAL		500-1300	Unconformity Alternating sandy shale and thin to thick bedded resistant sandstone, ledge and slope topography.	
	Straight Cliffs Formation MINOR COAL		80-500	Yellow-gray to brown thick bedded to massive cliff-forming sandstone with intervening gray shale, shaley sandstone coal, and carbonaceous shale.	
	Tropic Shale		700-1000	Gray shale with subordinate thin brown fine grained sandstone, slope former.	
	Dakota Formation MAJOR COAL SEAMS		150-450	Yellow gray to brown fine to medium grained sandstone alternating with gray shale, sandy shale, carbonaceous shale and coal, ledge and slope former creating Gray Cliffs; best coal near bottom and top of unit.	
Jurassic	Entrada Sandstone	Cannonville Member	0-300	Angular Unconformity White and reddish banded fine-grained sandstone and siltstone friable and earthy weathering, massive.	
		Gunsight Butte Member	0-300	Red-brown and light green siltstone, red cross-bedded sandstone.	
	Carmel Formation	Judd Hollow Tongue of Carmel	Wiggler Wash Member	0-60	Limestone, red siltstone, white and greenish gypsum.
			Winsor Member	180-250	White, pink, brown sandstone alternating with thin red siltstone and mudstone.
			Paria River Member	55-200	Interbedded light gray and red sandstone, limestone, siltstone, shale, and gypsum.
			Thousand Pockets Tongue of Navajo Sandstone	0-60	Yellowish cross-bedded friable, but resistant sandstone.
			Crystal Peak Member	120-190	Dark reddish brown and white to light gray fine-grained sandstone, medium-bedded with minor thin gypsiferous or calcareous shales and conglomerate.
		Kolob Limestone	122-350	Gray and tan dense limestone with some thin sandy red shale near the base and thin gypsum near top.	
Navajo Sandstone		1000+	Light gray to tan, locally red fine-grained sandstone, massive, exhibiting large-scale aeolian cross-bedding, calcareous and cliff forming.		

Modified from Doelling and Graham, 1972

thickness averages 5.5 feet with 1.2 feet of waste due to splits. The bed is not minable in the vicinity of the Sevier Fault zone.

Potential fossil-bearing units within the study area range in age from unconsolidated Pleistocene deposits to the early Jurassic Windsor Formation, which is in part equivalent to the Carmel Formation. Significant fossils have been found in almost every stratigraphic unit across the southern half of the State.

The Kaiparowits Formation and underlying Wahweap Sandstone (both of Late Cretaceous age) are potentially important, having yielded dinosaur bones as well as other fossil vertebrate, invertebrates, and plants. The Straight Cliffs sandstone is also paleontologically important having yielded fish remains, as well as invertebrate and plant fossils.

The Lower Cretaceous Tropic shale is most important paleontologically as a source of fossil cephalopods (from key horizons) and other invertebrates.

Rare and very significant fossils have been found in the coal-bearing Dakota Sandstone. Among these are dinosaurs, bird remains, other reptiles, invertebrates, and plant material.

A literature search was conducted to evaluate research completed in this region to identify, as far as possible, the known fossils and their association with the various formations in the region. The results of this literature search are compiled in a technical report on file at the BLM Utah State Office.

Water Resources

Surface Water

All of the southern Utah tracts proposed for leasing in the Alton area are in the Lower Colorado River Basin. Runoff from those tracts reaches the Colorado River by way of the Virgin River and Kanab Creek. The Flax Lakes tract drains to the Virgin River, whereas the Alton Amphitheater, Fisher Canyon, Mill Creek Canyon, and Ford Pasture tracts drain to Kanab Creek.

Estimated mean annual runoff from the southern Utah tracts proposed for leasing ranges from about 1 inch (about 50 acre-feet per square mile) in the lowest parts of the Flax Lakes and Ford Pasture tracts to about 8 inches (about 400 acre-feet per square mile) in the highest part of the Alton Amphitheater tract. Most of the runoff, however, is generated on the highest parts of the Paunsaugunt Plateau upstream from the tracts where it is estimated to exceed 12 inches (640 acre-feet per square mile) locally (Bagley et al., 1964). The seasonal peak runoff period is generally May to June, chiefly in response to the melting of winter snowpacks. Some runoff is also generated by local torrential summer rainstorms; flash floods resulting from such storms have been recorded throughout the Virgin River and Kanab Creek basins. They have occurred in perennial, intermittent, and ephemeral streams, and in some cases have caused considerable property damage (Woolley, 1946; Butler and Marsell, 1972). In some cases flood stages of the affected streams have ranged from several to more than 10 feet higher than the medium-flow stage.

Records of runoff (including annual peak discharges of some streams) have been collected by the Geological Survey at several streamflow gauging stations in the Virgin River and Kanab Creek basins. The gauging station sites are shown in Figure 3-14.

Runoff from the area of the southern Utah tracts ranges from fresh to slightly saline (Table 3-20). In most places, dissolved-solids concentrations of streamflow are less than 500 milligrams per liter during low flow and less than 250 milligrams per liter during high flow. In sections of Kanab and Johnson Canyon Creeks that cross the salt- and gypsum-bearing Tropic Shale and Carmel Formations, dissolved-solids concentrations of the streamflow generally exceed 1,000 milligrams per liter during both low and high flow periods (Price, 1980).

Principal minerals in the freshwaters are calcium and bicarbonate; in the most highly saline waters they are sodium and sulfate. There are no unusually large concentrations of trace elements in the streamflow.

According to the U.S. Soil Conservation Service (SCS, 1973) general sediment yields in the area of the southern Utah tracts range from about 0.1 to more than 3.0 acre-feet per square mile, with an average of about 1.8 acre-feet per square mile.

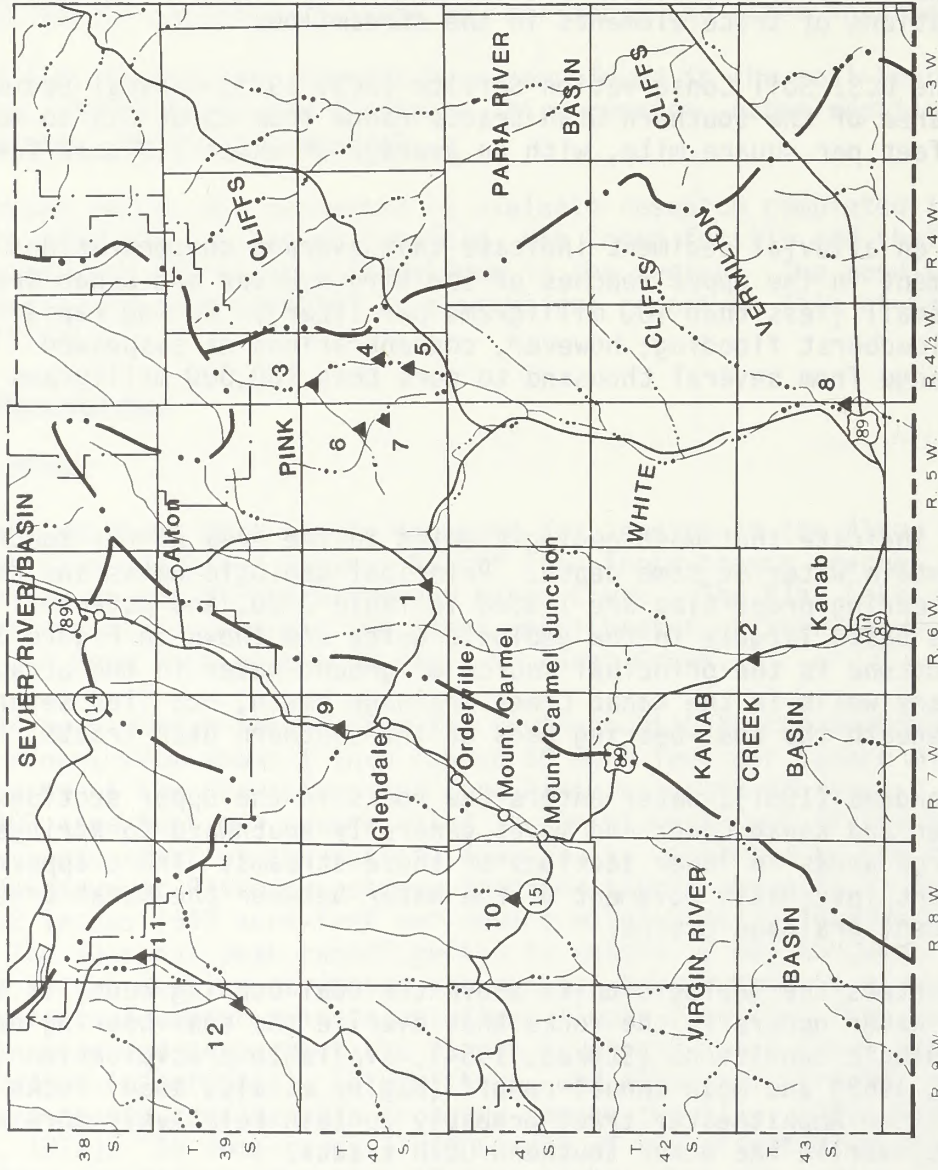
Available data on alluvial sediment indicate that average concentrations of suspended sediment in the upper reaches of the Virgin River and Kanab Creek are generally small (less than 100 milligrams per liter). During rapid snowmelt and cloudburst flooding; however, concentrations of suspended sediment may range from several thousand to more than 100,000 milligrams per liter.

Ground Water

Available data indicate that most geologic units in the area of the southern Utah tracts contain water at some depth. Principal geologic units and their general water-bearing properties are listed in Table 3-20, and potential yields of wells based largely in the geologic units are shown in Figure 3-15. The Navajo Sandstone is the principal source of ground water in the area. It is tapped by many wells in the Kanab Creek drainage basin, but lies several hundred feet beneath the coal-bearing beds of the southern Utah tracts.

According to Cordova (1981), water enters the rocks in the upper sections of the Virgin River and Kanab Creek and moves generally southward to springs and natural discharge areas in lower sections of those streams. There appears to be no significant interbasin movement of the water between the Kanab Creek basin and adjacent drainage basins.

Because water enters the geologic units above the coal-bearing beds, it is concluded that water occurs in the rocks that overlie the coal-bearing beds. Considering geologic conditions (Stokes, 1964), available precipitation (U.S. Weather Bureau, 1963) and mean annual runoff (Bagley et al., 1964) rocks overlying the Alton Amphitheater tract probably contain relatively more water than rocks that overlie the other southern Utah tracts.



(Base from USGS, 1977)

FIGURE 3-14
SOUTHERN UTAH G.S. GAUGING STATION SITES

TABLE 3-20
WATER BEARING PROPERTIES OF PRINCIPAL GEOLOGIC UNITS IN SOUTHERN UTAH

Geologic Unit	Yields of ^a wells and springs	Water Quality	Remarks
Quaternary Basalt	Small to large	Fresh to slightly saline	
Quaternary Valley fill	Small to large	Fresh to moderately saline	Many irrigation and some public-supply wells are in this unit.
Wasatch Formation	Small	Fresh	A major source of base flow.
Kaiparowits Formation	Small to large	Fresh	A major source of base flow.
Wahweap Sandstone Straight Cliffs Sandstone	Small to large	Fresh to slightly saline	A major source of base flow.
Tropic Shale	Small to moderate	Fresh to slightly saline	
Dakota Sandstone	Unknown	Fresh to slightly saline	
Undivided; excludes Carmel Formation	Small to moderate	Fresh to slightly saline	Moderate.
Carmel Formation	Small to moderate	Slightly saline	
Navajo Sandstone	Small to large	Fresh	Many irrigation and most public-supply wells are in this unit. Dissolved-solids concentration of water produced generally less than 250 milligrams per liter.
Kayenta Formation (exclusive of Tanney Canyon Tongue)	Small to moderate	Fresh	

continued

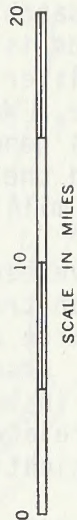
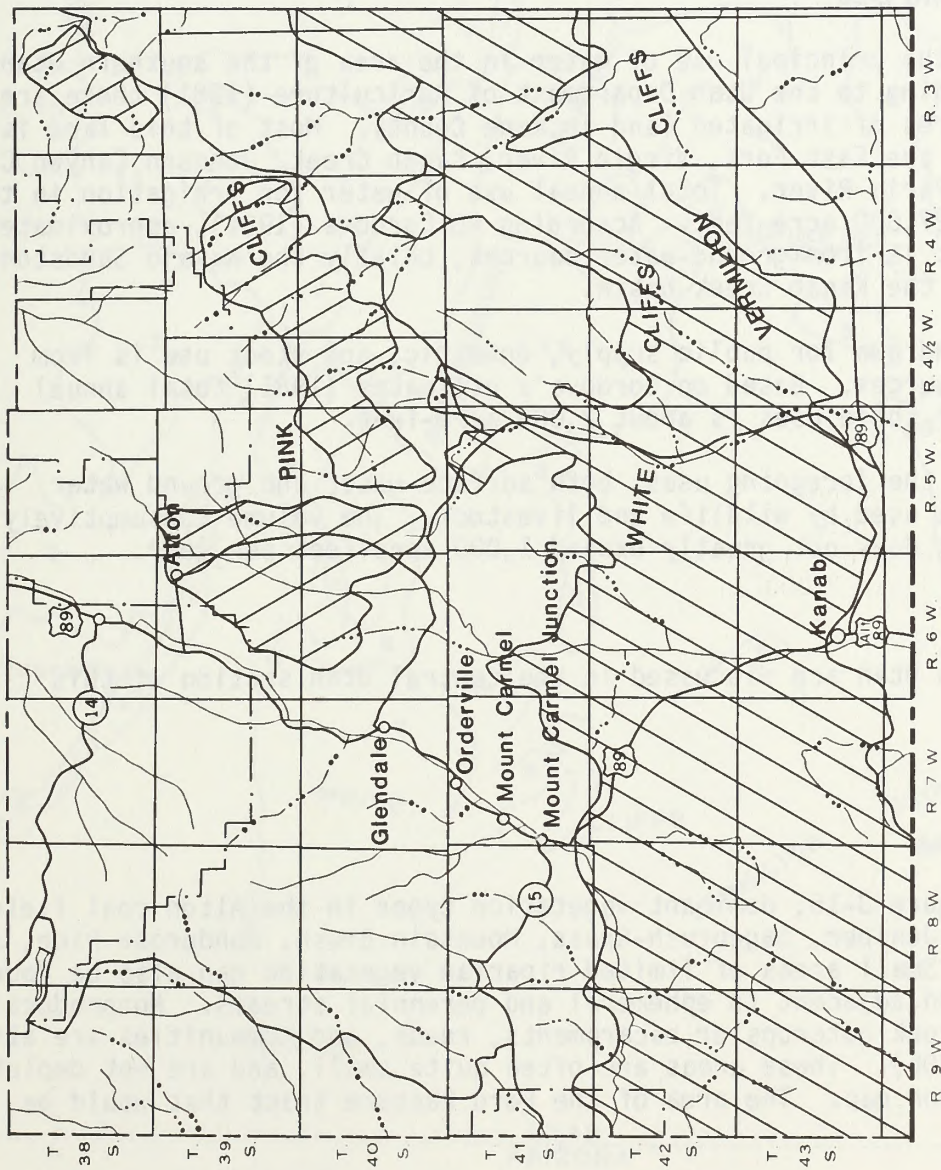
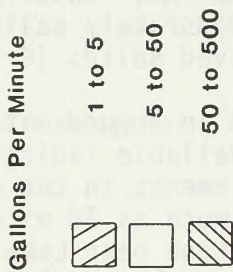
TABLE 3-20. cont'd

Unit	Yields of wells and springs	Water Quality	Remarks
Moenave Formation	Small to moderate	Fresh	
Chinle Formation	Small to moderate	Fresh to slightly saline	
Shinarump Member of the Chinle Formation	Small to large	Fresh to moderately saline	Some irrigation and public supply sources are in this unit.
Moenkopi Formation	Small to moderate	Fresh to moderately saline	
Kaibab Limestone	Small to large	Fresh to moderately saline	
Undivided sequence in which the Coconino Sandstone is the thickest unit	Unknown	Unknown	

Source: Cardova, 1981

- ^a Yields of wells and springs: Small 10 gal/min or less; moderate 10 to 100 gal/min; large 100 to 1,000 gal/min. Water quality: Freshwater has a dissolved-solids concentration of less than 1,000 mg/l; slightly saline water 1,000 to 3,000 mg/l; moderately saline water 3,000 to 10,000 mg/l.

Potential yields of wells at least 6 inches in diameter and up to 1,000 feet deep are generally in the ranges shown:



(Base from USGS, 1977)

FIGURE 3-15
POTENTIAL YIELDS OF WELLS IN SOUTHERN UTAH

Water in the Wasatch Formation and most other geologic units that overlie the coal-bearing beds is generally fresh and in most places contains less than 500 milligrams per liter of dissolved solids; this is also generally true of the Navajo Sandstone. Water in most other geologic units, including the coal-bearing beds, is generally fresh to slightly saline. Locally, however, the Tropic Shale and the Carmel Formation may be moderately saline, containing more than 3,000 milligrams per liter of dissolved solids (Price, 1980).

Few analyses have been made for trace elements in ground water in the area of the southern Utah tracts. The limited data available indicate that there are not unusually large concentrations of trace elements in the water from most geologic units. Arsenic concentrations of as much as 70 micrograms per liter have been found in water from the Navajo Sandstone near Lake Powell. The arsenic may be related to the Carmel Formation or rocks of Cretaceous age (Personal communication, Paul Blanchard, GS, 1982).

Water Supply and Use

Irrigation is the principal use of water in the area of the southern Utah tracts. According to the Utah Department of Agriculture (1981) there are about 8,900 acres of irrigated land in Kane County. Most of this land is in the valleys of the East Fork, Virgin River, Kanab Creek, Johnson Canyon Creek, and the upper Paria River. Total annual use of water for irrigation in the area is about 27,000 acre-feet. According to Cordova (1981), approximately 1,000 acre-feet is from ground-water sources, chiefly the Navajo Sandstone and older rocks in the Kanab Creek basin.

Most water withdrawn for public supply, domestic, and stock use is from ground-water sources. Based on Cordova's estimates (1981) total annual withdrawals for these uses is about 2,000 acre-feet.

In addition to the foregoing uses, both surface water and ground water (springflow) is used by wildlife and livestock. The volume consumptively used is unknown, but does not greatly exceed 1,000 acre-feet per year.

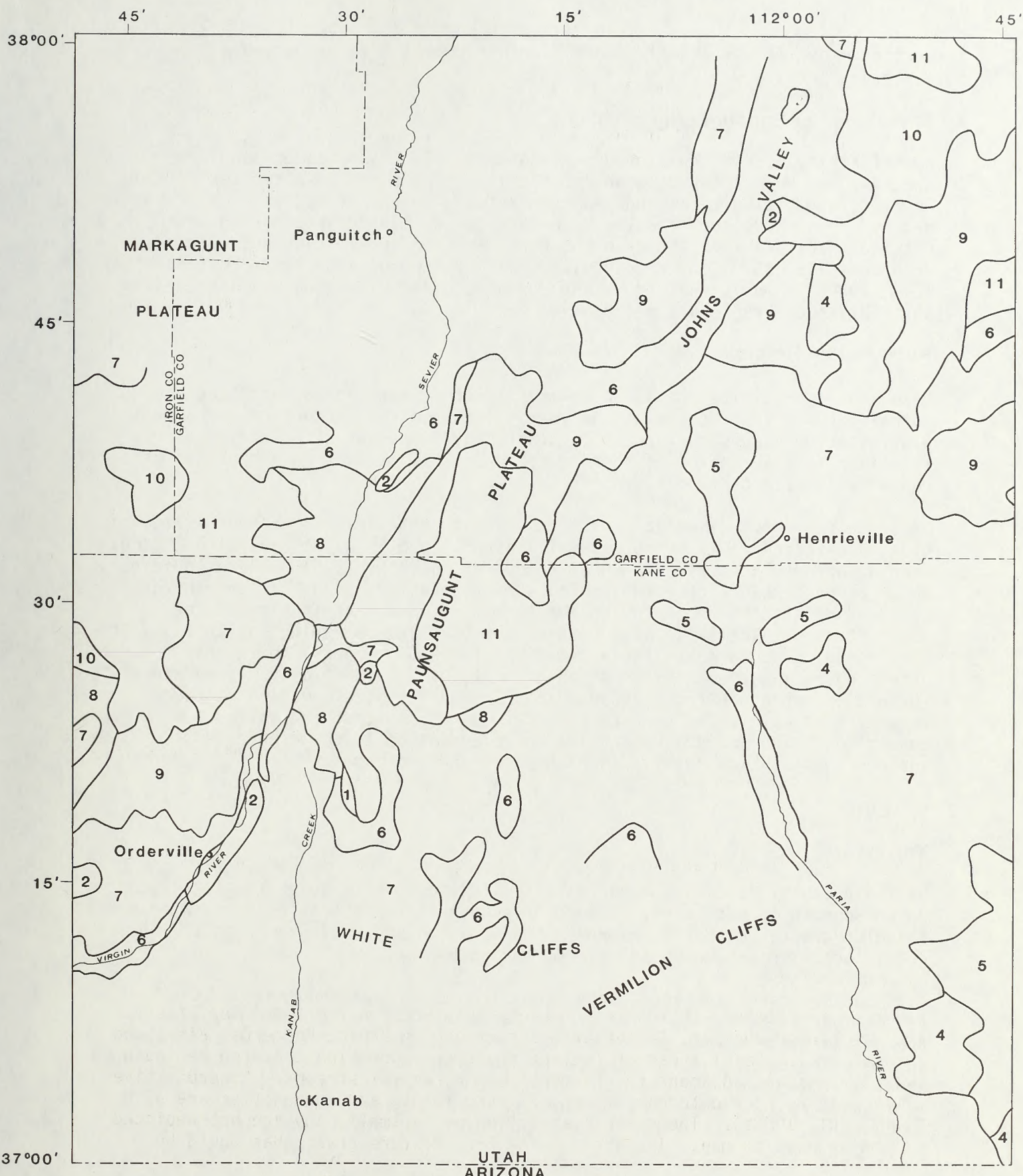
Water Rights

Water rights in Utah are discussed in the central Utah section of this Chapter.

Vegetation

Vegetation Types

As shown in Figure 3-16, dominant vegetation types in the Alton coal field include Pinyon-Juniper, Sagebrush-Grass, Mountain Brush, Ponderosa Pine, and Agricultural. Small areas of limited riparian vegetation can also be found near springs and adjacent to ephemeral and perennial streams. Nonproductive areas such as rock outcrops or escarpments, roads, and communities are also found (ERT, 1980b). These areas are often quite small, and are not depicted on the vegetation map. The area of the Ford Pasture tract that would be



VEGETATION TYPES

- | | |
|--------------------|----------------------------|
| 1. Non-productive | 7. Pinyon-Juniper Woodland |
| 2. Agricultural | 8. Mountain Brush |
| 3. Riparian | 9. Ponderosa Pine |
| 4. Grassland | 10. Aspen |
| 5. Desert Shrub | 11. Conifer-Aspen |
| 6. Sagebrush-Grass | |

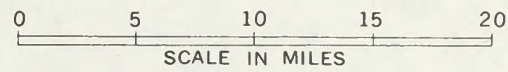


FIGURE 3-16
SOUTHERN UTAH VEGETATION TYPES

surface mined is essentially Pinyon-Juniper Woodland interspersed with sagebrush parks.

Threatened or Endangered Plants

No officially listed threatened or endangered plant species or candidate species have been located on any of the five tracts in the Alton coal field. However, vegetation types and geologic setting on the tracts is similar to nearby areas where such species have been found. These species and their critical habitats are listed in the Final Environmental Statement: Southern Utah Coal (GS, 1979) and Kaiparowits Coal Development and Transportation Study (ERT, 1980b). Additional threatened or endangered plant species searches on the individual tracts are necessary.

Reclamation Potential

Mean annual precipitation is approximately 16 inches and May and June are normally the driest months of the year. Twenty-eight percent of the annual precipitation occurs during July, August, and September often coming as localized intense storms of short duration. This results in high rates of runoff with attendant soil erosion hazard.

Based on the above climatic conditions, it is probable that without irrigation, vegetation would be successfully established in about one-third of the seeding efforts according to EMRIA Report No. 4 (BLM, 1975). There would be about an even chance of establishing some vegetation in another one-third of the seeding efforts depending on the timeliness and distribution of the precipitation. The EMRIA Report concludes that the remaining one-third of the time, seeding would most likely result in failures. Local conditions affecting reclamation include depth of soil, high rock volume in some areas (basalt or sandstone rock exposures), and Tropic Shale Formation exposure which erodes easily and produces high yields of sediment and saline and sodic conditions. The primary constraint to revegetation is the high rate of surface runoff which results in high water erosion rates.

Wildlife

Terrestrial

Garfield County has a large variety of wildlife in life zones ranging from Upper Sonoran to Hudsonian. Mule deer occupy all of the life zones, with elk and blue grouse occupying primarily the Canadian and Hudsonian zones. Sage grouse occur in sagebrush in valleys and on benches.

Life zones present in Kane County range from the Lower Sonoran near the Arizona border to the Canadian on the Markagunt and Paunsaugunt Plateaus at the northwestern corner of the county. Much of the lower terrain is dry and sparsely vegetated and is characterized by steep cliffs, canyons, breaks, and eroding stream beds that support only limited riparian habitat. Small irrigated cropland areas are confined to lands adjacent to the small communities. These conditions somewhat limit the variety of wildlife species

and population densities. Figure 3-17 shows the distribution of major game species and Table 3-21 depicts life zones, plant communities, and representative wildlife relationship.

Mule deer are the most common large mammal in the area and historically reached very high population levels. Currently, deer numbers are depressed especially in Herd Unit 60 A, which includes the Paunsaugunt Plateau and the Alton area; this unit has been closed to hunting since 1980 (Figure 3-17). Counts in 1981 (from summer spotlight routes) indicate a population level only 12.5 percent of the previous 1971 counts. The 1971 counts were prior to a decline that apparently began in 1972. The existing herd probably lacks sufficient mature does (5 to 7 years old) to increase productivity; this is evidenced by the fact that even with complete protection, the herd level is static or decreasing (UDWR, 1982). The UDWR management objective is to maintain a herd capable of producing an annual average harvest of 450 bucks (UDWR, 1980). This has not occurred since 1972 and herd levels would need to be at 1971 levels to produce this harvest. The herd unit prior to closure was utilized by an average of 1,000 hunters annually. Thus future hunting regulations would probably be restrictive and any antlerless harvest would be site specific and tightly controlled.

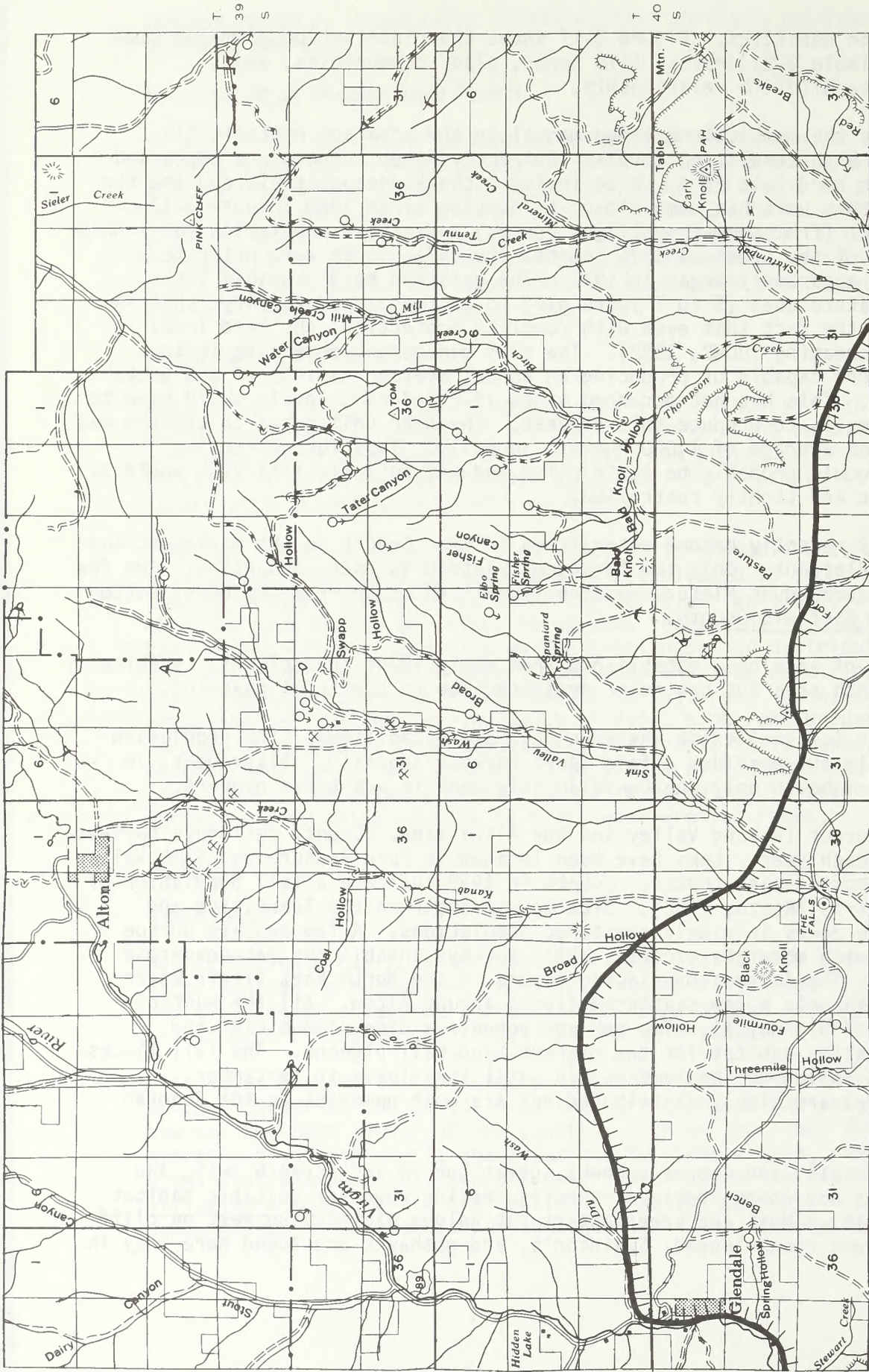
Elk have only recently become established in Kane County on the Markagunt and Paunsaugunt Plateaus. Only the Markagunt Plateau is open to hunting. The few elk on the Paunsaugunt Plateau apparently drifted south from the Mount Dutton Herd Unit in Garfield County.

A small band of antelope, established from early 1970s transplants, inhabits the Clark Bench area but has never prospered due to continual poaching.

Mountain lion (cougar) exist wherever deer are established. The population appears stable and provides a fair sport harvest annually. Black bear, in Kane County, inhabit only the Canadian life zone in scattered numbers.

Sage grouse occur in Long Valley and the Alton area. County residents harvest a few birds each year. Leeks have been located in Ford Pasture and Sink Valley near the proposed lease tracts. Counts in 1982 indicate a fall population of 100 to 150 birds (Ruzzo, 1982). Blue grouse occur in the Transition and Canadian life zones in widely scattered populations. A few hunters pursue these birds with moderate success. Wild turkeys inhabit the oak-ponderosa communities. The largest population occurs in the North Fork Virgin River watershed with only a few scattered flocks around Alton. All the hunting occurs west of Highway 89. The oak and ponderosa pine communities are important nesting habitat for the migrant band-tail pigeons. The fall flocks shift around following the feed supply until they leave in September. Mourning doves are widely distributed but are most numerous in the Sonoran life zones.

Sparrow, red-tail, and Cooper's hawks, great horned and screech owls, and golden eagles are common resident species nesting wherever suitable habitat and prey exists. Most are tree nesters but golden eagles also nest on cliff faces. Migrant rough-legged, Swainson's, and goshawks are found here only in



Deer Winter Range

FIGURE 3-17
SOUTHERN UTAH DEER WINTER RANGE

TABLE 3-21
SOUTHERN UTAH LIFE ZONES AND REPRESENTATIVE WILDLIFE

Life Zone	Dominant Plant Communities	Representative Wildlife
Lower Sonoran	Desert Shrub	Reptiles Raptors (winter) Black-tailed jackrabbits Antelope
Upper Sonoran	Sagebrush/Grass Pinyon-Juniper	Mule deer (winter) Desert cottontail Rodents
Transition	Pinyon-Juniper/Sagebrush	Mule deer Sage grouse Bandtail pigeon Turkey
Canadian	Conifer-Aspen	Mule deer (summer) Blue grouse Cougar Elk Black bear

the winter from November to April. Raptor populations are greatest during the winter when most areas of the county are utilized for prey searching.

Numerous small mammals and birds are distributed throughout the county and provide the prey for raptors and mammalian predators.

Fisheries

Numerous lakes and streams inhabited by trout occur in the mountains of Garfield County. Portions of the headwaters of the Sevier, Paria, and Virgin Rivers are located in Kane County on the Markagunt and Paunsagunt Plateaus. Short stretches of Asay Creek on the Sevier River system are rated as high priority fisheries and the remainder of Asay Creek, East Fork of the Sevier River, and Deep Creek, (a tributary of the North Fork Virgin River), are rated as substantial fisheries (USFWS-UDWR, 1978). Kanab Creek, a tributary of the Colorado River, originates above Alton and flows south through a cut-bank flat channel to a deep canyon south of Kanab City. Little pool and ripple habitat exists in the stream for trout except in the headwaters.

Species in these waters include rainbow and brown trout, speckled dace, flannelmouth sucker, and Gila sucker.

The majority of the fishing pressure in Kane County is concentrated on Navajo Lake, Deep Creek, and Asay Creek (all on the Markagunt Plateau).

Threatened or Endangered Species

Two endangered species, the American peregrine falcon and the northern bald eagle occur in Kane County. One active peregrine falcon eyrie is located in Bryce Canyon Park. Numerous sightings indicate both resident and migrant populations are present. The bald eagles occur only as winter visitors concentrating in the upper Virgin and Sevier River valleys. Lesser numbers occur throughout the Alton Area where they hunt for food.

In the Virgin River downstream from the tracts the woundfin, a Federally-listed endangered species, the Virgin River roundtail chub, a candidate for inclusion on the Federal endangered list, and the Virgin River spinedace, listed as a declining species by the UDWR, are found.

Land Use

Agriculture and Range

The tract areas are tributary to several streams and spring areas that are used for cropland or pasture irrigation in the Alton Amphitheater area and in valley areas south of the coal tracts. Streams and/or springs are located on all coal tracts, with the exception of Ford Pasture. An irrigation system organized under consolidated users delivers water to approximately 310 agricultural acres in the vicinity of Alton, Utah (personal communication, Heaton, Alton Irrigation Association, 1982 and Simper, Soil Conservation Service, Cedar City, Utah, 1982). Canals, ponds, and stream intake structures

operated by the irrigation company, and approximately 95 acres of irrigated pasture land are located on the Alton Amphitheater tract (BLM, 1982c). The farmlands that are under full irrigation in the Alton Amphitheater area are classified as prime farmlands by the Soil Conservation Service (personal communication, Simper SCS, Cedar City, Utah, 1982). Irrigation of cropland and pasture in the valley areas south of the tracts is done by systems developed by individual private landowners. Valleys are irrigated by stream and well water. As with the Alton Amphitheater area, the fully irrigated cropland in the valley areas is classified as prime farmlands by the SCS.

Public lands administered by BLM and the private lands are being grazed by livestock. Eleven grazing allotments are located within the coal tract areas and each tract is occupied by portions of two to six of the 11 allotments (personal communication, Wilkens, BLM, Cedar City, Utah, 1982). There are 53,180 acres in these 11 allotments, of which 24,737 acres are classified as suitable range. The present use on these allotments is 2,360 AUMs. There are 6,360 private acres being grazed on the coal tract areas with a production of about 584 AUMs (BLM, 1982c).

Streams and springs located on the coal tracts are used for livestock watering. Livestock watering rights on these sources are held by ranchers and BLM (BLM, 1982c).

In the Alton Amphitheater area, ranchers seasonally trail and truck livestock into and out of the BLM allotments. No defined livestock driveways are established.

Several farm and ranch operators graze substantial numbers of cattle and limited numbers of sheep and horses on cropland near the Alton Amphitheater tract and in the vicinity of Kanab and Panguitch.

Energy and Minerals Development

Twenty-eight existing leases, involving 25,818 surface acres, are in the Alton coal field. None of these leases have been developed, and the coal resources are currently being investigated by the lessees.

Portions of from 1 to 14 oil and gas lease areas are located on the coal tract areas (personal communication, Wilkens, BLM, Cedar City, Utah, 1982). There have been several exploratory wells drilled on the tracts but no producing wells have been developed.

Rights-of-Way, Special Uses, Other Land Uses

Several springs and creeks on the Mill Creek Canyon Tract serve as domestic water supplies for scattered summer cabins and ranches located on the tract. No domestic water sources exist on the other four coal tracts. Domestic water supplies for the community of Alton and for scattered ranch facilities south of Alton are derived from wells on springs located off the tracts. Kanab derives water from a spring and five wells located about 7 miles north of the municipality; from the Navajo Sandstone aquifer.

A portion of the southern boundary of the Alton Amphitheater tract is located contiguous to the community of Alton. Improved roads, domestic and agriculture water developments, electrical power distribution lines, telephone lines, and pastures are located along this boundary.

Proposed rights-of-way for segments of the coal slurry pipelines and power distribution lines associated with the proposed Allen-Warner Valley Project coal preparation would cross the southwest portion of Ford Pasture Tract.

Land Use Plans, Controls, and Constraints

Federal Plans

As part of the BLM Zion MFP, a Summary applying the Unsuitability Criteria (CFR 43 3461) to the Alton KRCRA was completed in October 1980 (BLM, 1980b). A petition of November 28, 1979, asked that lands near Bryce Canyon, of which the five Alton Area coal tracts were a part, be declared unsuitable for coal mining. A Petition Evaluation Document and EIS was completed in November 1980 (OSM, 1980). A decision by the Secretary of the Interior was issued on December 16, 1980 which amends the decisions presented in the MFP Summary for The Planning Unit. None of the land within the Alton Area coal tracts is affected by the Secretary's decision. The Zion MFP and Summary address all lands within the tract boundaries as acceptable for further leasing consideration. The Secretary's decision designated all Federal lands in township T. 40 S., R. 4 W.; T. 39 S., R. 4 W.; T 38 S., R. 4 W.; T 38 S., R. 3 W.; T 37 S., R. 4 W.; T 37 S., R. 3 W as unsuitable for surface coal mining operations. These lands are in the northeastern portion of the Alton coal field. None of the Alton area coal tracts is in the unsuitable area. All five Alton tracts are in areas identified as acceptable for further consideration for coal leasing in the Zion MFP.

Following the Secretary's decision, three suits were filed with the United States District Court for the District of Utah seeking to have the Alton decision set aside on the basis that it was arbitrary and capricious. Two companies that hold coal leases in the area argue that the decision impaired their contractual rights under their leases and that it constituted a taking of private property for public purpose without due process of law. The State of Utah argues that the Secretary's decision would preclude coal development on intermingled State lands. The third suit, filed by several environmental organizations and individuals, who argue that the Secretary erred in not designating the entire Alton coal field as unsuitable for surface mining. These suits have been consolidated into one lawsuit still pending and no court date has been set.

County Plans

All of the tracts in the southern Utah area are in Kane County. The thrust of the Kane County Master Plan in regard to coal mining developments is twofold; (1) support for development to increase economic potential and diversity of the area which will provide greater job and income opportunities for local citizens, and (2) implementation of land use strategies that will control growth and provide adequate services and facilities for county citizens. Plan

direction emphasizes the following in regard to impacts resulting from energy-related projects: (1) permanent year-round subdivision development should be within the existing communities; (2) existing and potential irrigated cropland will be protected through preferential tax treatment and restricting incompatible lands uses; (3) zoning ordinances should be up-dated to preserve agricultural land in the county for food and livestock production; (4) coal and other resources should be developed for the greatest economic advantage to the area; (5) areas defaced through mining, exploration, or timber removal, should be restored to the original condition or better.

Access roads into these areas should be built according to proper standards and be maintained with County equipment, to take advantage of agricultural development or recreational attraction; (6) the priority of natural resource development should be: water first, followed by coal, oil, and gas, the mining of minerals in the area and community development; (7) the county should promote and identify utility corridor and transportation routes for present and future development of natural resources to benefit both tourism and economy (Kane County, 1982a). Energy-related projects generating socioeconomic development impacts in county areas presently dedicated to rural agricultural uses and located in areas that have poor or no transportation access will be mandated to assess project impacts, identify plans to mitigate the impacts, and bear the major costs for mitigation (personal communication, McDonald, Five-County Association of Governments, 1982).

Relevant county zoning ordinance references, specifically related to coal mining in the Alton Areas, are as follows (Kane County, 1982b): All of the Alton Amphitheater and Flax Lakes tracts are zoned as agricultural, as are major portions of the Fisher and Mill Creek Canyon tracts. The Ford Pasture tract and small portions of the Fisher and Mill Creek Canyon tracts (including the logical portal areas) are zoned as multiple use zone MU-160. (The numerical designation MU-160 refers to minimum building or structure lot size in acres.) County zoning ordinances for the agricultural zone are written to preserve appropriate areas for permanent and temporary agricultural and open space uses. Uses normally and necessarily related to agriculture are permitted and uses adverse to the continuance of agricultural activity are not allowed. County zoning ordinance for the MU-160 zone are written to avoid excessive damage to watersheds, prevent or control water pollution, control soil erosion, and prevent excessive damage to land presently used for livestock grazing, forestry resources, and wildlife habitat. Coal mining developments in both zones are classified as "permitted conditional uses"... permitted when approved by the County Planning Commission, in accordance with ordinance provisions dealing with mining. Controls in the location and operation of coal mine activities and the requirements for reclamation of land subjected to such activities are outlined in the planning document.

Socioeconomics

Population, Income, and Employment

The area of analysis for the southern Utah region includes Garfield and Kane Counties. The 1980 census population of that area was 7,697. The estimated 1982 population is 8,800. (Unless otherwise noted, this discussion will rely

on the data from the 1980 census). These counties are typical of rural counties in Utah with the population concentrated in a few small communities along major roads. The largest of the communities in the area is Kanab with 2,148 residents and Panguitch with about 1,343 people. Kane County has an average household size of 3.12 persons, and Garfield has 3.00 both smaller than the State average of 3.20. Kane County had a 1980 mean household income of \$14,200, significantly below the State mean income of \$20,320, and Garfield is also low with mean household income of \$14,956. Garfield and Kane Counties had total wage and salary employment of 1,786 and 1,017 in 1980 with unemployment rates of 7.4 percent and 5.2 percent, respectively. Unemployment rates in 1982 rose to 8.6 percent in Kane County and 15.3 percent in Garfield. The government sector is the primary employment sector for Garfield County. With the fall in demand for uranium, mining and milling employment has declined since 1980. Kane County's primary employment sectors are trade, government, and services.

Infrastructure

Housing

The majority of housing units in both counties are conventional single family houses. Kane County has about 7 percent of their housing units in mobile homes and Garfield has about 4 percent mobile homes. Detail relative to the existing housing supply is presented in Table 3-22.

Education

The Garfield County School District had a 1981 enrollment of 920 students and 50 teachers, while the Kane County District had 1,002 students and 47 teachers. This represents pupil/teacher ratios of 18 to 1 and 21 to 1 for Garfield and Kane, respectively. These figures are significantly below the State service guide of 25 to 1.

Water and Sewer

Adequacy of culinary water systems is determined by the Utah Department of Health based on three components: water rights, supply/flow, and storage. Table 3-23 summarizes these components for the two-county area.

Septic tanks are the primary waste water facilities in all the counties and are presently considered adequate.

Kanab City completed an extensive new sewage project in 1981. The lagoon system has more than adequate flow capacity. Orderville, Glendale, Mt. Carmel are on a cooperative regional sewer system called the Long Valley Sewer System. The present system has a design capacity for 800 population, which is adequate for the present population. Alton residents use septic tanks for sewage disposal. Table 3-24 gives additional information.

TABLE 3-22
SOUTHERN UTAH EXISTING DWELLING UNITS MIX BY COMMUNITY

County	Conventional	Mobile	Multi-family
<u>Garfield</u>			
Panguitch	570	20	4
Hatch	73	5	0
Total	643 (95.7%)	25 (3.7%)	4 (0.006%)
<u>Kane</u>			
Kanab	601 (37.7%)	45 (6.53%)	43 (6.2%)
Alton	31	4	0
Glendale	65	11	0
Mt. Carmel	35	4	0
Orderville	129	6	0
Total	861 (88.4%)	70 (7.19%)	43 (4.4%)
Grand Total	1,504 (91.4%)	95 (5.8%)	47 (2.9%)

TABLE 3-23
SOUTHERN UTAH
SUMMARY OF WATER SYSTEMS

County	Source	Connections	Storage Capacity Gallons per day	Water Rights	Flow Gallons per minute
<u>Garfield</u>					
Hatch	wells	64	50,000	399	224
Panguitch	springs, wells	391	1,000,000	4,272	1,500
<u>Kane</u>					
Alton		25	18,000	204	215
Glendale		174	300,000	120	67
Kanab	springs, wells	1,290	3,500,000	11,026	2,917
Mt. Carmel		33	30,000	580	323
Orderville		175	550,000	336	189

TABLE 3-24
SOUTHERN UTAH SEWAGE AND SOLID WASTE DISPOSAL FACILITIES

Characteristics	Garfield County			Kane County			
	Hatch	Panguitch	Alton	Glendale	Kanab	Mt. Carmel	Orderville
<u>Sewage</u>							
Capacity (100 gal/day)	--	--	--	800 ^a	5,000	800 ^a	800 ^a
Flow gallons per minute	--	--	--	80,000 ^a	1,200,000	80,000 ^a	80,000 ^a
System Type	Septic Tank	Septic Tank	Septic Tank	Lagoon	Lagoon	Lagoon	Lagoon
Plans for Expansion	no	yes	no	no	no	no	no
<u>Solid Waste Disposal</u>							
Type of Facility	Landfill	Landfill	Open Dump	Open Dump	Open Dump	Open Dump	Open Dump
Percent of Cap. Used	Adequate	Adequate	N/A	Limited	Limited	--	Limited
Type of Collection	Green Box	Green Box City	Voluntary	Boy Scouts	Private	Individual	Individual
City/County	County	County	Private	City	City	City	Glendale

^aLong Valley.

Public Safety

In general the affected counties rely on the county sheriff for the major portion of their law enforcement capacity. The larger communities in each county generally have a separate police force and facilities. Summary law enforcement data for each of these counties are presented in Table 3-25.

The communities of Garfield County have well organized volunteer fire departments. Panguitch is currently recruiting a full-time fire chief to further enhance reliability. Response time is indicated at 3 minutes average with maximum time of 30 minutes.

Currently, there are no county-administered fire protection services in Kane County. All communities of the county have some form of fire protection plan ranging from well organized volunteers to a loosely organized effort of every available citizen. The entire county has only four fire fighting vehicles, one of which is a push cart pumper. Local officials, particularly on the west side of the county, indicated some reliance on Federal and State fire fighters.

Garfield County is served by the 14-bed Garfield Memorial Hospital in Panguitch. The hospital had a 43.1 percent utilization rate and a 4.61 day average length of stay. Medical manpower is provided by two physicians, 16 nurses, and one dentist. The emergency medical services within the area are provided by 41 EMTs and five ambulances.

Kane County has one hospital at Kanab with 33 beds with a 22.2 percent utilization rate. In 1981, there were 1,620 patient days and a 2.9 day average length of stay. The County is served by two physicians, two dentists, and 13 nurses. The County is also served by nine EMTs and two ambulances.

Much of the solid waste disposal in the study area is accomplished with open dumps that are not State approved; however, there are several areas that have approved landfills which are generally considered to be adequate for the present and immediate future. Table 3-24 contains detailed information on present facilities.

Garfield County operates a State-approved landfill which serves Hatch and Panguitch, as well as other county communities. Collection is relatively sophisticated, employing a "green box" method refuse collection. The County has an established fee for cities and for each resident for use of the "green boxes" and the landfill. The landfill has had difficulty in maintaining open hours so that individuals can bring large items to the landfill. For this reason, some additional open dump sites still remain in use.

Social/Attitudes

The area of Kane and Garfield Counties is comprised of sparsely populated Mormon communities whose growth has been slow and, with the exception of Kanab in Kane County, has experienced a population decline. There is generally a very favorable attitude toward development of the area's coal resources which

TABLE 3-25
SOUTHERN UTAH EDUCATION, HEALTH, AND
LAW ENFORCEMENT SERVICES 1982

Service	Kane	<u>County</u>	Garfield
<u>Education</u>			
Enrollment	1,002		920
Excess Capacity Student/Teacher Ratio	21.1/1		18.4/1
Teachers	47		50
<u>Health Facilities</u>			
Hospital Beds	33		14
Doctors	9		2
Dentists	2		1
Nurses	13		16
Emergency Medical Technicians	9		41
Ambulances	2		5
Nursing Home Beds	13		0
Clinical Psych.	<u>1</u>		1
Masters Degree in Social Work	<u>2</u>		<u>3</u>
<u>Law Enforcement</u>			
Police	7		6
Police Cars	8		7
Fire Trucks	5		4
Number of Firemen	47		40
Jail Capacity	28		8

is strongly linked to a desire of the local populace to improve their economic base. The strong desire for growth has encouraged local officials to be active in pursuing growth and opposing those who for environmental reasons would place constraints on development. In Kane County, the Alton coal field is located near some of the State of Utah's most significant park resources, and environmental groups have opposed any development in the area.

Transportation

Road segments in the southern Utah area are shown on Figure 3-18. Vehicle transportation in the southern Utah area is primarily on US 89 which forms an L along the west and south sides of the coal tracts. It is the main route between Flagstaff, Arizona and the cities of the Wasatch Front in northern Utah and carries commercial and recreational traffic.

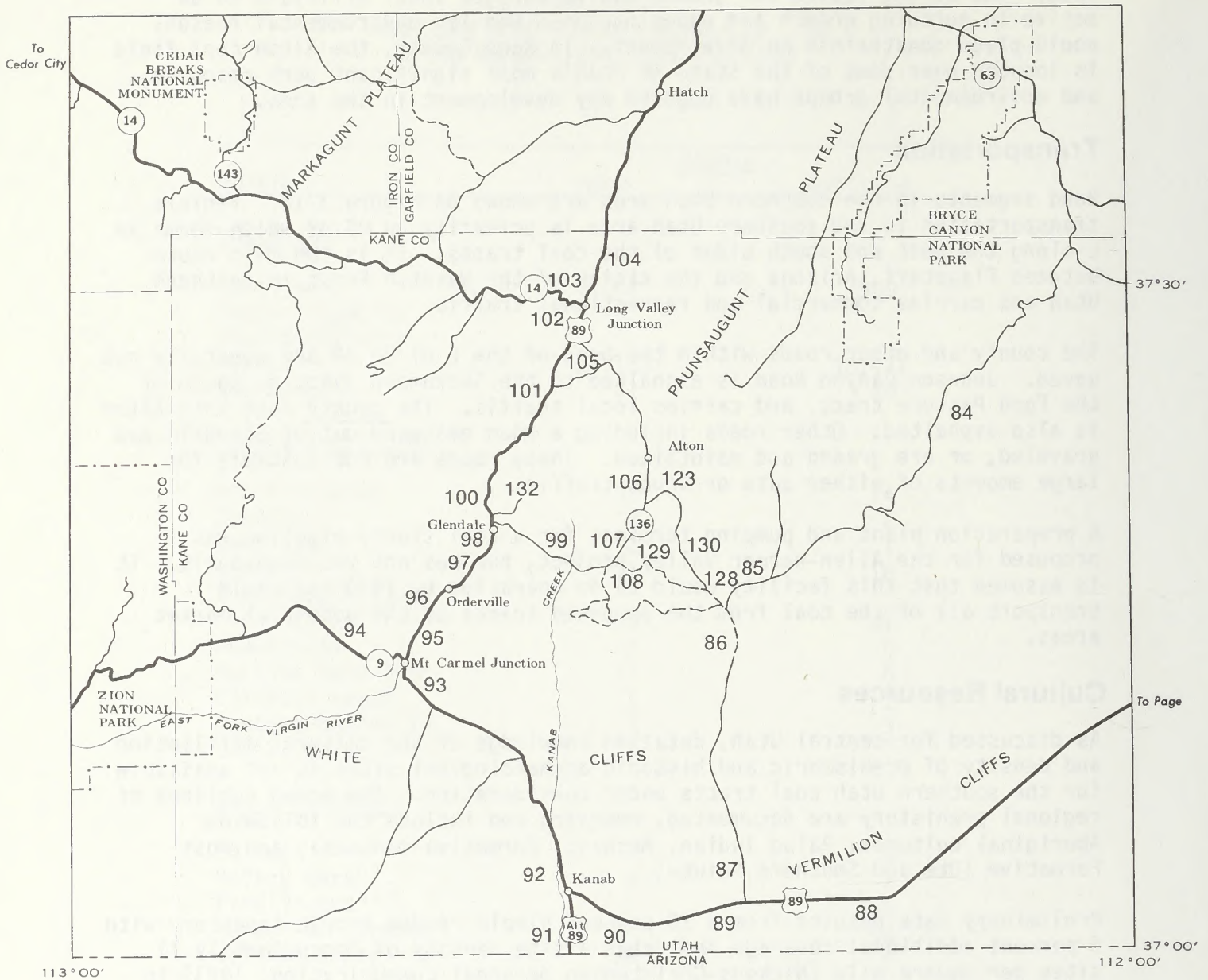
The county and other roads within the bend of the L of US 89 are generally not paved. Johnson Canyon Road is asphalted to the Skutumpah junction south of the Ford Pasture tract, and carries local traffic. The county road into Alton is also asphalted. Other roads including a road eastward out of Glendale are graveled, or are graded and maintained. These roads are not suitable for large amounts of either auto or truck traffic.

A preparation plant and pumping terminal for a coal slurry pipeline was proposed for the Allen-Warner Valley project, but has not yet been built. It is assumed that this facility would be in operation by 1990 and would transport all of the coal from the proposed tracts to the potential market areas.

Cultural Resources

As discussed for central Utah, detailed knowledge of the cultural affiliation and density of prehistoric and historic archaeological sites is not available for the southern Utah coal tracts under consideration. The broad outlines of regional prehistory are documented, however, and include the following Aboriginal cultures; Paleo Indian, Archaic, Formative (Anasazi) and Post Formative (Ute and Southern Paiute).

Preliminary data results from a 20-percent simple random sample inventory with 5 percent additional coverage indicates a site density of approximately 11 sites per square mile (Nickens-Christensen personal communication, 1983) in the tracts. This is in agreement with previous inventories conducted in the area. There are no known National Register sites in the lease tract areas (Smith, 1983). At present, environmental variables or settlement patterns which affect site distributions have not been identified. Sites are generally temporary camps and limited activity areas, although two extended camps and a possible habitation are known to exist. Archaic, Anasazi, and Southern Paiute cultures are represented in roughly equal proportions. Cultural affiliation for two-thirds of the recorded sites has not been determined. Site significance ratings are generally low for such sites.



000 - TRAFFIC SEGMENT NUMBERS



FIGURE 3-18
SOUTHERN UTAH REGIONAL TRAFFIC MAP

Recreation

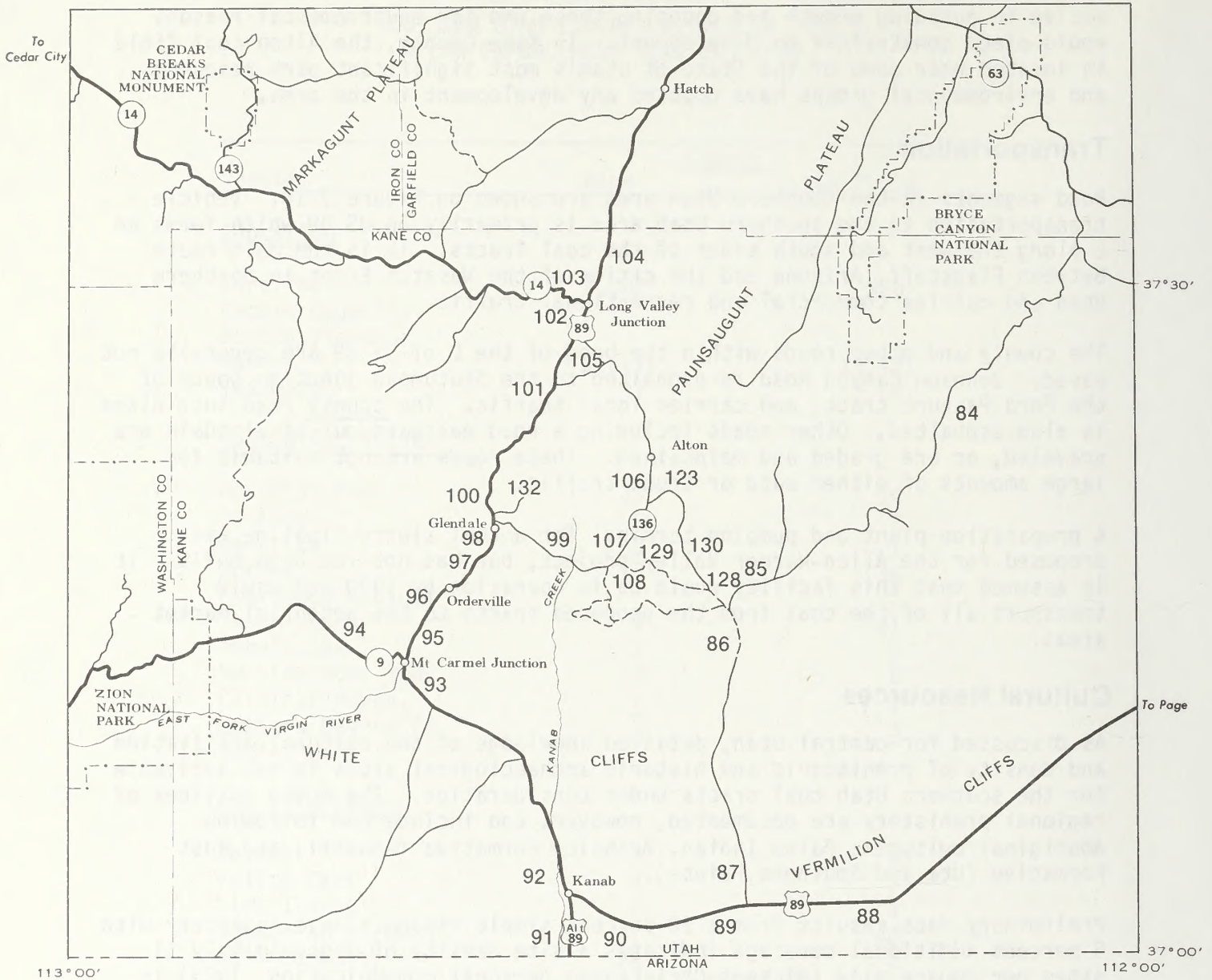
Garfield and Kane Counties have an abundance of nationally significant recreation lands and are the two most tourism-dependent counties in Utah. Within the two-county region are portions of the Dixie National Forest, Bryce, Canyonlands, Zion, and Capital Reef National Parks, and Glen Canyon National Recreation area.

Nearly all land in the two county region is used for dispersed outdoor recreation (e.g., sightseeing, backpacking, camping, picnicking, big and upland game hunting, fishing, and off-road vehicle use). The Escalante and Paria rivers are known nationally for the outstanding backpacking and sightseeing opportunities they provide. If Statewide statistics are applied, approximately 18 percent or 1,540 residents of the two-county area presently hunt deer; approximately 2 percent or 150 residents hunt elk; approximately 9 percent or 748 residents hunt upland game; and approximately 45 percent or 3,960 residents fish (Thayne and Hudson, 1978). The success rate for big game hunting in the region is down from early 1970 figures, but the success trend has been generally up since 1975. The success rate for upland game hunting (birds/hunter day) in the region has been trending upward from 1974. In 1981, the region provided for approximately 16 percent of the Statewide sage grouse harvest. The region provided for less than 3 percent of the harvest for all other upland game species (UDWR, 1981b). If Statewide figures are applied, the success rate for fishing (fish/hour/fisherman) has been decreasing since 1967 (UDWR, 1981a; UWDR, 1981b; UWDR 1978). Of the total people hunting deer in the two-county region, about 25 percent originate in Garfield and Kane counties (UDWR, 1981). It is not known what percentage of elk hunters, upland game hunters, and fishermen originate from within the two-county region. Off-road vehicle activity is generally associated with hunting and fishing. Approximately 7 percent or 598 residents in the two-county region own motorcycles and approximately 35 percent or 3,080 residents presently own a 2-wheel truck or 4-wheel drive vehicle (UORA, 1978).

Despite the vast amount of dispersed recreation resources in the region, developed recreation sites (campgrounds and picnic areas), particularly campsites, are in short supply (UORA, 1973). Twenty of the 38 developed sites listed in Table 3-26 demonstrate 1981 use rates at or greater than capacity.

There are not sufficient golf courses, tennis courts, playing fields, and swimming pools in the two-county region to meet standards proposed by the State of Utah (UORA, 1973).

None of the proposed lease tracts contain developed recreation sites. The tracts support intermittent dispersed recreational activities generally associated with sightseeing. The Alton-Skutumpah road, segment numbers 84, 85, 106, 107, 108 and 128 of Figure 3-18, which would be a mining access road to all the tracts is also a popular recreational road for sightseeing south of Bryce Canyon National Park. Although the tracts are located near Bryce Canyon (approximately 3 to 15 miles away), none of the tracts are visible from the Park.



000 - TRAFFIC SEGMENT NUMBERS



FIGURE 3-18
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TABLE 3-26

RECREATION USE ON SELECTED DEVELOPED SITES IN GARFIELD AND KANE COUNTIES

Managing Agency and Site	Visitor Days ^a	Percent of Theoretical Maximum Capacity ^b
<u>BLM</u>		
Hog Springs	1,090	NA ^c (perceived to be under capacity)
Calf Creek	5,175	NA (perceived to be at capacity)
Lonesome Beaver	275 ^d	NA (perceived to be under capacity)
McMillan Spring	230 ^d	NA (perceived to be under capacity)
Starr Springs	3,330 ^d	NA (perceived to be at capacity)
Deer Creek	1,500	NA (perceived to be under capacity)
Paria Picnic Area	NA	NA
Ponderosa Grove Campground	2,500 ^d	NA
Paria-Hackberry Movie Set and Picnic Area	6,700 ^d	NA
<u>FOREST SERVICE</u>		
Panguitch Lake North Campground	3,200	71
Spruces Campground	11,900	36
Duck Creek	57,700	43
Panguitch Lake South Campground	10,900	106
Pine Lake Campground	8,000	22
Blue Spruce Campground	900	14
Posey Lake Campground	4,900	14
White Bridge Campground	8,400	27
Antimony Creek Picnic Area	2,900 ^d	70
Oak Creek	3,600 ^d	32
Pleasant Creek	6,900 ^d	32
Lower Browns	1,000 ^d	12
Teah Campground	20,800 ^d	53
Navaho Campground	16,800 ^d	48
Kings Creek Campground	18,000 ^d	47
Red Canyon	48,900 ^d	48
<u>NPS</u>		
Bryce Canyon - North and Sunset Campgrounds	136,326 ^d	(perceived to be at or above capacity)
Zion - South and Watchman Campgrounds ^e	276,206 ^d	(perceived to be at or above capacity)
Capital Reef Campground ^e	31,686 ^d	(perceived to be at or above capacity)
Glen Canyon - Bullfrog, Hite, Hall's Crossing, Wahweep, Lee's Ferry ^e	1,086,266 ^d	(perceived to be at or above capacity)

continued

TABLE 3-26 (cont'd.)

Managing Agency and Site	Visitor Days ^a	Percent of Theoretical Maximum Capacity ^b
STATE OF UTAH		
Coral Pink Sand Dunes	17,906 ^d	NA
Escalante Petrified Forest	27,705	NA
Kodachrome Basin	16,779	NA

Source: BLM, FS, NPS, State of Utah 1980-1981 visitor use figures through personal communications.

- a Recreation use reported in visitor days. (Visitor day consists of 12 visitor hours which may be aggregated by one or more persons)
- b Beyond 40-percent use, sites deteriorate rapidly, require heavy maintenance, and user experience levels diminish from overcrowding (i.e., loss of privacy, increase in noise, etc.)
- c Not available
- d Reported in number of visits - visitor day estimates are not available.
- e Campground adjacent to Garfield/Kane Counties.

In a visitor survey of Bryce Canyon National Park (Kelly, 1980), 89 percent of the respondents said that natural forest, wildlife, and solitude are important characteristics of the Park.

Typical background sound levels measured in the Park are extremely low. In the absence of strong winds, ambient sound levels frequently fall below 20 dBA which is comparable to sound levels in a high quality recording studio. Even at higher visitor use areas, ambient sound levels frequently fall below 30 dBA during the day (Foch and Oliver, 1980).

Visual Resources

The scenic character of Garfield and Kane Counties is one of variation. The landscape includes sparsely vegetated desert valleys, forested plateaus, and colorful canyons. The region is rich in scenic attractions of national significance (see Special Designation Areas). Developments have had minimal impact on the region, which appears largely undisturbed by the presence of man.

The proposed coal tract lands have been inventoried for visual resource values. They have neither outstanding nor unique scenic values when considered in the physiographic region. They are located on rolling foothills covered with pinyon-juniper, oakbrush, scattered ponderosa, and sagebrush. Although located near Bryce Canyon National Park, the tracts are not visible from the Park. The VRM class ratings given to the tract lands are shown in Table 3-27. The VRM objectives for each class are described in Appendix 5. The tract lands appear natural. In the vicinity of the tracts, the town of Alton and the surrounding agricultural lands provide the only significant manmade contrast with the natural landscape.

Portions of all tracts are visible from the Alton-Skutumpah road (segments 84, 85, 106, 107, 108 and 128 of Figure 3-18) which receives approximately 19,400 visitors each year, the majority of which travel the road for the purpose of viewing the scenery, particularly the pink cliffs, south of Bryce Canyon National Park. Those portions of the Mill Creek Canyon and Fisher Canyon tracts where portal and associated surface facilities would most likely be located, however, cannot be viewed from the Alton-Skutumpah road. The Ford Pasture tract is readily visible from the Alton Skutumpah road at distances of approximately 1.0 to 5.0 miles, and as viewed from the road is in a visual line with the pink cliffs. Portions of the Alton Amphitheater tract including logical portal and surface development areas are readily visible from a paved portion of the Alton-Skutumpah road, and from the town of Alton at distances of approximately 0.2 to 3.0 miles. Although portions of the Flax Lakes tract are highly visible from U-89 and from the Alton Skutumpah road including those portions of the tract in which portals and other surface developments would logically be located are visible only from the Alton-Skutumpah road, and from there only at a distance of approximately 6.0 miles.

TABLE 3-27

VISUAL RESOURCE MANAGEMENT CLASSIFICATIONS
OF COAL TRACTS IN GARFIELD AND KANE COUNTIES

Tract	Classification	General Location of Classification Area
Alton Amphitheater ^a	VRM Class III	Area highly visible (foreground) from the Utah Highway 136 portion of the Alton-Skutumpah road.
	VRM Class IV	Remainder of tract.
Mill Creek Canyon ^a	VRM Class IV	Entire Tract
Fisher Canyon ^a	VRM Class III	Area highly visible (foreground) from the Alton-Skutumpah road.
	VRM Class IV	Remainder of tract.
Flax Lakes ^a	VRM Class III	Area highly visible (foreground) from Utah Highway 89 and from the Utah Highway 136 portion of the Alton-Skutumpah road.
	VRM Class IV	Remainder of tract.
Ford Pasture	VRM Class III	Area highly visible (foreground) from the Alton-Skutumpah road.
	VRM Class IV	Remainder of tract.

^a This entire tract is either entirely or partially under private surface ownership. The VRM classification given is how the lands would be classified if entirely under Federal ownership. Although VRM classifications are not generally applied to private surface lands, they are applied here so that the effect of Federal coal leasing and development can be determined for private surface lands in the same manner as for Federal surface areas.

Special Designation Areas

The two-county region contains portions of four National parks, one National recreation area, one State reserve, five natural areas, one primitive area, and one natural landmark. Although there are no officially designated wilderness areas or wild and scenic rivers within the two-county region, there are 31 areas presently under wilderness review and six rivers presently being inventoried for wild and scenic values. In total, there are 40 areas in the region with special designation or potential for special designation. These areas are listed in Appendix 6. None of the above are located within the proposed lease tracts.

West-Central Colorado

Climate, Air Quality

Climate

West-central Colorado is located in a semiarid, continental climate regime, characterized by dry air, sunny days, clear nights, little precipitation, extreme evaporation, and large diurnal temperature changes. The region's complex topography causes considerable variation in site-specific temperature, precipitation, and winds; these influences are less on the plateaus than in the valleys. Generally, summer temperatures range from lows of 55 degrees F to highs of 90 degrees F. Winter temperature range from 15 degrees F to 40 degrees F. Frost-free periods vary from year to year and by location, but tend to range from 140 to 160 days. Annual precipitation is highly variable ranging from 7 to 25 inches, with slightly more than half of the moisture coming from late summer thunderstorms. Snowfall amounts vary from 15 to 100 inches.

Inversions are formed under stable conditions, trapping pollutants within a certain layer of air. Moderate inversions are typical during the summer in the evening and dissipate at dawn. Winter inversions are stronger and last longer.

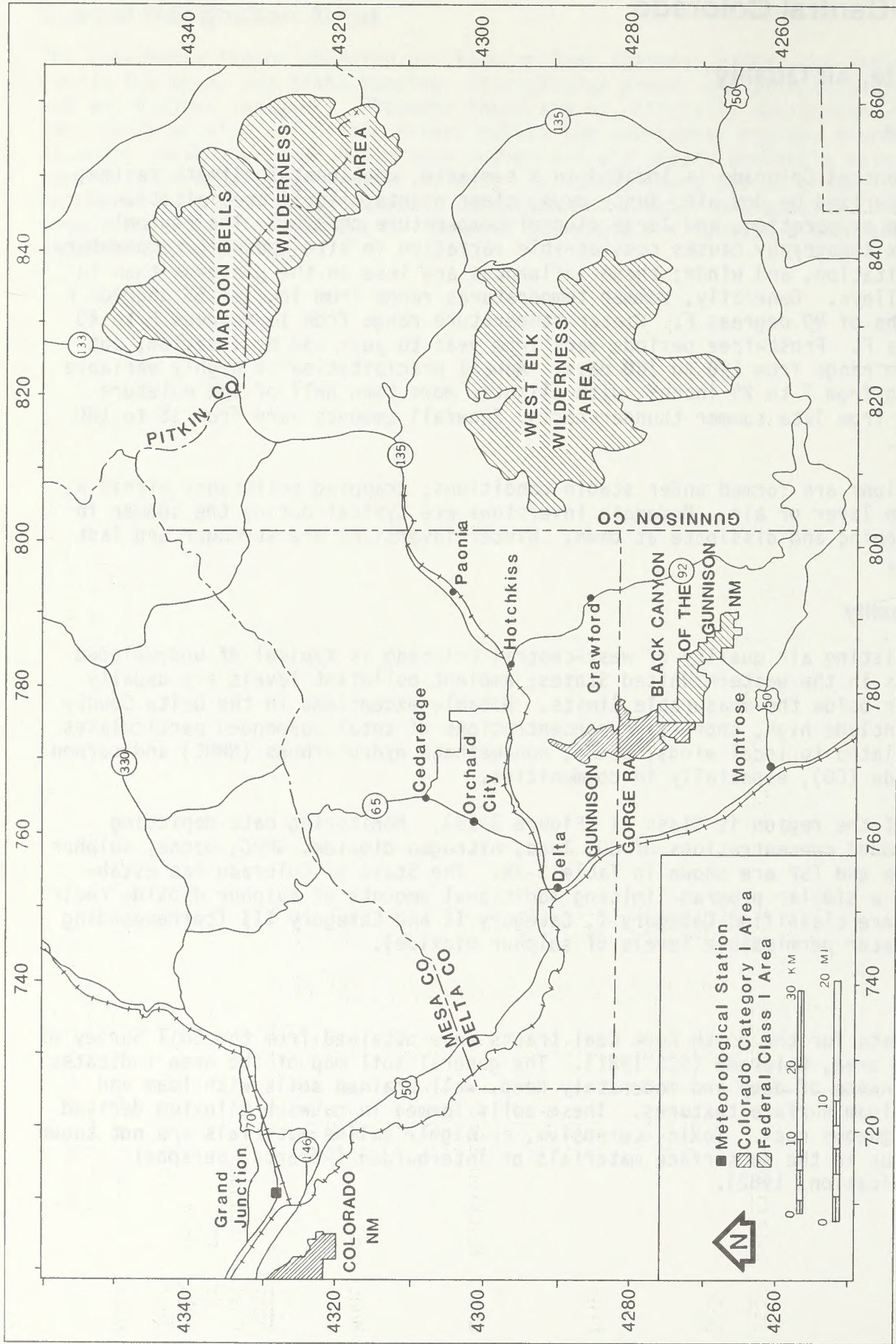
Air Quality

The existing air quality of west-central Colorado is typical of undeveloped regions in the western United States; ambient pollutant levels are usually near or below the measurable limits. Notable exceptions in the Delta County area include high, short-term concentrations of total suspended particulates TSP related to local winds, ozone, non-methane hydrocarbons (NMHC) and carbon monoxide (CO), especially in communities.

Most of the region is Class II (Figure 3-19). Monitoring data depicting background concentrations of CO, lead, nitrogen dioxide, NMHC, ozone, sulphur dioxide and TSP are shown in Table 3-28. The State of Colorado has established a similar program limiting additional amounts of sulphur dioxide their lands are classified Category I, Category II and Category III (corresponding to greater permissible levels of sulphur dioxide).

Soils

Soil data for the North Fork Coal tracts were obtained from the Soil Survey of Paonia area, Colorado (SCS 1981). The general soil map of the area indicates a dominance of deep and moderately deep, well drained soils with loam and stony loam surface textures. These soils formed in outwash alluvium derived from igneous rock. Toxic, corrosive, or highly saline materials are not known to occur in the subsurface materials or interburden (Roberts, personal communication, 1982).



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 3-19

LOCATIONS OF COLORADO CATEGORY I AND FEDERAL CLASS I AREAS IN WEST CENTRAL COLORADO

TABLE 3-28
WEST-CENTRAL COLORADO SELECTED POLLUTANT CONCENTRATION

Station/Period	TSP			SO ₂			CO			Lead			T ₁₅		
	# Days	Ann. Geo. Mean	2nd 24hr Max.	Ann. Arth Mean	2nd 3hr Max.	2nd 24hr Max.	1st 8hr Max.	2nd 8hr Max.	1st 1hr Max.	2nd 1hr Max.	Ann. Arth Mean	1st 1/4 Max.	# Days	Ann. Arth Mean	1st 24 hr Max.
Delta	1981	86	<u>70</u>	<u>232</u>											
	1980	80	<u>74</u>	<u>231</u>							(.30)	.40			
	1979	83	<u>86</u>	<u>266</u>							.40	.55			
	1978	89	<u>94</u>	<u>226</u>							.40	.70			
Fruita	1981	79	<u>86</u>	<u>178</u>									74	102	129
	1980	71	<u>69</u>	<u>145</u>							(.35)	.45			
	1979	77	<u>76</u>	<u>164</u>											
	1978	88	<u>71</u>	<u>147</u>											
Grand Junction	1981	84	<u>77</u>	<u>232</u>	13	52	21	9660	9315	18400	14375	.70	1.0	57	194
	1980	82	<u>78</u>	<u>144</u>				7015	7015	16100	13225	.75	1.0		
	1979	83	<u>82</u>	<u>176</u>				5060	4370	8050	8050	1.0	1.5		
	1978	85	<u>74</u>	<u>142</u>								.95	1.5		
Montrose	1981	85	<u>60</u>	<u>155</u>											
	1980	30	<u>(74)</u>	<u>124</u>								(.45)	.60		
	1979	80	<u>66</u>	<u>154</u>								.60	.75		
Ambient Air Quality Standards															
Primary		75	260	80	-	365	-	10000	40000	-	1.5				
Secondary		60	150	-	1,300	-	-	-	-	-	-				

Source: Colorado Department of Health, n.d.

Note: Underlined values indicate violation of Ambient Air Quality Standards. Parentheses indicate insufficient data to determine reliable average. Ambient standards are the absolute maximum level, allowed to protect either public health (primary) or welfare (secondary). All values are in micrograms per cubic meter.

Prime and unique farmlands occur less than 2 miles downslope from the Paonia tract (SCS 1979). Approximately 50,560 acres of prime farmland and 8,000 acres of unique farmland are located in Delta County (SCS, 1979). No portions of the North Fork tracts are deemed unsuitable due to the presence of alluvial valley floors.

The present erosion rate for the soils occurring on the proposed lease tracts varies from 1 to 6 tons per acre per year. Differences in surface texture, structure, organic matter content, rock fragment content, slopes gradient and length, and protective cover account for this variability.

Reclamation potential is fair on both tracts. Reclamation potential was determined based on local climatological data and Soil Conservation Service interpretive guidelines for rating soil reconstruction material (SCS, 1978). Precipitation and growing season length are favorable for successful seeding and planting of a wide variety of adapted plant species during most years. Limiting soil factors for reclamation are excess stones, excess lime, high erosion hazards, steep slopes, clayey subsoils, shallow soils and low available water capacity.

Establishing plants used in revegetation would take 2 to 5 years for recontouring, topsoil redistribution, seedbed preparation and seeding; and 4 to 5 years to establish vegetation cover sufficient for wildlife and livestock use. Seed planting should occur during the fall (October - November) to allow adequate soil moisture for seedling survival the following spring.

Mineral Resources

The Paonia-Somerset coal field in which the tracts are located contains approximately 215,550 acres of medium to high coal development potential deposits. The tracts total about 6,845 acres or about 3.2 percent of the total coal field.

Gas has been discovered adjacent to this coal field in the Mesa Verde Formation north of the lease tracts and the coal field is prospectively valuable for oil and gas. There are no known oil and gas deposits on the lease tracts; however, oil and gas are known to occur in the Entrada, Morrison, Dakota, Mancos Shale, Mesa Verde, and Wasatch formations. The tracts are presently leased for oil and gas.

Topography, Geology, Paleontology

The Paonia-Somerset coal field is located in the southeastern end of the Piceance Basin, bounded by the Gunnison Uplift to the south, the West Elk mountains to the east, and the Uncompahgre Plateau to the west.

The elevation varies from 5,500 to 9,500 feet above sea level in the coal field. Over half of the Paonia D Seam tract surface is steep sloping (34 percent), with only 17 percent of the surface gently to moderately sloping (0 to 15 percent). The rest is characterized by moderately steep slopes ranging from 16 to 33 percent. Weathering and water erosion dissect the slopes, creating rounded ridgelines and exposing prominent sandstone rock outcrops and cliffs.

The Cedaredge tract is characterized by moderately steep slopes, comprising about 70 percent of the surface. Seventeen percent is steep sloping, and about 13 percent is gentle to nearly flat.

The geologic formations occurring within the tracts are the Ohio Creek, and Mancos Shale and the coal-bearing Cretaceous Mesa Verde formations. The coal is found in the Mesa Verde Formation and outcrops between the 7,000 to 7,500 foot elevation contour line.

The Somerset-Paonia coal field is within a seismically inactive area. There are no active faults adjacent to or on the tracts (Kirkham, 1981). However, a major fault (47 feet displacement) was encountered in the Orchard Valley Mine, adjacent to the Paonia D tract. This may extend into the tract; however, there is no surface evidence of faults.

No quantitative data exist for subsidence on or adjacent to the tracts, however, the surface effects of subsidence have been recorded in the study area (Dunrud, 1976). The overburden thickness ranges from 0 feet at the coal outcrop of the uppermost minable coal seam to 2,000 feet above the coal seam at the northern boundary of the tracts. Because of the rugged topography and the dip of the coal seam (approximately 3 degrees to 6 degrees north-northeast), the overburden gets progressively thicker to the north. The overburden thickness is generally less than 500 feet when the topographic elevation is between 7,500 and 7,700 feet above sea level. Subsidence is directly affected by the thickness of the coal seam mined (4.5 to 12 feet for the Paonia D tract and 4 to 11 feet for the Cedaredge tract), the overburden thickness, and overburden composition.

Other geologic hazards occurring on the tracts are landslides, unstable slopes, and rockfalls. These hazards usually form due to the clays and sandstones in the Mesa Verde Formation and between the contact of the Mesa Verde Formation and the Mancos Shale.

The Wasatch, Mesa Verde, and Mancos Shale Formations are known to contain invertebrate and plant fossils (Lee, 1912); however, no known fossils of significance have been found on or near the tracts.

Water Resources

The area is in the Gunnison River Drainage which is part of the Upper Colorado River Basin. The area is comprised of semiarid watersheds at the lower elevations and forested-mountain watersheds at the higher elevations. The lower-elevation watersheds are characterized by intermittent and ephemeral streams with surface runoff primarily occurring during high-intensity summer thunderstorms. Because of the low annual precipitation (7 to 12 inches) and high runoff potential, these areas contribute little to groundwater recharge. In contrast, the higher elevation watersheds are responsible for producing the majority of the river basins' water yield. These areas are characterized by perennial streams with high flows primarily occurring during the spring snowmelt. From late summer to early spring, streamflow is comprised mostly of groundwater discharge.

Because of local topography and geology, differences exist between surface water and regional groundwater divides. In the vicinity of the coal tracts, the surface water systems drain generally to the south and west while the regional groundwater flows in the direction of the geologic formation dip (3 to 6 degrees to the north-northeast). There are, however, several local (shallow) groundwater systems that discharge to the areas' surface water systems.

There are no special floodplains, municipal watersheds, or National Resources Waters located on the lease tracts.

Water Quantity and Distribution

The Paonia tract is dissected by several intermittent and ephemeral streams. There are also approximately 21 stockponds, three water pipelines, three irrigation water ditches and at least 16 springs located on the tract. East Roatcap Creek, located on the western portion of the tract, is used as an irrigation water conveyance system.

The Cedaredge tract supports two perennial streams (Camp Creek and Oak Creek) and several intermittent and ephemeral streams. There are also one stock pond, three irrigation water ditches, and an unknown number of springs on the tract.

Ground Water

The Rollins Sandstone, the lowest member in the Mesa Verde Formation, and some of the coal seams are the only potential aquifers associated with a regional groundwater flow system. The springs, seeps and baseflow associated with the Cedaredge and Paonia coal tracts are believed to be areas of natural discharge from local groundwater flow systems.

Faults and fractures in the Mesa Verde Formation are the primary paths through which water flows both vertically between rock strata and horizontally within rock strata. When faults and fractures are encountered within some of the present coal mines in the North Fork of the Gunnison River Valley, they produce mine inflows. The flow characteristics of these inflows depend upon the lateral extent and the proximity of the fault or fracture to a stream valley (Colorado Mined Land Reclamation Board, 1982).

Groundwater discharging in the area's surface water from the Mancos Shale is usually highly saline. The Mancos Shale Formation in the North Fork of the Gunnison River Basin is primarily responsible for contributing an estimated 72,600 tons per year of baseflow salt load to the Colorado River System (GS, 1980).

Water Quality

The major rivers in the study area show a progressive increase in salinity in the downstream direction. The primary source of the salinity is the Mancos Shale Formation. This formation is exposed in the low-lying portions of the study area and underlies more recent geologic formations in the higher areas.

Both natural and man-caused processes contribute to the salinity problem. Surface runoff dissolves salts contained in the soils overlying the Mancos Shale and groundwater dissolves subsurface minerals while flowing through the salt-laden shale layers. Agricultural irrigation practices contribute to the salinity increases by diverting water from the river systems, and through consumptive use by crops and evaporation, salts are concentrated in the remaining water. In addition, SCS (1982) showed that most crops are irrigated in excess of normal water needs. Deep percolation of this excess water results in return flows through the salt-laden shale layers. The lower Gunnison River Basin which includes the North Fork of the Gunnison River, produces approximately 42 percent of its salinity by natural processes and 58 percent from agricultural irrigation practices and related water conveyance systems.

Data collected by the Bureau of Reclamation showed the total dissolved solids (TDS) concentration of the North Fork of the Gunnison River near Somerset, Colorado averaged 178 milligrams per liter; 25 miles downstream, near the confluence with the Gunnison River, the TDS averaged over 1000 milligrams per liter.

The sediment yield throughout the study area varies considerably. Some of the controlling factors are: drainage size, slope, soil texture, amount of vegetation cover, and amount of surface disturbance. The low-lying areas, comprised of soils derived from Mancos Shale, can yield on the average 16 tons of sediment per acre per year (GS, 1971), whereas, the higher-elevation watersheds typically produce less than 1 ton per acre per year.

Depending on the controlling factors discussed above, the annual sediment yield on the Paonia and Cedaredge tracts varies from less than 1 to 5 and from 1 to 7 tons per acre, respectively.

The United State Geological Survey has recently completed a hydrologic and subsidence potential study of the Paonia D and Cedaredge tracts (Water Resources Investigations Report 83-4069). This report describes the hydrologic systems and potential impacts from subsidence in greater detail than is presented in this document. Copies of the study are available from the BLM Montrose District Office or the BLM Colorado State Office.

Water Rights and Use

The study area is within District 40 of Colorado Water Division 4. Presently, all surface and groundwater within the District is appropriated by the State of Colorado. There are several water decrees in or adjacent to the coal tracts with uses including: irrigation, industrial, recreation, and domestic (municipal and livestock). Water flowing off the tracts is crucial to satisfy water decrees downstream. In the 1981 water year, District 40 had direct flow diversions amounting to approximately 388,000 acre-feet. Water use estimates are as follows: irrigation (90 percent); domestic (municipal and livestock) (6 percent); industrial (3 percent); trans-mountain diversions, less than 1 percent. (Colorado Water Division, 1981).

Vegetation

Vegetation types within the study area consist of Agricultural, Riparian, Saltbush, Sagebrush, Pinyon-Juniper, Mountain Shrub, Aspen, Spruce-fir and Mountain Meadows. The proposed lease tracts are dominated mainly by Pinyon-Juniper and Mountain Shrub, with small acreages of Sagebrush, Aspen and Riparian vegetation types. A list of the dominant species found in each vegetation type is found in Appendix 4.

Two cacti listed as threatened and endangered occur within Delta County. They are the spineless hedgehog cactus (*Echinocereus triglochidiatus* var. *inermis*, endangered) and the Uinta Basin hookless cactus (*Sclerocactus glaucus*, threatened). *Eriogonum pelinophilum* a species proposed for listing as endangered also occurs in Delta County in the salt desert shrub vegetation type on Mancos shale soils.

Inventories and literature searches conducted by the Natural Heritage Inventory (Lapin and Peterson, personal communication, 1982), Bureau of Land Management, and the North Fork coal companies have not located any endangered, threatened or sensitive plants in the vegetation types found on these coal tracts in the North Fork Valley.

Wildlife

Both tracts have populations of terrestrial wildlife species typical of pinyon-juniper, mountain brush zones, aspen, and deciduous riparian habitats in west-central Colorado. Approximately 85 percent of the Cedaredge tract and 50 percent of the Paonia tract are crucial deer and elk winter range. Most of the remaining acreage could be classed as intermediate range. A substantial, but unquantified amount of crucial winter range is provided by private land. The fencing of about 1,500 acres of orchards and the conversion of private farmland and native range to housing and industrial uses is causing reductions in available winter range (Taylor, personal communication, 1982).

The Paonia and Cedaredge tracts are in Game Management Units 521 and 411. Pellet group counts conducted by the BLM, Colorado Division of Wildlife (1969) and Colorado Westmoreland, Inc. (1981-1982) have been used to estimate deer and elk densities for these tracts. Winter mule deer densities are estimated to be 186 deer per square mile on the Paonia tract and 152 deer per square mile on the Cedaredge tract. Winter elk density figures are estimated at 22 elk per square mile on the Paonia tract, and 30 elk per square mile on the Cedaredge Tract. The actual densities would vary yearly depending on the severity of the winter. There are no resident elk on either tract; summer mule deer densities are estimated at 10 deer per square mile.

Big game mortality from vehicle collisions is a problem throughout the North Fork area when the animals are concentrated on the winter range. These losses are especially evident when traffic densities are increased due to coal production and haulage. During the winter of 1981-82 about 20 deer and one elk were killed by vehicles directly connected with coal production adjacent to the Paonia tract (Craig, personal communications, 1982).

Black bear densities in the lease tract areas are unknown, but fluctuate seasonally. Typically in this region most of the bears move into the oakbrush zone in August where they feed actively while preparing for hibernation (Beck, 1982). Therefore, the oakbrush types present on these tracts may be essential to the local bear population. Two bears were harvested on the Paonia tract during the 1981 season (Craig, personal communications, 1982). Mountain lion numbers on these tracts probably fluctuate seasonally with the occurrence of their principal prey, mule deer. There are no estimates of density for this area.

Riparian habitat is the most productive and limited habitat type in the area (Thomas, et al., 1979; Johnson, et al., 1977; Bottorff, 1974). All of the perennial and ephemeral streams, and some irrigation canals provide some type of riparian habitat. These habitats are essential to many species of nongame birds and mammals as well as serving as migration corridors for big game species. None of the streams on the tracts are sport fisheries but all support some aquatic life including nongame fish.

A number of species of birds of prey are found in the region. Repeatedly used nest sites have been identified for golden eagles and red-tailed hawks only. Coopers hawks have been sighted on the Paonia tract, but no nest site has been found (BLM, 1982d).

A 1978 through 1980 Bureau of Land Management inventory (BLM, 1981d) has shown that bald eagles (Haliaeetus leucocephalus) use the proposed tracts on an incidental basis from November until April. The North Fork of the Gunnison receives a moderate amount of use. No roost areas have been identified in or near either lease tract.

Known or potential habitat for other threatened or endangered species was not found on, or adjacent to, either lease tract during application of Coal Unsuitability Criteria (BLM, 1981e) or in subsequent contacts with Federal or State wildlife personnel.

No endangered or threatened fish species are found on, or adjacent to the proposed lease tracts. However, the Colorado River squawfish (*Ptychocheilus lucius*, Federally endangered) and razorback suckers (*Xyrauchen texanus*, Colorado endangered) are known to occur in the Gunnison River downstream from Delta (personal communication, Holden-Ferguson and Krueger-Ferguson, 1982). The humpback chub (*Gila cypha*, Federally endangered) occurs downstream in the Colorado River.

Land Use

The predominant land use in the North Fork Valley is agriculture associated with cattle and sheep ranching and orchards with a few vineyards scattered throughout the valley. Local ranchers depend heavily on Federal land for grazing. However, in the Cedaredge area the majority of the farms are orchards. There are fewer large family ranches in the Cedaredge area and there is less use and dependence on public land.

In 1981, there were eight producing coal mines as well as numerous abandoned coal mines in the area. Adjacent to the Paonia D seam tract is the producing Orchard Valley mine with portal facilities and a ventilation site which produces noise levels up to 86dBA. Approximately 90 percent of the Federal lands in the North Fork Valley area are leased for oil and gas.

There are three irrigation ditches (Hossier, Eagle, and Sandburg) and one unnamed reservoir on the Cedaredge tract. The Paonia tract contains seven rights-of-way and three irrigation ditches (Overland Ditch, the ditch off Roatcap Creek, and the ditch off Terror Creek). Water requirements both for coal production, agriculture, and domestic use are obtained from irrigation ditches or from other water sources such as wells, streams, or lakes in both areas.

The Stevens Gulch public road, which provides access to Forest Service lands, passes through the Paonia Tract.

Land Use Plans, Controls, and Constraints

Federal Plans

The Colorado tracts were considered in BLM's North Fork land use plan amendment completed in October 1981 and were found acceptable for further leasing consideration through application of the unsuitability criteria in 43 CFR 3461. A protest to the amendment was filed in November 1981. A decision was made by the BLM Colorado State Director in December 1981 which amended the land use decision to include the protest. The State Director's decision to modify the Paonia study area lowered potential impacts to water resources, and incorporated the following objectives into the amendment decision:

(a) require, through lease stipulations, both inventory and protection of surface and groundwater flows (and associated water rights) in all drainages to be impacted by leasing.

(b) require the protection of water resources through an effective combination of the following:

- (1) water insurance
- (2) water replacement
- (3) restriction of mining from areas containing surface water resources,

County Plans

Delta County does not have detailed land use plan or zoning regulations. A county land use plan is scheduled for completion sometime in 1983.

Socioeconomics

Between 1974 and 1981 Delta County experienced a 30-percent population increase, a 29-percent growth in employment and a 53-percent rise in personal income. Over this period coal production in the North Fork Valley of Delta

and Gunnison Counties rose from 1.26 to 2.97 million tons annually. This represents a 136-percent increase in coal production. This coal production increase was accompanied by a corresponding rise in mine employment from 416 to 897 employees.

Delta County received \$619,000 in coal tax revenues in 1981 which includes Federal royalty and State severance taxes. Mine employment in Delta County was responsible for approximately 13 percent of total labor and properties income in 1980 falling only behind retail trade and government enterprises as sources of income. Though mining represents a relatively small part of the economy of Delta County, the increase in population, employment and personal income experienced over the 1974 to 1981 period can be shown to be highly correlated statistically with North Fork Valley mine employment.

In 1981 Delta County experienced a 4.3 percent unemployment rate. In August 1982, two of the eight mines that produced coal in 1981 were closed, three are producing at lower levels, and one is reaching the end of a short-term potentially renewable production contract. Only one mine is under a long-term contract and is assured of continuing to produce at 1981 levels. Between January and June of 1982, unemployment increased from 5.8 to 8.3 percent.

Infrastructure

A 30-percent increase in population over 8 years has left the communities in Delta County with infrastructural deficiencies. Continued population growth at 1974 to 1981 rates would place a strain on local and county governments in financing additional facility expansion.

A breakdown of Delta County infrastructural facilities reveals that problems currently exist in Delta County fire fighting capabilities in four communities, health care facilities in three communities, police protection in one community, sewage capacity in three communities and water storage and delivery capacity in four communities.

Social Conditions

Delta County had a 1981 population of approximately 22,272. A socioeconomic survey of Delta County residents was conducted in 1981 concerning their perceptions and ideas about energy-related growth. In general, respondents felt that clean air and scenery should not be sacrificed to meet the country's energy needs (62 percent). Most agreed that the costs of growth related to energy production should not be borne by the residents (76 percent) and since increased job opportunities were seen as a positive benefit resulting from energy development, many (48 percent) foresaw increased crime as an adverse effect of energy development.

Crime rate, a major indicator of disintegrating social ties in a community, increased 230 percent in Delta County between 1974 and 1980, compared to a 37-percent increase for the State of Colorado between these years. Increased crime rates, alcohol and drug abuse, higher divorce rates, and increased levels of violence within the family are thought to be major effects of disintegrating social ties in rural communities resulting from rapid growth.

Transportation

The Paonia tract is accessed by the Stevens Gulch road off Colorado State Highway 133. The first 2.38 miles of the Stevens Gulch road are paved to the Orchard Valley mine entrance. The remainder of the road is graveled surface. Several other primitive unsurfaced roads exist in the tract and provide access to private and Federal land.

The daily traffic volume (DTV) from Paonia to Hotchkiss on State Highway 133 was 3,000 in 1980 (Colorado Department of Highways, 1980). The DTV from Paonia to the Delta-Gunnison County line was 1,650 in 1980 (Colorado Department of Highways, 1980); of this approximately 190 vehicles per day were coal trucks from the Orchard Valley mine. Traffic peaks in the months of July and August, and is comprised of recreational, agricultural, and coal development associated traffic. Construction of a new alignment for State Highway 133 is in progress, between Terror Creek (2 miles east of Paonia) and a point 3 miles east of Somerset. This construction of a new alignment for SH 133 could take as much as another 3 to 5 years to complete. There is no alignment alternative to SH 133 planned between Terror Creek and Hotchkiss. The existing roadway will be improved in this area and that improvement will not begin until the Terror Creek to Somerset construction is complete. The old highway will be used for local traffic, including coal trucks, while through traffic will be routed to the new highway. When completed, the new highway will result in a major reduction in the 190 reported accidents during 1978 (which included 2 fatalities and 57 other injuries), and property loss which exceeded \$670,000 (Colorado Department of Highways, 1978).

The Cedaredge tract is accessed by State Highways 65 and 92 and county road 2075 from Delta, Colorado. The DTV on State Highway 65 at the intersection with State Highway 92 has averaged 3,850. Studies have shown an average of almost three accidents per year at this intersection. Other unsurfaced county roads also provide access directly to the tract. No traffic data are available for these roads. There is no improvement or reconstruction planned for State Highway 92 between Hotchkiss and Delta or on State Highway 65 between State Highway 92 and Cedaredge.

The Denver and Rio Grande Western railroad spur from Grand Junction is used solely for coal haulage. The line ends just past Somerset at the Hawks Nest Mine and connects loadout facilities of several coal mines along the route. Rail service is at Delta, Colorado, 14 miles to the south of the Cedaredge tract. Two 100-car train loads of coal use the tracks between Somerset and Grand Junction and return every day. Coal cars are sided at loadout facilities until they are filled with coal near Delta and Paonia.

Cultural Resources

Approximately 30 percent of the Paonia tract was inventoried for cultural values at a Class III (100 percent) level and eight sites were located. In addition, the area surrounding the tract has been subject to other inventory efforts and eight additional sites were found. Consultation with the State Historic Preservation Officer (Dec. 10, 1981) during the unsuitability process (43 CFR 3461.1 (q)(1)) identified eight of the sixteen recorded sites as

eligible to the National Register of Historic Places. Three sites: a circa 1910 homestead, a circa 1919 homestead, and a 1925 homestead, lie within the lease tract. Five other sites, prehistoric lithic scatters, and a historic sawmill lie outside the lease tract area.

The Cedaredge tract has had minimal inventory conducted on it and to date no cultural values have been located. Consultation with the State Historic Preservation Officer (Dec. 10, 1981) during the unsuitability process (43 CFR 3461.1 (q) (1)) identified no additional sites eligible to or listed on the National Register of Historic Places on the tract.

Recreation

The lease tracts do not contain developed recreation facilities or sites, nor do they exhibit a potential for future development. Both tracts support opportunities for some incidental or intermittent dispersed recreational activities (e.g., hunting). However, neither tract is recognized as having exceptional opportunities for any specific recreational activity. Visitor use is unquantifiable since the marginal recreational demand has never warranted special efforts to collect visitor use data. Less than 25 deer hunters would use the general area within and surrounding the lease tracts on any one day of the regular deer season.

Regionally, the areas in the bottom of the North Fork Valley and in the surrounding high country have high recreation values and support most types of recreational activities. The intermediate hills (the public lands managed by BLM in which the lease tracts occur) have a relatively low value and capacity to attract and support recreation use. The privately owned pastoral lands of the valley bottom and the lands in the high country, such as Grand Mesa and the Ragged Mountains, possess a greater diversity of environments and features which provide outstanding opportunities for hunting, fishing, camping, picnicking, cross-country skiing, and snow mobiling.

Visual Resources

The character of the landscape in the Cedaredge and Paonia D seam coal lease tracts is defined by the steep, stream dissected slopes common in the southern foothills of Grand Mesa defining the North Fork Valley. The Cedaredge tract is dominated by evergreen, pinyon-juniper vegetation, while the Paonia D seam tract is dominated by mountain shrub vegetation. The setting of both tracts is primarily agricultural and natural with farms, ranches, and orchards dominating the activities in the valley. Small towns and dispersed urbanizing areas are found along the main highways. Coal mines, loading sites, and a railroad are found in the vicinity of the Paonia D seam tract.

About 10 percent of the Paonia D seam is visible from Paonia and Highway 133 in the foreground-middleground, and about 40 percent in the foreground from Stevens Gulch Road. The rest of the tract is seldom seen. Roughly half of the Cedaredge tract is visible in the background from the town of Cedaredge and Highway 96.

Preliminary visual management Class III is applicable to all areas visible from State Highway 133 and Stevens Gulch Road in the foreground-midground, and Class IV to all seldom seen areas. Class V rehabilitation goals apply to exploration, drilling, and road modifications affecting about 15 acres on both tracts.

Special Designation Areas

The Adobe Badlands (BLM) and a portion of the Gunnison Gorge (BLM) Wilderness Study Areas are located within Delta County. The West Elk Wilderness Area lies immediately east of the general lease tract area. The Gunnison Gorge Recreation Lands (BLM), Black Canyon of the Gunnison National Monument (NPS), Needle Rock Natural Area (BLM), and a portion of the Gunnison River (BLM/NPS), which has been recommended for inclusion into the Wild and Scenic Rivers System, also occur within the general study area. None of the above areas are within the proposed tract lands.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter analyzes anticipated impacts arising from implementation of any one of four alternatives. Discussions for each alternative focus on three separate geographical areas: central Utah, southern Utah, and west-central Colorado. No impact interactions are anticipated between the three areas. The analyses presented are for the most part summaries of more detailed technical reports prepared by resource specialists from Bureau of Land Management, Forest Service, Geological Survey; the State of Utah, and Sanpete County. Copies of these reports are available for review at BLM Utah State Office, FS Supervisor's Office in Price and Richfield, Utah, and BLM Uncompahgre Area Office in Montrose, Colorado. Where reliable sources of information or references were unavailable, analyses were based on the professional judgments of the resource specialists.

Discussion of impacts is focused on those resources which would be most significantly affected. The majority of physical impacts would be restricted to the actual tracts. However, anticipated impacts to resources such as air quality, socioeconomics, transportation, recreation, and visual resources would have regional implications and are considered on a broader basis. Additional site specific environmental analysis will be required upon submission of mine plans for the individual tracts.

The first section of this chapter consists of analysis assumptions and guidelines used in impact analysis. This section is followed by the general impact analysis which constitutes the main body of the chapter. Also included are regional summaries of unavoidable adverse impacts, the relationship between the short-term use of man's environment and the maintenance and enhancement of long-term productivity, and irretrievable or irreversible commitment of resources. The final section under each alternative is a synopsis of significant cumulative impacts for each geographical region. Appendix 7 is a net energy analysis for alternatives one, two and three.

Analysis Assumptions and Guidelines

Impact analysis assumes that appropriate laws, regulations, and the mitigating measures listed in Appendix 3 will be applied and enforced. The following basic assumptions and estimates were made to facilitate analysis of the environmental impacts of mining and other coal related developments considered in this EIS:

1. Where a tract has the potential to be developed independent of adjacent operations or leases, the analysis is based on that assumption even though the probability is that the tract would be developed from adjacent properties.
2. The impacts described in this chapter that are attributable to Alternatives One through Three would be in addition to baseline impacts described in Alternative Four (No Action). The cumulative impacts that

would result by the year 2000 can be determined by adding the projected impacts from proposed leasing to the projected baseline impacts from other development. To facilitate the identification of significant cumulative impacts, a summary analysis of such impacts is presented at the end of each alternative discussion.

3. Timeframes for the proposed tracts to be addressed:

- 1984 - Proposed Round Two leasing.
- 1987 - Exploration and construction period begins (first year of appreciable impacts mainly from exploration).
- 1990 - Coal production would begin.
- 1995 - Full production reached (significant impacts still accumulating).
- 2000 - Expression of maximum impacts that would continue through the life of the mine.

Exploration would be conducted from 1987 through 1989. Mine construction would begin in 1987 and full production reached by 1995. Impacts are analyzed only to the year 2000. Percent recovery for each tract is identified in Chapter 6.

4. Coal production figures are based on a 23- to 50-percent recovery rate for underground mines and an 85- to 90-percent recovery rate for surface mines.

5. Mine production would average 15 tons per man-shift for underground mining and 75 tons per man-shift for surface mining.

6. In underground mines, longwall mining methods would be used where technically and economically feasible. Room and pillar methods would be used where necessary.

7. Lands disturbed by exploration and mining activities would be reclaimed. Lands utilized in community development or retired to provide community or mine water would not be reclaimed or returned to their original use.

8. Community development would be at the rate of approximately 18 people per acre; half of this land would come from irrigated cropland.

9. Water needs for mining and expanded communities would be met by obtaining rights to irrigation water. For each acre of community development, an additional 0.75 acre of irrigated cropland would be retired to provide community water needs. Mining would require an average of 7 gallons per ton of coal produced.

10. Annual water use per person would be at the rate of 225 gallons per day (4.5 acre-feet/18 people/year). The water required to irrigate 1 acre annually would supply the annual water needs of 14.3 people (3.6 acre-feet/acre/year).

11. Sewage treatment plants and effluent would conform to State and/or Environmental Protection Agency standards.
12. The planned Castle Valley Railroad Spur would be built by Denver and Rio Grande Western (D&RGW) and functioning by the time the tracts begin producing coal. Current plans call for the railroad to be functioning by 1985.
13. Traffic projections for 1995 are based on historic trends plus projections for a baseline coal production rate of 21.6 million tons per year between 1990 and 2000 and the distribution of increased population resulting from Federal coal leasing considered in this statement.
14. Future traffic would be accommodated on the existing and proposed highway system. Shortfalls in capacity would be accommodated through upgrading of the specific overloaded elements of this system.
15. Coal-haul trucks using public roads would have a net load capacity of 40 tons.
16. Coal transportation in central Utah and west central Colorado would be to railroad loading facilities by truck.
17. Coal transportation in the Alton coal field would be by truck to a slurry pipeline originating from the Bald Knoll area.
18. Incidental service-truck traffic to mines would be 20 visits per day per million tons per year of coal production.
19. On tracts where portal area size was not estimated site specifically, it is assumed that if production is greater than 1 million tons per year the portal would require 20 acres; if production is less than 1 million tons per year, the portal would require 10 acres.
20. On tracts where ventilation shafts for underground mines were not estimated site specifically, it is assumed that two 1-acre areas for ventilation shafts would be developed by the year 2000. Access for assumed ventilation shafts would be through the mine. Where outside access for ventilation shafts would be needed, it is assumed that access road width would be 20 feet.
21. It is assumed that four to six 0.1-acre drill hole sites would be required for each section of land in the tracts depending on complexity of the geologic structure. It is also assumed that existing access would be utilized where possible and on the average 0.25 to 0.5 mile of 12 to 25-foot-wide disturbance for new roads (depending on slope) would be required for each bore hole. Some upgrading of existing roads may be required, but roads would not be substantially widened. Exploratory drill hole pads and roads would be reclaimed immediately unless the disturbance would occur on sites that would later be used for portals or other project components.

22. Main access and truck haul roads would disturb 10 acres per mile (82.5-foot width).

23. Reclamation of surface-mined land would involve separate stockpiling of overburden and surface soils. Prior to replacement of surface soils, the overburden would be replaced as slightly undulating terrain in order to minimize long flows and concentrations of water runoff. The surface soils would then be replaced on the reshaped overburden.

Alternative One: Maximum Level Central Utah (1.907 Billion Tons)

Climate, Air Quality

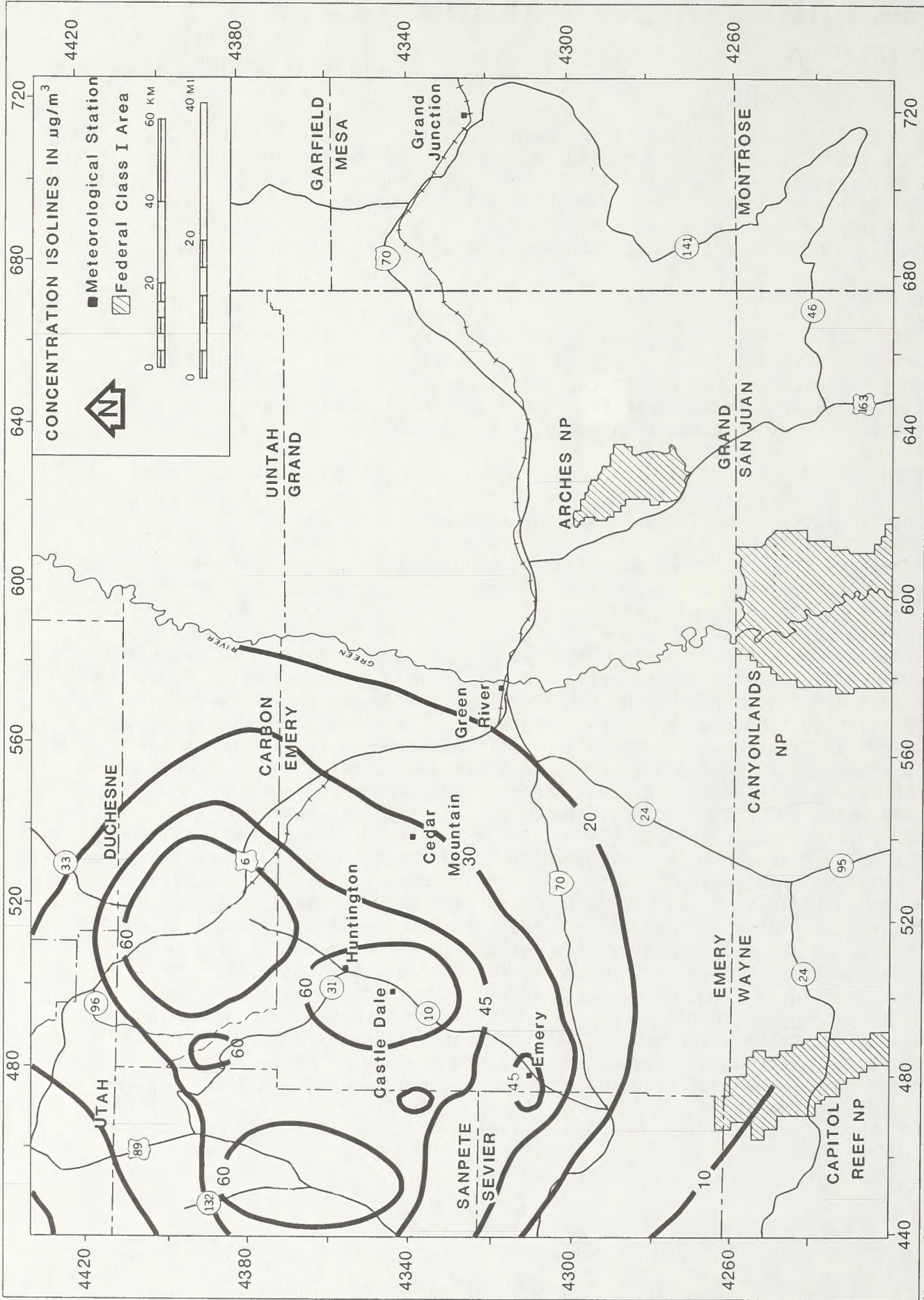
Potential air quality impacts of concern include: (1) whether National Ambient Air Quality Standards (NAAQS) would be exceeded as a result of coal leasing; (2) whether Prevention of Significant Deterioration (PSD) incremental limitations would be exceeded; (3) potential impacts to visibility and other air quality related values at Federal Class I areas; and (4) potential degradation of air quality in cities and towns due to increased population.

Air Quality

The air quality analysis focuses on regional scale impacts. Unless cited otherwise, this analysis is based on a report by Aerocomp, Inc. (1982). Impacts for each tract were not considered in detail. Each new mine would need a notice of intent permit from the Utah Bureau of Air Quality, at which time a localized, site specific analysis would be performed.

Development of all central Utah tracts would increase emissions of all pollutants covered by the NAAQS. The increase is considered significant only for particulates; therefore, it was the only pollutant modeled.

Under Alternative One total suspended particulates (TSP) emissions are projected to increase by 33,343 tons per year (tpy) over the 1981 level of 111,981 tons and the projected baseline of 204,273 tpy by the year 2000. Therefore, by the year 2000, TSP emissions resulting from implementation of Alternative One are estimated to increase by 29 percent over 1981 levels and 16 percent over the projected baseline. The model ISCLT with Cedar Mountain wind data and concurrent Grand Junction stability data was used to calculate annual average TSP concentrations. The results of annual average calculations are shown in Figure 4-1. A background concentration of 15 micrograms per cubic meter should be added to the annual average values shown. Three areas near Price, Castle Dale, and Mount Pleasant are predicted to exceed the primary NAAQS for TSP. Secondary NAAQS are presently exceeded within a 160 square mile area. By the year 2000, the secondary NAAQS would be exceeded within a 2,470 square mile area of which 1,040 square miles would result from implementation of Alternative One. It should be noted that the modeling analysis is conservatively high and may overestimate the size of the area exceeding the NAAQS. The model does not consider the fact that most of the particles are large and would settle out within approximately 1 mile of the source, and that terrain provides a barrier to particulate movement and causes variation in wind flow, which tends to disperse pollutants. Long distance estimations of annual concentrations are expected to be exaggerated. The greatest contribution to the predicted concentrations would be vehicular travel on unpaved roads. This includes truck haulage of coal, employee traffic, and general use of unpaved roads by the increased population of the central Utah region.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-1
 ANNUAL AVERAGE TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 2000
 ALTERNATIVE ONE

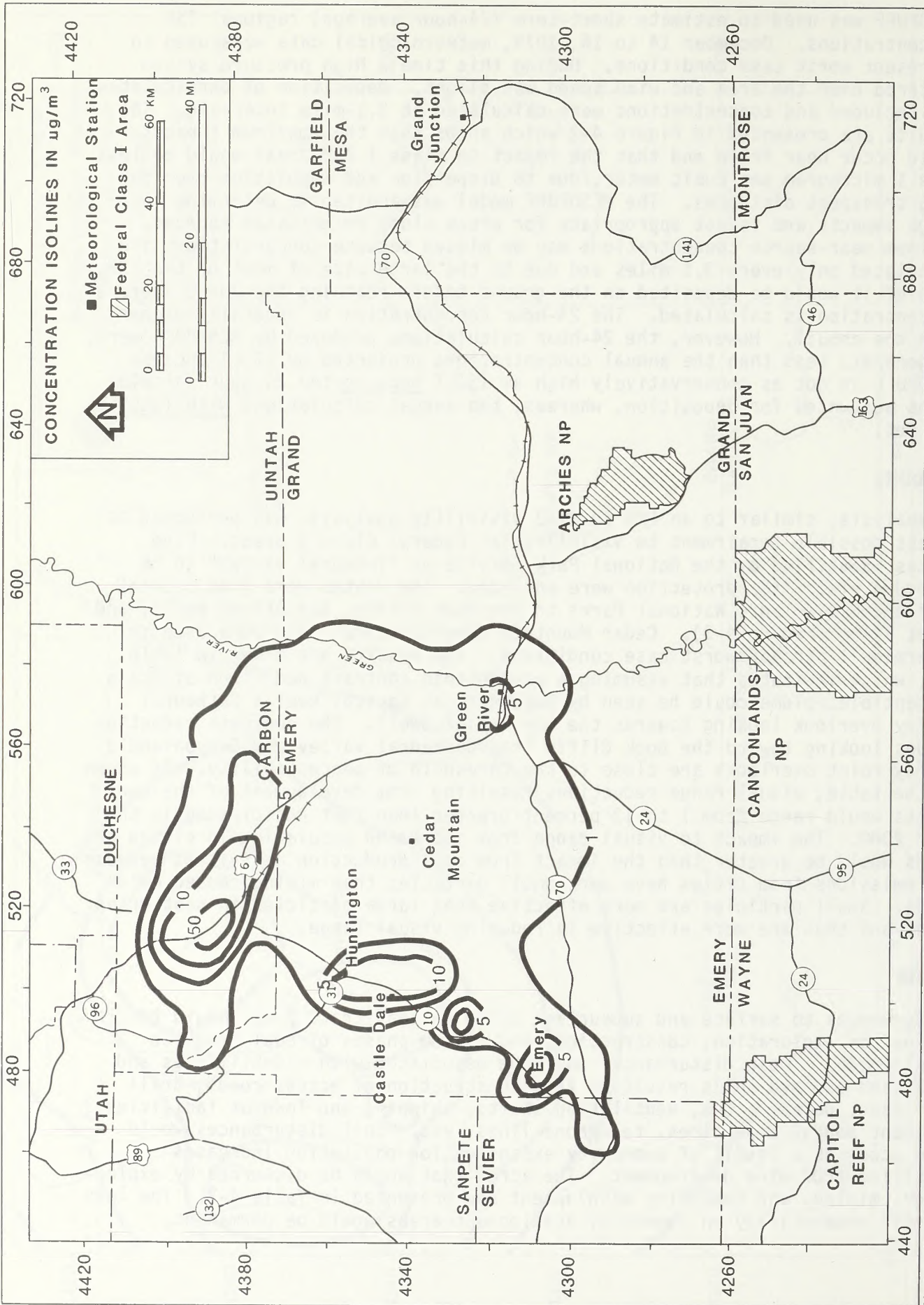
MESOPUFF was used to estimate short-term (24-hour average) regional TSP concentrations. December 14 to 16, 1979, meteorological data were used to represent worst case conditions. During this time a high pressure system centered over the area and wind speed was slight. Deposition of particulates was included and concentrations were calculated at 3.1-mile intervals. The results are presented in Figure 4-2 which shows that the maximum impacts would occur near Price and that the impact to Class I PSD areas would be less than 1 microgram per cubic meter, due to dispersion and deposition over the long transport distances. The MESOPUFF model was applied to determine long range impacts and is not appropriate for areas close to emission sources. Maximum near-source concentrations may be missed because concentrations are calculated only every 3.1 miles and due to the large size of most of the TSP, much of it would be deposited on the ground before reaching the point where a concentration is calculated. The 24-hour concentration is generally higher than the annual. However, the 24-hour calculations produced by MESOPUFF were, in general, less than the annual concentrations projected by ISCLT because MESOPUFF is not as conservatively high as ISCLT because the 24-hour calculations accounted for deposition, whereas, the annual calculations with ISCLT did not.

Visibility

An analysis, similar to an EPA level-2 visibility analysis, was performed to assess possible impairment to visibility at Federal Class I areas. Five vistas identified by the National Park Service as "integral vistas" to be afforded visibility protection were analyzed. The vistas were from Capitol Reef and Canyonlands National Parks to the Book Cliffs, San Rafael Swell, and Mount Baldy (Figure 4-3). Cedar Mountain meteorological data were used to determine 1 percent worst case conditions. The results are shown in Table 4-1, which indicates that assuming a perceptible contrast reduction of 0.1 a perceptible plume could be seen by observers at Capitol Reef's Cathedral Valley overlook looking towards the San Rafael Swell. The contrast reduction values looking toward the Book Cliffs from Cathedral Valley and Canyonland's Murray Point overlooks are close to the threshold of perceptibility. As shown in the table, visual range reductions resulting from development of the new tracts would range from 1 to 13 percent greater than that anticipated in the year 2000. The impact to visual range from increased population in cities and towns would be greater than the impact from coal production activities because TSP emissions from cities have more small particles than mining caused emissions. Small particles are more effective than large particles in scattering light and thus are more effective in reducing visual range.

Soils

Disturbances to surface and subsurface soils on coal tract areas would result during the exploration, construction, and mining phases of coal resource development. These disturbances would be associated with sidehill cuts and fills and exposed soils resulting from construction of access roads, drill hole pads, portal sites, ventilation shafts, shipping and loadout facilities, sediment ponds, powerlines, telephone lines, etc. Soil disturbances would also occur as a result of community expansion for population increases resulting from mine development. The acres that would be disturbed by exploration, mining, and community development are presented in Table 4-2. The loss of soil productivity on community development areas would be permanent.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-2
24 HOUR TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 2000
(BASELINE PLUS ROUND II)

TABLE 4-1

WORST-CASE (1 PERCENT OCCURRENCE) VISIBILITY IMPAIRMENT FOR CENTRAL UTAH
YEAR 2000 BASELINE

Alternative One

Line of Sight	From CV to BC	From CV to MB	From CV to SRS	From MP to BC	From MP to MB
Visual Range Reduction ^a at Sunrise (Percent)					
Year 2000 baseline	50.36	4.55	16.53	50.79	13.49
Secondary growth	9.05	1.14	4.06	8.28	2.36
Proposed mines	4.35	0.29	1.64	1.53	0.87
Year 2000 total	63.76	5.98	22.23	60.60	16.72
Contrast Reduction ^b at Sunrise					
Year 2000 baseline	0.066	0.033	0.103	0.062	0.015
Secondary growth	0.014	0.008	0.025	0.011	0.003
Proposed mines	0.006	0.002	0.010	0.002	0.001
Year 2000 total	0.086	0.043	0.138	0.075	0.019
Visual Range Reduction at Sunset (Percent)					
Year 2000 baseline	47.52	5.01	13.41	51.94	14.37
Secondary growth	8.32	1.28	3.10	8.47	2.50
Proposed mines	3.85	0.33	1.18	1.57	0.91
Year 2000 total	59.69	6.62	17.69	61.98	17.78

CV - Cathedral Valley Overlook, Capitol Reef National Park

BC - Book Cliffs

MB - Mt. Baldy

SRS - San Rafael Swell

MP - Murray Point Overlook, Canyonlands National Park

^a Threshold of perceptibility: 15-70 percent^b Threshold of perceptibility: 0.1

TABLE 4-2

CENTRAL UTAH
ACRES OF SOIL DISTURBANCE ON COAL TRACT
AND COMMUNITY DEVELOPMENT AREAS

Alternative One

Activity	Acres Disturbed				
	1987	1990	1995	2000	
Exploration ^a	265.2	265.2	265.2	265.2	The exploration and mining acres represent 2.4 percent of the total surface acres within the coal tracts.
Mining ^b	0	1,033.5	1,085.4	1,129.3	
Community Development ^c	167.6	303.7	840.7	985.0	
Totals	432.8	1,602.4	2,191.3	2,379.5	

Source: Round Two Tract Profiles. Round Two Leasing and socioeconomic data from the State of Utah Planning Coordinator's Office, 1982.

- ^a Although included in cumulative total of disturbed acres, these exploration acres would be rehabilitated within a 3-year period after completion of exploration work.
- ^b Includes 100 acres of off-tract loadout facilities.
- ^c Soil productivity loss considered permanent on these acres.

Soil disturbance in general would cause increased susceptibility to erosion or displacement. The degree of susceptibility would vary according to soil erodibility characteristics, topography, surface roughness, and the presence or absence of protective soil cover such as vegetation, plant residues, gravel, cobble, or rock. The amount of erosion would be related to the time between the disturbance and re-establishment of vegetation or implementation of erosion control measures. Soil productivity could be reduced by the loss of topsoil or the mixing of topsoil with substratum materials (excavated during exploration, construction, and mining phases) that are high in salinity, alkalinity, other toxic materials, or unweathered parent materials.

Soil loss on disturbed areas would continue until erosion control and revegetation of the areas were successful. In areas of native vegetation, where climatic and soil conditions are favorable and slope gradients are gentle, successful erosion control and revegetation would likely be achieved within 1 to 2 years.

Table 4-3 presents estimated soil losses on critical soil erosion areas. The losses depicted are considered as averages over the potentially disturbed tract areas. As shown, the upper range of percent increases could be large, but would occur on a relatively small portion of the total tract acreage (from 1 to 4 percent). Revegetation and erosion control measures in compliance with applicable laws and regulations would reduce soil erosion to acceptable levels within a 2- to 10-year period on most tract areas. Soil loss on all disturbed acres would exceed soil loss tolerance values.

The distance of soil movement from disturbed areas and its effect on offsite resources, e.g., water courses and vegetation, cannot be projected without site specific mine plans and facility locations. Soil on some sites would move only a few feet while in other locations it may move into perennial streams and be carried long distances. Any soil movement is considered a soil loss as it would change soil structure and its potential as a plant growth medium. The critical soil areas on the Book Cliffs and Wasatch Plateau coal tracts would experience larger differences between soil losses and tolerance values than the Emery area tracts.

The following discussions on soil disturbances are presented by geographical area for exploration and production activities, with emphasis on impacts to critical soil erosion areas. For exploration activities, soil impacts on total acres of potential disturbance are discussed; for production activities, only soil impacts on cut and fill slopes are analyzed, with the assumption that minimal soil erosion and loss would result on the road running surfaces due to engineering design features.

Soil disturbances from exploration activities in central Utah would be temporary (1 to 2 years) on approximately 265 acres. Revegetation and soil erosion control procedures should establish adequate groundcover and stabilize soils within a 2-year period on most sites.

On the Alkali Creek, Coal Creek, Soldier Creek, and Dugout-Pace tracts, slopes in excess of 30 percent would probably be encountered during exploration in

TABLE 4-3
CENTRAL UTAH
ESTIMATED SOIL LOSSES^a ON CRITICAL SOIL EROSION AREAS
ALTERNATIVE ONE

Coal Tract	EXPLORATION ACTIVITIES			PRODUCTION ACTIVITIES		
	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments
Book Cliffs Tracts	0.5 to 3.0	5.0 to 50.0 (Moderately steep areas)	4.5 to 47.0	900 to 1600	900 to 1600	Same as shown for exploration ^d
Wasatch Plateau Tracts						
Gooseberry, North Trough Springs, Mud Creek, and Castle Valley Ridge	0.2 to 22.0	20.0 to 50.0	19.8 to 28.0	130 to 100	130 to 100	Same as shown for exploration.
Trail Mountain, Ferron Canyon, The Pines, & Qultchupah	20.0+	50.0 to 100.0	30.0 to 80.0	150 to 400	150 to 400	Same as shown for exploration.
Emery Area Tracts	Water Erosion 0.5 to 1.0 Wind Erosion 20.0+	0.5 to 1.0	0	0	0	Water Erosion 0.5 to 1.0 Wind Erosion 20.0
		50.0+	30.0+	150	150	50.0 to 100.0 30.0 to 80.0 200 to 400

^a Tons per acre per year in water erosion rates on steep slopes unless otherwise indicated. Lack of site specific project and soil survey information prevents projection of cumulative total soil losses from construction activities on critical soil erosion areas as compared to total cumulative soil losses from natural erosion on these same areas.

^b Source: Table 3-4.

^c Site specific analyses for coal tracts to be included in the Uinta-Southwest Utah Coal Region Environmental Impact Statement: Round Two Leasing.

^d Soil loss for production activities on the Book Cliffs tracts would be the same as for exploration activities with the exception of utility line routes where soil loss with tract development would be 0.5 to 20.0 tons per acre per year.

^e In the Emery area, production activities would occur only on the Blue Trail Canyon tract because the Walker Flat tract would be mined from an existing portal.

the location of some drill pads and access roads. Erosion or mass movement on these steep slopes would be accelerated where disturbed by exploration activities.

Major portions of the Gooseberry, North Trough Springs, Mud Creek, and Castle Valley Ridge tracts have slopes in excess of 25 percent. Sheet erosion, soil creep, gully formation, and slope failures presently occurring on portions of these slopes (Table 3-3) would be accelerated by exploration activities. Soil loss could range from 5 to 50 tons per acre per year on moderately steep areas to 50 to 100 tons per acre per year on the steeper escarpment areas (BLM, 1982b; Iaquinta, personal communication, FS, 1982). The severity of soil loss is indicated by comparison with allowable soil loss tolerance values of 1 to 5 tons per acre per year in central Utah as listed in Table 3-4. These soil losses would occur during the first year after disturbance, mainly during intensive summer storms and spring runoff periods. Accelerated soil loss, combined with low soil fertility, productivity, and high salt and clay content, would cause revegetation problems on the Trail Mountain, Ferron Canyon, The Pines, and Quitchupah tracts (Table 3-3). Soil losses from water erosion on 3 acres of the Walker Flat and Blue Trail Canyon tracts disturbed by exploratory activities would be less than 1 ton per acre per year (BLM, 1982b); however, wind erosion losses could be in excess of 50 tons per acre per year until successful reclamation occurs (BLM, 1982b).

Approximately 353 acres would be disturbed by production activities on steep slopes within critical soil erosion areas.

In the Book Cliff tracts, 52 acres of steep slopes would be disturbed mainly on the Alkali Creek, Coal Creek, and Dugout-Pace tracts. Disturbances on steep slopes could result in soil losses of 50 tons or more per acre per year from combined water and wind erosion (BLM, 1982b). Successful revegetation and soil erosion control could be achieved within 10 years after initiation of reclamation procedures.

In the Wasatch Plateau, even with required mitigation, soil losses on exposed soils of cut and fill slope acres could range from 20 to 50 tons per acre per year on 106 acres in the North Trough Springs, Mud Creek, and Castle Valley Ridge tracts and from 50 to 100 tons per acre per year on 195 acres in the Trail Mountain, Ferron Canyon, The Pines, and Quitchupah tracts. Due to the high erosion potential, low soil fertility, and high salt and clay content, revegetation problems would exist on the disturbed acres of these tracts. Soil erosion on an unestimated number of offsite acres on the steep slopes of all tracts would be accelerated or initiated by the concentration of water from cut and fill slopes and road surfaces into numerous intermittent drainages crossed or intercepted by production facilities.

Subsidence, as evidenced on coal lease operations within the Wasatch Plateau could increase the potential for mass soil movement on all tracts especially the unstable soils of the Castle Valley Ridge, Trail Mountain, and Ferron Canyon tracts (see Topography section). This could accelerate soil erosion and cause increased sediment transport into intermittent and perennial stream courses within or adjacent to these tracts.

On the Blue Trail Canyon tract about 65 acres would be disturbed by mining activities by the year 2000. Access road and work site construction activities on the mesa top would affect approximately 25 acres; soil lost by water erosion would be 1 to 5 tons per acre per year, with the potential for significantly larger losses from wind erosion, i.e., in excess of 50 tons per acre per year (BLM, 1982b). Surface mining operations would disturb approximately 40 acres at a rate of 4 acres per year. A maximum of 20 acres would be unreclaimed at any one time. Soil lost by water erosion would be less than 5 tons per acre per year but could exceed 20 tons per acre per year on cutbanks and spoilbanks (BLM, 1982b). Soil lost by wind erosion could exceed 100 tons per acre per year on sandy areas and stockpiled topsoil; such significant soil losses would limit the amount of area that could be rehabilitated. Seeding success on disturbed soil could be poor due to low annual precipitation (10 inches or less), shallow to very shallow plant rooting depths, the potential of exposure of highly saline and toxic materials, the high wind erosion potential, and the limited area of suitable topsoil (BLM, 1979b). Revegetated areas would be subject to accelerated water and wind erosion for up to 10 years.

Mineral Resources

Approximately 132.9 million tons or 36 percent of the coal in the Book Cliffs tracts, and 317.1 million tons or 41.9 percent of the coal in the Wasatch Plateau tracts, would be recovered using current mining techniques. A north-south trending fault with a down-throw of more than 200 feet, prevents the economical recovery of the eastern two-thirds of the Mud Creek tract. This may reduce the amount of recoverable coal presently projected for the tract. Approximately 25.9 million tons of coal would be recovered from the Emery tracts. This represents 34 percent of the total resource on the Walker Flat tract and 90 percent on the Blue Trail Canyon tract.

The mining of coal would result in total depletion of the coal resource as the 718.8 million tons of unrecoverable coal, though still in the ground, would no longer be available as a mineral resource given present mining technology.

Surface and subsurface mining activities and subsidence could hinder the subsequent exploration and location of facilities related to oil and gas development in the Book Cliff and Wasatch Plateau areas. The potential reduction in recoverable resources cannot be estimated at this time. See Land Use Section for additional details.

Topography, Geology, Paleontology

Construction of surface facilities would cause permanent changes in topography on 1,295 acres in central Utah.

Surface mining would alter 65 acres of the Blue Trail Canyon tract. Due to the swell factor of the excavated materials local topography after mining could be as much as 30 feet above the present elevation of the surface.

Topography would be altered as a result of subsidence on portions of 52,974 total acres. Tension cracks, buckling, and troughs can be expected in these

areas. The extent of the effect is dependent on the strength and thickness of the overburden, the geologic structure of the rock formations, the width of the mined out area, the thickness of the coal bed being extracted, the mine configuration, and the rate and uniformity at which the coal is mined (Dunrud, 1976). Surface Mining Control and Reclamation Act requires that subsidence be considered in the permit application, controlled during mining, and included in reclamation.

The median overburden of the Book Cliffs is comparable to the Wasatch Plateau, but more local variation in overburden depth occurs within the Book Cliffs' tracts. Since surface expressions of subsidence tend to be less in areas of thicker overburden, there may be an increase in topographic slope gradients from areas of thicker overburden to areas of shallow overburden (Moore, Nawrocki, 1980). Moore and Nawrocki predict a maximum subsidence in the Book Cliffs of 12 feet, assuming a median overburden of 1,105 feet and a maximum coal seam thickness of 15 feet. If a 1-mile square area is extracted, leaving no barrier pillars where a limit angle of 16 degrees is considered representative, it is estimated that the maximum surface that would be susceptible to subsidence would be 168 percent of the area mined. Tension cracks that occur above the pillars could reach the surface as fissures. Near escarpments a wider pillar is required, otherwise escarpment failure could occur.

Moore and Nawrocki (1980) also predict a maximum subsidence of 16 feet for the Wasatch Plateau. If a 1-mile square area of coal is extracted, leaving no barrier pillars where a limit angle of 16 degrees is considered representative of the coal field, the estimated maximum surface area that would be susceptible to subsidence would be 170 percent of the area mined. The Ivie tract has considerably less overburden (600 feet) than the other tracts and open tension fractures as well as subsidence may occur on this tract.

In the Emery area, subsidence resulting from underground mining would only affect the Walker Flat tract containing 1,520 acres. Because seam thickness is small, subsidence would not exceed 6 feet. Moore and Nawrocki predict the maximum lateral extent of subsidence in the Emery Area as 117 percent with a limit angle of 16 degrees. The effects of subsidence would be more pronounced than in the Wasatch or Book Cliffs fields due to the shallower overburden. Open tension fractures may occur at the surface.

Subsidence damage to geologic formations above underground coal mines can deform other coal beds, reduce mine safety, and disrupt the hydrologic regime (see Water Resources) so that production efficiency is lowered reducing the minable coal reserves (Dunrud, 1976).

Subsidence usually does not exceed 50 percent of the thickness of the seam extracted. Geologic conditions and/or mining methods could increase or decrease this percentage. The effects of subsidence can be identified geologically in the area directly above the coal extracted and the area within the limit angle. Though 16 degrees is the representative limit angle for the coal fields, this angle can increase or decrease with varying geologic conditions. Though the effects of subsidence can be identified topographically within the area of the limit angle, those effects may be considerably less than that area above the extracted coal.

In the Wasatch Plateau and Book Cliffs coal fields, significant plant fossils used for correlation and paleo-environmental guides could be destroyed by coal removal activities in the fossil-rich Blackhawk Formation. However, much of the flora has already been documented and recorded (Parker, 1976). Significant disturbances to other scientifically important fossils could be avoided if mitigating measures are followed (Appendix 3). Surveys and mining activities could also expose new fossils and enhance paleontological studies.

Water Resources

Surface Water

Surface mines and the construction of roads and other facilities associated with both surface and underground mining would require some modification of local surface-drainage patterns. This would increase erosion and fluvial sediment. It would also increase the rate of sediment deposition in local reservoirs such as Millsite and Scofield Reservoirs and would increase the load on local public-supply filtration systems. The regional impact, however, would be small.

According to the U.S. Soil Conservation Service (SCS, 1973), annual sediment yields in the area of the central Utah tracts range from about 0.1 to more than 3.0 with an average of 0.75 acre-feet per square mile. Kilpatrick (1979) indicates that land disturbance associated with synfuels development could increase sediment yields tenfold. Consequently, annual sediment yields on the lands that would be disturbed by mining and associated development of the central Utah tracts could increase to nearly 28 acre-feet by the year 2000 (Table 4-4). This is 0.08 percent of the estimated combined annual sediment yield in the Green and Dirty Devil River basins. The sediment would add additional stress to already stressed ecosystems in and along the affected streams. The stress would be greater nearer the source because there would be less water for dilution and some sediments would be deposited along the channel.

Table 4-5 shows by drainage subbasin the estimated increase in annual sediment yields from areas that would be disturbed by maximum development of the central Utah tracts.

TABLE 4-5

CENTRAL UTAH
ALTERNATIVE ONE
SEDIMENT YIELD INCREASE

River Drainage Basins	Estimated Increase in Sediment Yield (acre-feet per year)	Percent of estimated annual basin yield
Price River	11.4	0.98
Dirty Devil River	8.5	0.70
Sevier River	5.6	0.18
San Rafael River	2.4	0.05
Total	27.9	N/A

TABLE 4-4

CENTRAL UTAH
ALTERNATIVE ONE

IMPACTS ON WATER RESOURCES AND REGIONAL SIGNIFICANCE

Item	1987	1990	1995	2000
Water requirement (acre-ft/year)				
Mining and exploration	114.0	260.5	260.5	260.5
For public supply	759.5	1377.8	3813.0	4470.7
Total	873.5	1638.3	4073.5	4731.2
Consumptive water use				
Total (acre-ft/year) ^a	493.8	949.4	2167.0	2495.8
Percent of runoff ^b	.01	.02	.05	.05
Increased annual sediment yield				
Total (acre-ft)	5.1	18.8	25.7	27.9
Percent ^c	.01	.05	.07	.08
Increase in salinity (milligrams per liter) ^d				
	.04	.08	.19	.22

a Assumes 50 percent of withdrawal for public supply and 100 percent of withdrawal for exploration and mining.

b Percent of combined average annual runoff of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, Utah.

c Percent of estimated annual yield upstream from the stations cited in footnote b.

d As determined at Imperial Dam. Does not include reduction in salinity from reduced irrigation return flow.

Development of the Gooseberry and Mud Creek tracts in the Upper Price River subbasin could increase annual sediment inflow to Scofield Reservoir by up to 0.06 acre-feet. This is only about 0.11 percent of the average annual inflow from 1943 to 1979 as determined by bathymetric surveys (K. M. Waddell, written communication, GS, 1982). The effect on the life and utility of the reservoir would be small. By the same analogy, the effect of increased sediment production due to development of the Ferron Canyon tract would have a slightly larger impact on the life and utility of Millsite Reservoir. Annual sediment yields for acres disturbed by development of the Ferron Canyon tract could increase by an estimated 1.2 acre-feet, or about 1.0 percent of the estimated annual sediment inflow to Millsite Reservoir.

Maximum development of the central Utah tracts would have a minor impact on surface-water quality in the general area of the tracts, access roads, loadouts, and affected communities. The regional impact on water quality would be negligible. However there could be serious local impacts due to local increases in sediment yields or accidental spills of contaminants.

Water discharged from mines is generally more saline than runoff in adjacent streams (BLM, 1981a). Consequently, discharge of mine water to such streams as Cottonwood and Ferron Creeks would increase the salinity in the receiving stream. In most cases, however, the increase would be small because the ratio of mine discharge (generally less than 100 gallons per minute) to the discharge of receiving streams such as Cottonwood and Ferron Creeks is so small that the average concentration of dissolved solids would not increase by more than 2 to 3 milligrams per liter (BLM, 1981a). Except in the case of trans-basin diversion of water by mines and possible contamination of the mine water, the salt load of the receiving streams would not be significantly increased by the mine water because much of that water and its salt load reaches the streams through seeps and springs under natural (nonmining) conditions. However, the ratio of mine discharge to natural runoff in small intermittent streams could be large. Any increase in salt loading from mine dewatering would be negligible compared to the salt loading from irrigated lands in the lower stream reaches, especially those in the Price, San Rafael, and Dirty Devil River drainage basins. It should be noted that State law now prohibits issuance of new National Pollution Discharge Elimination System (NPDES) permits on National Forest lands. Development of some tracts on the Wasatch Plateau may conflict with this law.

Recent Geological Survey studies (written communication, Waddell, GS, 1983) indicate that Scofield Reservoir in the Upper Price River Basin is borderline between meso-eutrophic and eutrophic. Accidental pollution and pollution control failures on the Gooseberry and Mud Creek tracts could add nutrients to streams flowing into Scofield Reservoir. This would contribute to eutrophication of the reservoir for short periods of time.

By the year 2000, 4,731 acre-feet per year more water would be diverted for mining and associated population growth under Alternative One; the annual consumption rate would be 2,496 acre feet (Table 4-4). Salt concentration resulting from withdrawal of the water and salt loading resulting from return of the unconsumed water (chiefly from fluid-waste disposal systems) would have

a minor effect on the salinity of the Colorado and Sevier Rivers. For example, the salinity of the Colorado at Imperial Dam would be increased by an estimated 0.22 milligrams per liter. This increased salinity is negligible compared to the salt loading of irrigation and natural runoff from the salt-bearing Mancos Shale. Locally, that runoff contains more than 5,000 milligrams per liter of dissolved solids and deposits more than 7 tons of salt per acre-foot of water into lower reaches of the Price, San Rafael, and Dirty Devil Rivers.

Rock fracturing associated with the subsidence tends to divert more snowmelt and rainfall underground, increasing ground water recharge at the expense of overland runoff. This fracturing, however, could also cause water in certain near-surface aquifers such as those in the Flagstaff Limestone to drain downward more rapidly than normal. Consequently, the flow of springs that provide baseflow to headwater streams (including those in municipal watersheds) might be reduced. Similarly, the flow of some springs that provide water for the wildlife, livestock, irrigation, and public supply could be either reduced or increased. Subsidence-caused fracturing can also divert streamflow directly underground if the fracture intersects a stream channel and remains open. Springflow and streamflow diverted underground by subsidence-caused fracturing would not be lost from the hydrologic system and might not be lost from the drainage subbasin in which it originates. The water would move through newly formed fractures and would degrade in quality more rapidly than it would as overland runoff. For example, runoff in the headwaters of such streams as Ferron, Cottonwood, and Huntington Creeks commonly contain less than 200 milligrams per liter of dissolved solids. Water discharged from the Blackhawk Formation to the Wilberg Mine has an average dissolved-solids concentration of more than 280 milligrams per liter (BLM, 1981a).

Without mine plans and detailed hydrologic inventories for the central Utah tracts it is not possible to determine how many or which springs or streams would be affected by subsidence-caused fractures if the tracts were leased and developed. The probability of a spring or stream being affected decreases as the thickness of the geologic section above the mined-out area increases. In central Utah most of the largest and important springs are in the Wasatch Plateau area. These springs discharge from the Flagstaff Limestone and North Horn Formations 1,500 to over 3,000 feet above the coal seams that would be mined. Therefore, even on such tracts as the North Trough Springs tract, which probably contains more than 50 springs, the chance of a subsidence-caused fracture reaching the land surface and diverting the flow of even one spring (or headwater stream) is very small.

Ground Water

Mining and mine dewatering would create pressure gradients in the local ground-water systems causing ground water to move toward the mine workings. This could induce the movement of saline water (such as that found in the Mancos Shale) into freshwater aquifers such as the Star Point Sandstone, thus locally reducing the quality of the freshwater aquifers (Lines, 1983).

Underground mine workings would disrupt local ground water flow systems in the Blackhawk Formation and adjacent formations causing a redistribution of ground

water discharge. The mine workings could divert water away from springs used by wildlife and livestock, or from streams used for public supply or irrigation. In most cases this redistribution of ground water discharge would not result in a loss of water from the drainage subbasin in which the water originates. The new discharge points (in most cases mine discharge sites) would generally be in the same drainage subbasins as the former natural discharge points; however, several of the tracts straddle the divides between drainage subbasins. Mine workings extending beneath those divides would intercept water naturally tributary to one of the drainage subbasins and divert that water to the other drainage subbasin.

Mining of the Book Cliffs tracts could divert some ground water from the Uintah Basin to the Price River basin. In a similar manner, mining of the other central Utah tracts could prevent ground water originating in the subbasin from reaching natural discharge points in the adjacent subbasin.

The volume of ground water that would be diverted from one drainage subbasin to another is unknown but probably very small compared to the total water yield of the individual subbasins affected. Based on data collected by GS (written communication, Waddell, GS, 1982), the fine grained, poorly permeable beds probably transmit about 30 acre-feet of water per year from the area of the Book Cliffs tracts to the Uinta Basin. This is only about 0.02 percent of the estimated mean annual runoff from the southern Uinta Basin as estimated by Price and Miller (1975). Proportionately small amounts of water probably are transmitted through the rocks in the area of the other central Utah tracts assuming mine workings on those tracts do not intersect faults similar to those intersected in the Wilberg and Deer Creek mines.

Water Supply and Use

Maximum development of the central Utah tracts would require up to 4,731 acre-feet of water per year for mining and public water supply needs (Tables 4-4 and 4-6). Sources of the water probably would be springs and streams currently used for public water supply and irrigation, water producing mines, and wells. These impacts are further discussed in the Land Use Section of this Chapter. An estimated 2,496 acre-feet of water would be consumed annually. This represents about 0.05 percent of the combined average annual discharge of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, (GS, 1982) and about 0.17 percent of Utah's share of Colorado River water. Impacts on the available supply in individual drainage subbasins could be larger. Table 4-6 shows the estimated annual mine-and-population-related water requirement from affected river drainage basins as related to average annual discharge at maximum flow gaging stations.

Maximum annual water requirement from affected drainage subbasin would range from about 0.6 percent of the annual discharge in the Sevier River basin to about 2.7 percent of the discharge of the Price River.

TABLE 4-6
CENTRAL UTAH WATER REQUIREMENTS COMPARED TO RIVER DRAINAGE BASIN RUNOFF

River Drainage Basin	Gaged site (Figure 3-4)	Combined average annual discharge at gaged site (acre-feet)	Approximate total Round Two Leasing water requirement	
			Acre-feet	Percent of average annual gaged discharge
Price River	18	103,600	2,764.8	2.7
San Rafael River	46, 47	96,940	689.0	0.7
Dirty Devil River	55	16,820	329.6	1.9
Sevier River	58	162,300	947.8	0.6
Total	N/A	N/A	4,731.2	N/A

Vegetation

Implementation of this alternative involving development of coal on 20 central Utah tracts would directly disturb a total of 1,395 acres of vegetation by the year 2000. This disturbance both onsite and offsite would result from exploration activities, construction of surface facilities, access roads, powerlines, loadout facilities, and surface mining activities. The majority of this disturbance would occur in the Pinyon-Juniper woodland and Conifer-Aspen forest. In addition to direct disturbances, subsidence may cause some alteration in vegetation types due to changes in underground or surface water systems. However, this impact is difficult to predict and not quantifiable.

An additional 1,796 acres of vegetation would be lost or altered as a result of community expansion and mine water use. By the year 2000, 985 acres of land would be required for community development of which 493 acres would be from irrigated cropland. In addition, 811 acres of irrigated lands would be retired from irrigation to provide water for mining and community needs. Table 4-7 summarizes disturbance by year and vegetation type.

Since mining plans have not been submitted or housing areas identified, the figures used are only estimates based on projected areas of development and the percentage of vegetation types found in those areas. The actual acreage of vegetation types that would be disturbed, should this alternative be implemented, may vary from these projected figures.

Cumulative vegetation disturbance would total 3,191 acres; however, vegetation loss would occur at different periods of time following lease issuance. As a result, disturbed areas would be in various stages of reclamation by the year 2000. The following summarizes major vegetation disturbing activities and if or when vegetation reclamation would likely occur.

Strip mining and associated developments on the Blue Trail Canyon tract would result in total removal of vegetation from 65 acres by the year 2000. However, only about 4 acres would be disturbed annually by strip mining activities. Based on a projected reclamation plan it is anticipated that no more than 20 acres would be unreclaimed at any one time in the mining area.

TABLE 4-7

CUMULATIVE VEGETATION DISTURBANCE BY
VEGETATION TYPE: CENTRAL UTAH

ALTERNATIVE ONE

Vegetation Type	Direct Mining Impacts ^a (Acres)				Indirect Impacts ^b (Acres)	Total ^c
	1987	1990	1995	2000	2000	2000
Agriculture	-	-	-	-	1304.0 ^d	1304.0
Riparian	3.0	6.0	11.0	11.0	-	11.0
Desert Shrub	1.0	90.0	90.0	93.0	107.3	200.3
Sagebrush-Grass	45.0	125.1	138.9	138.9	11.0	149.9
Pinyon-Juniper Woodland	12.5	390.0	418.3	442.4	283.6	726.0
Mountain Brush	4.9	59.9	59.9	59.9	21.4	81.3
Ponderosa Pine	24.7	132.1	132.1	135.1	-	135.1
Aspen	10.9	45.9	45.9	45.9	-	45.9
Conifer-Aspen	96.1	325.2	325.2	329.2	-	329.2
Non-Productive	7.0	24.0	27.0	29.0	69.0	98.0
Other (Douglas Fir, Mountain Meadow, Grassland, etc.)	60.1	100.5	102.3	110.1	-	110.1
TOTAL	265.2	1298.7	1350.6	1394.5	1796.3	3190.8

a Includes surface facilities, portal access, mining operations, exploration activities, powerlines, ventilation construction, and loadouts.

b Total lands lost to community development including agricultural lands retired from irrigation to provide water for community needs. This acreage was computed for the year 2000 only and does not include 96 acres of irrigated cropland that would be retired for exploration water requirements from 1987 through 1990.

c Total vegetation disturbance by the year 2000.

d Includes 492.7 acres lost to community development, 739.3 acres retired from irrigation to provide water for community needs, and 72.0 acres retired from irrigation to provide water for mine use.

Exploration activities involving construction of drill pads and access roads would disturb a total of 265 acres by the year 1990. By the year 2000 this acreage, while included in the cumulative total of acres disturbed, would be in advanced stages of reclamation.

Implementation of this alternative would result in the loss of 1,130 acres of vegetation from construction of surface facilities, portal access, powerlines, ventilation installation, and loadout facilities. Most of these acres would not be fully reclaimed until completion of mining activities. Certain access roads may continue to be used for other purposes following completion of mining and would not be reclaimed. Agricultural and nonagricultural lands surrounding local communities which would be lost to community expansion (493 and 492 acres, respectively) or retired from irrigation (811 acres) to provide water for community expansion and mining would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of residential development.

Even though less than 50 acres of Douglas fir communities in the Book Cliffs would be removed, it would represent a permanent commitment of the resource as the stands are not reproducing themselves. The areas disturbed would eventually revert to a mountain brush community.

For areas that would be reclaimed, the duration of the impact of total vegetation loss would depend upon the success of reclamation. Because of the well developed soils and annual average precipitation of 25 inches, reclamation attempts on the Wasatch Plateau and Book Cliffs tracts are expected to be 50 to 80 percent successful (Hagihara et al., 1972). On steep slopes and poorly developed soils in these areas, 30 percent of revegetation attempts are expected to be successful. At the end of the mine life, vegetation loss would continue for about 10 years on previously unreclaimed lands. Two years would be required for reclamation work and up to 8 years for establishment of vegetation cover. Shrub and tree cover would not become established for approximately 15 years after reclamation begins. Reestablishment of native species is expected to occur through natural succession over the long term. On areas of Aspen-Conifer, restoration to the original type would take longer. Fifteen to 20 years or more would be required for a return to original types.

Reclamation of vegetation on the two Emery coal field tracts would be difficult. Due to climate (average annual precipitation 7.55 inches) and soil conditions, some special treatment and supplemental irrigation may be necessary. The disturbance of topsoil through strip mining would compound this problem. Studies at nearby Huntington and other sites in Utah indicated a decrease in plant production of approximately 40 percent with removal of the top 3 inches of soil. The amount of water needed to produce predisturbance levels of vegetation increased 60 to 90 percent (Lyons, 1978). The EMRIA study of the reclaimability of these lands (BLM, 1979) concluded that because of the extent and sensitivity of present vegetation and the severity of the climate, the post-mining environment on some sites would probably not be suitable for plant growth without significant long-term support for seeded shrubs and grasses; however, reclamation would be successful with proper treatment. Positive results would be achieved in years with above normal precipitation, but success in dry years may depend on supplemental irrigation (Bleak et al., 1965; Aldon and Springfield, 1975).

The use of native species for reclamation has the highest potential for reclamation success (BLM, 1979b). Grass competition is a major deterrent of shrub and forb survival, and could produce a monoculture as a result of reclamation (Hubbard, 1956).

Mitigating measures regarding survey and clearance of proposed onsite and offsite locations and routes for mining facilities associated with the Blue Trail Canyon tract would effectively eliminate impacts to the candidate endangered species Townsendia aprica.

Wildlife

Terrestrial

The surface disturbance from production activities of 1,030 acres by the year 2000 could decrease the deer populations in herd units 33, 34, 35, 36, 38, 43, and 45 by 150 deer. Elk loss from habitat destruction would be 33 animals per year or 0.3 percent of the potential Manti elk herd. The majority of the elk loss would be in critical winter range. No comparable losses of elk from the proposed mining activity would occur in the Avintaquin-White Rocks-Anthro-Argyle herd unit (Table 4-8).

Construction of roads and surface facilities could disrupt elk migration routes as well as encroach on critical elk and deer winter range in Ferron and Quitchupah Canyons. The Castle Valley Ridge, North Trough Spring and Mud Creek tracts are located within known elk calving areas. Developments on these tracts could result in an undetermined amount of habitat loss.

Encroachment by mining activity on mountain lion and black bear home ranges, illegal killing, and loss of prey species such as deer and elk would reduce lion and bear populations by an unknown amount until reclamation was completed. The increased development and widespread human disturbance on this range would cause abandonment of some home areas and a reduction in size or use of others.

Potential damage to riparian zones, a critical element of wildlife habitat, could occur from portal and road construction: however, stipulations, where practical, could help alleviate this impact. Moose require willows year-round and disturbance of riparian habitat associated with the development of the Mud Creek tract beginning in 1987 could displace moose and other wildlife from riparian habitat along 2 miles of Mud Creek and Long Canyon. While significant locally, this impact would be insignificant regionally.

Acreage utilized in community development would be irreversibly lost as wildlife habitat. Half of the acreage would come from irrigated cropland adjacent to expanding communities. Many species inhabit these lands, notably pheasants, cottontail rabbits, doves, small birds, and mammals. With 1,304 acres of irrigated agricultural land committed to urban use by 2000 (subdivisions and water right purchases), the regional pheasant population could be reduced by 846 birds potentially reducing the cock harvest by 245 (Appendix 7). Regionally this would be insignificant, but in Carbon County where over one-half of the community development would occur, the potential cock harvest loss would be 5.7 percent of the average annual harvest.

TABLE 4-8

CENTRAL UTAH
BIG GAME HABITAT DISTURBANCE
ALTERNATIVE ONE

Tract	Acres Disturbed	Plant Community	Wildlife ^a Use	Species	Losses/ ^b Year
Alkali Creek	39.1	P-J/P. Pine ^c	HP Winter	Deer	5
Coal Creek	83.5	P-J/Sagebrush	HP Winter	Deer	6
Dugout Pace	2.5	Sagebrush	HP Winter	Deer	1
Graves	0	P-J	HP Winter	Deer	2
Hoffman Creek	0	-	-	-	-
Soldier Creek	11.8	Sagebrush	S Summer	Deer	1
Whitmore Park	0	-	-	-	-
Acord	0	Sagebrush	HP Summer C Winter	Deer Elk	0 0
Castle Valley Ridge	155.0	Conifer/ Grass	HP Summer HP Summer C Winter	Deer Elk Elk	26 7
Ferron Canyon	129.9	P-J/ Sagebrush	HP Winter HP Winter	Deer Elk	10 7
Gooseberry	34.1	Aspen/Grass	HP Summer HP Summer	Deer Elk	13 2
Ivie	2.0	Mt. Shrub	S Winter C Winter	Deer Elk	0 0
Mud Creek	28.7	Conifer/ Grass	HP Summer HP Summer	Deer Elk	4 2
North Trough Springs	58.1	Riparian Conifer/ Grass	C Winter HP Summer HP Summer	Moose Deer Elk	1 28 3
Quitcupah	155.1	P-J/P.Pine	C Winter C Winter	Deer Elk	11 7
Skumpah	76.0	Mt. Shrub	HP Summer C Winter	Deer Elk	18 4
The Pines	114.1	P-J/Sagebrush	C Winter C Winter	Deer Elk	21 5
Trail Mountain Blue Trail	76.9	P-J/Sagebrush P-J/	HP Winter	Deer	4
Canyon	62.5	Desert Shrub	Yearlong	Deer	0
Walker Flat	0	Desert Shrub	S Winter	Deer	0
Totals	1,029.3			Deer Elk Moose	150 33 1

^a See Appendix 8. HP, high priority; S, substantial; C, critical.

^b Includes 0.1 mile influence zone. Based on optimum herd management level objectives (Deer/acre/habitat type, UDWR, 1981a).

^c Pinyon-Juniper/Pinyon pine

TABLE 4-9

CENTRAL UTAH
POTENTIAL DEER TRAFFIC MORTALITY FROM NEW ROADS
ALTERNATIVE ONE

Tract	New Roads (miles)	Deer Range ^a	Deer Loss/ Year ^b	Mine Life ^c
Alkali Creek	1.6	HP Winter	2	25
Coal Creek	4.8	HP Winter	6	40
Dugout Pace	0	HP Winter	0	45
Soldier Creek	0	S Summer	0	40
Acord	0	HP Summer	0	18
Castle Valley Ridge	14.1	HP Summer	69	40
Ferron Canyon	11.7	HP Winter	28	20
Gooseberry	1.5	HP Summer	10	40
Ivive	0	S Winter	0	40
Mud Creek	1.7	HP Summer	4	40
North Trough Springs	5.0	HP Summer	24	40
Quitcupah	8.5	C Winter	13	40
Skumpah	4.05	HP Summer	16	40
The Pines	7.9	C Winter	19	40
Blue Trail Canyon	2.1	Yearlong	0	20
Trail Mtn.	4.6	HP Winter	13	40
Totals	67.55		204	

^a See Appendix 8. HP, High priority; S, Substantial; C, Critical

^b 1,280 acre (1 mile each side of road) X road length/deer density X 0.076 = deer loss/year. Divided again by 2 because occupancy of summer or winter range for six months.

^c Deer losses at this rate only apply to initial years of road use.

Surface expression of subsidence such as cracks, bulges, and displacements are not expected to directly affect wildlife, but any reduction or elimination of surface water flows and associated vegetation communities could adversely affect some species. Loss of water sources would result in reduced utilization of habitat by mobile species such as deer, elk, beaver, and birds, and elimination of species such as small mammals, reptiles, and amphibians that are unable to relocate. Because of lack of data on wildlife populations and the unpredictability of subsidence and its effects, the number of animals that could be affected cannot be quantified. At the projected production level up to 52,974 acres would be susceptible to subsidence.

Construction of a minimum of 43 miles of new utility lines (estimated length of new utility and new portal access) in the area would provide additional perching and hunting sites for raptors. This would be a beneficial impact; however, use of these structures along roadsides or in areas open to human access would expose the birds to illegal shooting and disturbance (BLM, 1981a). The extent of losses from this activity cannot be tabulated but approximately 16 miles of the new utility lines would be adjacent to portal access roads.

With this proposed level of production, 68 miles of new and improved portal access roads would be needed for access and truck hauling of coal. Most of these roads would be in deer and elk summer and winter ranges and vehicle traffic would present an additional hazard to wildlife (BLM, 1981). In the 1980-81 field year 292 deer were recorded as traffic mortalities in deer herd units 33, 34, 35, 36, 38, 43, and 45. By 2000 an estimated 21 percent increase in traffic from coal hauling and commuting could increase the deer traffic mortality on existing roads to 352 animals per year. An additional 204 deer could become traffic mortalities on new roads (Table 4-9). However, this could decrease after the initial years of use because of habituation and dispersal of deer by human activity. Total traffic mortality (556) when combined with habitat losses would result in the loss of 1 percent of the deer population in central Utah. Anticipated elk mortality has not been quantified but is expected to be low.

Because they would be heavily traveled, portal access roads could be a limiting factor to small, isolated animal populations and become an obstacle to small animal movement especially among forest dwelling species (BLM, 1981a). On the Wasatch Plateau some of the new roads would pass through forest and meadow habitat.

The escarpments of the Wasatch Plateau and the Book Cliffs are favored nesting sites for raptors especially golden eagles. Nesting concentrations are located in the south Wasatch Plateau and around Alkali Creek in the Book Cliffs. Because many of the portals and access roads would be located in or adjacent to the escarpment, potential conflicts would exist (Table 4-10).

Construction, vehicle traffic, and noise within proximity of nest sites could cause abandonment of nests and subsequent loss of productivity for these protected species.

TABLE 4-10

CENTRAL UTAH
 RAPTOR NESTING SITES ON PROPOSED TRACTS
 ALTERNATIVE ONE

Tract	Raptor Nesting Sites ^a on Tract	Raptor Nesting Sites Affected	Potential Conflicts
Alkali Creek	3	1	access road, portal
Coal Creek	0	1	access road off tract
Dugout Pace	0	1	access road, portal off tract
Soldier Creek	0	1	portal off tract
Hoffman Creek	1	0	none
Ferron Canyon	5	1	portal
Ivie	4	1	access road
Quitcupah	5	1	portal
Skumpah	2	2	access road, portal
The Pines	6	0	none
Trail Mtn.	5	0	none
Walker Flat	2	0	none
Totals	33	9	

^a Source USFWS 1981-82 aerial surveys.

The human population increase in 1987 is expected to be 4 percent above the projected baseline, peaking at 18 percent above by 2000. Similar increase in hunters, fishermen, and off-road vehicle use (Recreation Section) would result. The presence of a larger human population could exert greater pressures on the wildlife populations through harvest, harassment, and displacement from habitat. The legal harvest could be controlled by instituting more stringent regulations while harassment could be partially controlled by enforcement of regulations. However, the disturbance of animals by human intrusion in natural habitats could not be eliminated.

Seventy-five percent of the elk habitat in the Manti herd unit is located within 1 mile of a road. By 2000 an additional 4,444 2-wheel and 4-wheel drive trucks could be located in the four-county region. An increase in unregulated use of unimproved roads on the Wasatch Plateau and Book Cliffs would result and would adversely affect adjacent elk habitat (Lyon, 1979). This effect would also apply to other wildlife species inhabiting these areas.

Utah Division of Wildlife Resources (UDWR) reports a 250-percent increase in citations issued during a period of a 48-percent population increase. Seventy-three percent of these citations were for violations that directly reduced wildlife populations (BLM, 1981a).

Assuming a rate equal to the reported increase, the 18-percent human population increase projected by the year 2000 could result in a 66-percent increase in illegal taking of wildlife. Illegal killing of wildlife could significantly reduce big game populations. For example, illegal killing of moose on the Wasatch Plateau has apparently stymied efforts to establish a viable herd despite transplants, protection, and advertisement of the herd's plight by the UDWR (UDWR, 1982).

Fisheries

Pollution of fisheries from coal wastes and coal mine drainage would not be anticipated with reasonable enforcement of applicable State and Federal laws. If accidental pollution from spillages of coal, untreated mine drainage, caustics, sewage, or petroleum products occurs, important fisheries that would be affected are Straight Canyon Creek, Ferron Creek, Pleasant Valley Creek, and Salina Creek. The extent of the stream damage would be dependent upon the type, quantity, and duration of spill. These spills could directly kill fish and/or the aquatic fauna, or increase algae growth thereby choking the stream. Fugitive dust from coal hauling trucks could add sediments and coal fines to 6.5 miles of stream habitat in steep canyons where roads could not be located more than 0.25 mile from the streambed. No fisheries would be directly affected in the Book Cliffs.

Ferron, Mud, Muddy, Quitcupah Creeks, and some tributaries of Huntington Creek could suffer dewatering in short sections if subsidence occurred and altered the channels. Mitigation measures could repair the channel and restore the flow avoiding permanent damage and total loss of fisheries.

Anticipated human population increases could significantly increase fishing pressure on popular waters such as Electric Lake, Huntington Creek, Joe's Valley Reservoir, Scofield Reservoir, Johnson Valley Reservoir, and Fish Lake. Quality fishing in these waters would decrease unless hatchery production was increased to satisfy the demand or harvest limits reduced.

Threatened or Endangered Species

No developments are anticipated to occur within critical habitats, therefore, no significant impacts to terrestrial or aquatic threatened or endangered species or known habitats would be expected. However informal consultation has been initiated with USFWS to confirm these findings and to determine the overall impact to threatened and endangered species in connection with other central Utah projects (e.g. tar sand development).

Land Use

Agriculture and Range

During the construction and production phases of coal resource development on all coal tracts, there would be changes principally from grazing to mining and support uses, from agricultural land to community use, and from irrigated cropland to retired cropland. Table 4-11 displays projected total acres of temporary and permanent land change by activity. Table 4-12 displays acreage converted permanently to community development, agricultural acreage converted to community development, and irrigated cropland retired to provide community water. Impacts to non-agricultural and irrigated croplands located off coal tract areas as well as the effects to existing uses on coal tract areas are discussed below.

Permanent land use changes associated with community expansion would affect cropland agriculture and community development in Carbon, Emery, Sanpete, and Sevier Counties. By the year 2000, these counties would experience a permanent change of approximately 985 acres from grazing and agricultural uses to housing and community development. Of the 985 acres, 493 acres (50 percent) would be irrigated cropland (consisting mainly of alfalfa and small grains). The remaining 492 acres would be non-irrigated lands adjacent to existing communities. An additional 739 acres of irrigated croplands would be retired to provide community water requirements (Table 4-12). Overall permanent land changes would occur on 1,724 acres (Table 4-11) due to conversion of land for community expansion and the retirement of irrigated cropland to provide community water needs.

Water requirements for exploration and mining activities would also impact irrigated cropland. Water for approximately 96 acres of irrigated cropland would be diverted to exploration activities over a 3-year period. For mining activities, irrigation water sufficient for approximately 72 acres of cropland would be diverted annually during the life of the mines.

In summary, total agricultural lands affected by the year 2000 due to the conversion of irrigated croplands for community development, retirement of irrigated croplands for community water supply, and the diversion of water for

TABLE 4-11
CENTRAL UTAH
ACRES OF LAND USE CHANGES DUE TO COAL TRACT DEVELOPMENTS
BY YEAR 2000
ALTERNATIVE ONE

Projected Maximum ^d Total Acres Changed From One Land Use to Another	Temporary Land Changes Acres of Land Change Due to Mining Operations, Including On-Tract and Offsite Support Facilities	Permanent Land Changes--Acres Changed for Community Development and Acres Irrigated Cropland Retired to Provide Community Water Needs
	899 acres for access routes, ^b 396 acres for on-tract facilities 100 acres for offsite loadout facilities 72 acres of irrigated land retired for mine water	1,724
Totals	3,191	1,467

Source: Utah State Office - Bureau of Land Management, 1982.

¹⁷⁶ a Projected Maximum Total Acres Changed From One Land Use to Another are totals of Temporary Land Changes plus Permanent Land Changes.

b Exploration drill pads counted as part of access acres.

exploration and mining activities would be 1,400 acres. Water for approximately 96 acres of cropland (retired by exploration activities) would be available for cropland use upon completion of exploration (1989). All of the affected irrigated cropland would be off the proposed coal tracts. These acres represent less than 1 percent of the total four-county cropland acreage, but they include lands that are among the most favorable for agricultural use (Utah Department of Agriculture, 1982). Some prime farmland could be among that which is converted and retired, unless planning avoided such areas.

About 971 of the 1,400 acres of affected irrigated cropland would be in Carbon and Emery Counties. The communities in these counties are mostly on lands that, if available for agriculture, would be highly productive. About one-half of the community expansion would occur on similar farmland if community development trends in the area persist (BLM, 1981b). The remaining 429 acre irrigated cropland loss would occur in Sanpete and Sevier Counties, with no significant impacts to the two-county agricultural land base (0.2 percent).

Land changes from irrigated cropland to community use and from irrigated cropland to retired cropland would eliminate cattle, sheep, and horse grazing on such land. Due to variability of grazing numbers and season of use on the existing cropland acres, actual animal unit month (AUM) losses could not be predicted. Due to the high grazing capacity on such areas, overall losses could be high, i.e., one AUM lost for every 5 acres converted. Such losses would significantly affect small operators.

There would be temporary land changes on 1,467 acres (Table 4-11). The following discussion presents the effects of these land changes on existing uses. Some of the effects would be long-term, extending beyond mine life.

Losses of livestock grazing numbers (AUMs) on BLM and FS allotments would be insignificant with a loss of less than 2 percent of the total AUM capacity of any Federal allotment and less than a 2 percent annual reduction on directly affected private surface. Grazing reductions on BLM and FS allotments and private surface would affect ranching operations on private lands off the tract areas. Ranchers would have to acquire additional feed to prevent reductions of animal numbers on private off-tract areas during late fall, winter, and early spring months (seasons of nonuse on the tract areas).

There would be increased difficulty in moving livestock to and from grazing areas served by Deadman, Coal, Soldier, Dugout, Pace, Rock, Cottonwood Creek and Straight Canyons and in Ferron and Link Canyons. Congestion caused by new developments and increased traffic in these canyons would result in greater hazards of vehicle collisions with migrating livestock.

Subsidence could reduce or eliminate the flows of an undetermined number of natural springs used by livestock. Stream flows and channels could be reduced and changed; range structures such as watering impoundments and water conveyance pipelines could be disrupted. Such subsidence impacts could eliminate livestock water sources. Range impacts related to subsidence would be most evident on the Castle Valley Ridge, The Pines, Trail Mountain and Quitcupah Coal tracts, where a large number of range structures exist. Replacement of the facilities and water lost would be required by lease stipulations, therefore, these impacts should be temporary.

The livestock water sources provided by Ivie and Saleratus Creeks could be lost due to subsidence on the Walker Flat tract. Loss of these water sources would necessitate large reductions in grazing numbers on the Saleratus Allotment where there are 1,843 Federal and 325 private AUMs until the water is replaced by the lessee.

Energy and Minerals Development

Conflicts could result between the development of the coal tracts and the development and operation of existing leases if there were different lessees involved. These conflicts would mainly involve transportation and utility access.

Oil and gas development could be hampered by underground coal mining. In the Book Cliffs and Emery areas, quantification of the effects are unknown since the tracts have not been sufficiently drilled to determine oil and gas potential. According to the Price River/Range Creek Coal Area Land Use Plan ... "Development of oil and gas leases should be simultaneously allowed where the development of one would not significantly affect the development of the other; when only one development could occur, coal development should be favored, since oil and gas reserves have not been proven" (BLM, 1981b). Oil and gas exploration may be locally deferred but would probably not be precluded.

In the Wasatch Plateau area, exploration and development of coal resources on the North Trough Springs, Mud Creek, Castle Valley Ridge, Trail Mountain, and The Pines tracts could conflict with the oil and gas exploratory well drilling presently being conducted on or immediately adjacent to these tract locations. Coal development and production phases would affect oil and gas exploration activities on the areas occupied by coal production surface facilities or underground mining areas. Oil and gas drilling would either be precluded from such areas or the drilling methods would have to be modified to meet oil and gas exploration objectives. Coal exploration and development activities would also conflict with the development of potential and known oil and gas fields located within the boundaries of the above coal tracts. Quantification of the effects are unknown since information on oil and gas reserves and production potentials for the fields have not been published by the companies involved.

Subsidence and/or surface disturbing operations associated with coal exploration and development on the North Trough Springs and Mud Creek tracts could accidentally damage wellhead facilities and pipelines and curtail gas production. Mining permits would provide for protection or relocation of existing facilities.

Rights-of-Way, Special Uses, Other Land Uses

Adherence to Environmental Protection Agency and State water discharge criteria and standards would protect the established beneficial uses of affected streams, including those streams classified as sources for domestic water systems. In most cases, water treatment facilities and procedures within central Utah would not have to be upgraded or modified in response to

increased mining activity. However, water contamination accidents or periodic system failures at mine locations (such as cited for Huntington Canyon - see Chapter 3, Land Uses) could require that the coal lessees or communities in Carbon and Emery Counties plan and fund new water treatment facilities and measures.

If coal extraction resulted in subsidence within the tracts, the quality and quantity of water from the seven municipal watersheds in Carbon and Emery Counties could be impacted. Water quality would change due to a disrupted aquifer and discharge rates would be slowed or stopped. Communities deriving domestic water from affected springfed streams would have to upgrade existing treatment facilities and/or develop new water sources. Alternative water sources are generally not available to the affected communities.

Exploration and production activities on the Trail Mountain and Ferron Canyon tracts could disturb the mechanical watershed treatment areas located on portions of these tracts. Additional watershed treatments are proposed for the North Trough Springs tract and could also be affected. Disturbance to the contour trenches and seeded areas would cause erosion problems on sensitive soil areas and would nullify past erosion control investments. Restoration would be required under Surface Mining Control and Reclamation Act.

Land Use Plans, Controls, and Constraints

Federal Plans

Coal leasing in central Utah has been addressed in Federal Land Use plans (Chapter 1). The Secretary of the Interior would consult with the Secretary of Agriculture for consent to offer tracts located on National Forest System lands (43 CFR 3420.4-2). The Secretary of Agriculture's decision on this round of leasing would be based on existing land use plans as well as available data in the new Land and Resource Management plans currently under preparation. The Manti-LaSal and Fishlake National Forests are scheduled to complete these new plans by late 1985. For all other tracts it has been determined that leasing would not conflict with any Federal land use plans if mitigating measures are applied as directed by the Surface Managing Agency.

County Plans

All tracts and alternatives were evaluated in light of county plan direction and zoning ordinances. Although county plans and zoning restrictions are not applicable to Federal lands, plan and zoning direction has been considered in coal leasing proposals on Federal land as well as on State and private lands.

Most tract developments in Carbon County would be in the CE-1 zone where coal mining is not allowed. Zoning variances or rezoning of potentially disturbed areas to the CE-2 zone would have to be approved by Carbon County before mining could proceed. After rezoning, mining would be a permitted conditional use.

All coal mine developments on tracts in Emery, Sanpete and Sevier Counties would be in zones where coal development is permitted. All coal mine developments would be required to implement county mitigation requirements for

protection of other land resources as well as for social and economic concerns (see Chapter 3 for description of county plan concerns). If such measures are applied and met, potential conflicts could be resolved to the satisfaction of the counties.

Socioeconomics

Introduction

The socioeconomic impacts provided in this EIS are taken from a draft technical report entitled Social and Economic Impact Analysis Uinta-Southwestern Utah Coal Environmental Impact Statement. This document was prepared by the Utah State Office of the State Planning Coordinator and Department of Community and Economic Development.

Population, Income, and Employment

A summary of population and employment projections for Alternative One is provided in Table 4-13. Growth would begin in 1987 with a population increase of 3,016. By the year 2000 the population would increase by 17,777 persons, or 26 percent over 1982 population levels, and 18 percent over the projected baseline. Total employment would increase by 7,480 jobs or 18 percent over projected baseline conditions. Carbon County would receive about 47 percent of the population growth and 44 percent of the employment. Sevier County would receive about 13 percent of the population and 31 percent of the employment.

Projected personal and per capita income is shown in Table 4-14. Relatively higher per capita income would be anticipated with additional leasing because of the higher wages paid in the mining sector. The total personal income is a weighted average of the baseline projections and the impact projections of personal income. This may somewhat understate total income because the baseline projections reflect historical wage patterns as compared to the impact projections which are based on the mining based economy of Carbon County. However, the effect of increased mining would be to increase per capita incomes in all the counties.

Infrastructure

Housing

Carbon County would require an additional 1,440 single family units, 360 multi-family units and 600 mobile home units by the year 2000. Emery County would need a housing mix of 960 single family units, 240 multi-family units, and 400 mobile home units. Sevier County would need an additional 414 single family units, 172 mobile home units, and 104 multi-family units to provide for growth from Alternative One over the projected baseline growth. A total of 5,100 new housing units would be needed in central Utah by the year 2000 under Alternative One. This would represent a 34 percent increase over 1982 levels and an 18 percent increase over the projected baseline by the year 2000. Table 4-15 summarizes additional demand for housing by type for each county.

TABLE 4-13

POPULATION AND EMPLOYMENT IMPACT
PROJECTIONS BY COUNTY
ALTERNATIVE ONE

County	Population	Employment
Carbon County		
1987	1,206	821
1990	2,443	1,069
1995	6,766	2,860
2000	8,371	3,300
Emery County		
1987	780	176
1990	1,800	374
1995	4,861	1,012
2000	5,645	1,200
Sanpete County		
1987	432	348
1990	455	251
1995	1,316	663
2000	1,390	680
Sevier County		
1987	598	620
1990	758	890
1995	2,241	2,291
2000	2,371	2,300
Total (year 2000)	17,777	7,480

TABLE 4-14

TOTAL PERSONAL INCOME PROJECTIONS BY COUNTY
ALTERNATIVE ONE

Year	1987	1990	1995	2000
<u>Carbon County</u>				
Total Personal Income (\$1,000)	<u>359,981</u>	<u>403,937</u>	<u>500,368</u>	<u>537,618</u>
Total Population (Baseline + Impact)	<u>34,100</u>	<u>37,600</u>	<u>44,000</u>	<u>46,100</u>
Per Capita Personal Income	<u>\$10,554</u>	<u>\$10,743</u>	<u>\$11,372</u>	<u>\$11,662</u>
<u>Emery County</u>				
Total Personal Income (\$1,000)	<u>143,055</u>	<u>166,830</u>	<u>224,720</u>	<u>238,904</u>
Total Population (Baseline + Impact)	<u>14,900</u>	<u>16,600</u>	<u>20,000</u>	<u>20,400</u>
Per Capita Personal Income	<u>\$ 9,601</u>	<u>\$10,050</u>	<u>\$11,236</u>	<u>\$11,711</u>
<u>Sanpete County</u>				
Total Personal Income (\$1,000)	<u>130,519</u>	<u>144,810</u>	<u>179,348</u>	<u>198,279</u>
Total Population (Baseline + Impact)	<u>19,530</u>	<u>20,860</u>	<u>23,100</u>	<u>23,800</u>
Per Capita Personal Income	<u>\$ 6,683</u>	<u>\$ 6,942</u>	<u>\$ 7,764</u>	<u>\$ 8,331</u>
<u>Sevier County</u>				
Total Personal Income (\$1,000)	<u>169,850</u>	<u>214,634</u>	<u>285,092</u>	<u>322,814</u>
Total Population (Baseline + Impact)	<u>20,300</u>	<u>22,360</u>	<u>26,300</u>	<u>27,800</u>
Per Capita Personal Income	<u>\$ 8,367</u>	<u>\$ 9,599</u>	<u>\$10,840</u>	<u>\$11,612</u>

TABLE 4-15

CENTRAL UTAH
HOUSING DEMAND BY TYPE
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	Single Family		Multi-Family		Mobile Homes	
	Total	Increase	Total	Increase	Total	Increase
<u>Carbon</u>						
1987	6,546	246	1,637	62	2,727	102
1990	7,140	480	1,770	120	2,950	200
1995	8,160	1,260	2,040	315	3,400	525
2000	8,520	1,440	2,130	360	3,550	600
<u>Emery</u>						
1987	2,496	156	624	39	1,040	65
1990	2,760	360	690	90	1,150	150
1995	3,300	840	825	210	1,375	350
2000	3,360	960	840	240	1,400	400
<u>Sanpete</u>						
1987	3,390	90	848	23	1,412	37
1990	3,570	90	893	23	1,487	37
1995	3,900	240	975	60	1,625	100
2000	3,966	246	992	62	1,652	102
<u>Sevier</u>						
1987	3,606	126	902	32	1,502	52
1990	3,810	150	953	38	1,587	62
1995	4,428	408	1,107	102	1,845	170
2000	4,614	414	1,154	104	1,922	172
Total (year 2000)	20,460	3,060	5,116	766	8,524	1,274
Total addi- tional units (year 2000)	5,100					

If required housing units are not available as needed, housing prices could increase to the point of causing personal hardship and the use of substandard housing would also increase.

Education

Growth in the Carbon School District would expand beginning with a 3-percent increase in student population (over baseline projections) by 1987, expanding to a 25-percent increase in the school-age population over baseline forecasts by 2000. This would require 96 additional teachers over the baseline demand of 388 to instruct the additional 2,400 students.

The Emery School District would experience a 36-percent growth over baseline forecasts by the year 2000. This would require an additional 64 teachers to be added to a baseline demand of 178 to instruct the additional 1,600 school-age children that would be in the district at that time under this alternative.

By the 1990s, projected growth of this magnitude would stress the school district to meet required accommodations and maintain quality education. Careful planning would be required to ensure an adequate capital availability for operating costs and new facilities.

Sevier and Sanpete would face similar growth rates through 1990 with growth at 2 percent higher than baseline forecasts in 1987 and increasing to 6 to 9 percent higher by the year 2000. This would require 17 additional teachers in Sanpete County over the baseline demand for 260 teachers. Sevier County District would need 28 additional teachers to instruct the additional 710 students. With assistance from potential lessees and developers, the Sevier and Sanpete School Districts should be able to accommodate the anticipated growth. Additional information is presented in Table 4-16.

Water and Sewer

Water and sewer needs for each community in the impact area are shown in Table 4-17 and 4-18, respectively. A proposed new water storage tank and upgrade and modernization of existing water and sewer lines in Price would be necessary to handle anticipated growth resulting from implementation of Alternative One.

The demand for water connections would grow from the existing 3,010 to 4,975 in 1987, 5,559 in 1990, 6,574 in 1995, and reach 7,016 in the year 2000, an average 11-percent growth per year between now and the end of the decade. The Price River Water Improvement District regional sewer system that services the communities of Price, Helper, Wellington, as well as adjacent unincorporated areas would also need to be substantially upgraded to handle the anticipated increased sewage needs. Estimates on the cost of upgrading the sewer system to National Pollution Discharge Elimination System standards are between 5 and 7 million dollars. Price will also need to replace several miles of water line in the next 2 to 3 years. In addition, Wellington would need \$750,000 to upgrade its water system.

TABLE 4-16

IMPACTS ON EDUCATION, HEALTH, AND LAW ENFORCEMENT BY COUNTY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
<u>CARBON</u>								
Education								
Students	7,890	8,110	220	3	8,863	9,313	450	5
Teachers	316	324	8	3	355	373	18	5
Health Facilities								
Hospital Beds	66	68	2	3	70	75	5	7
Doctors	18	19	1	6	19	21	2	11
Dentists	16	17	1	6	18	19	1	6
Nurses	66	68	2	3	70	75	5	7
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	7	0	0	7	8	1	14
EMTs ^d	46	48	2	4	49	53	4	8
Ambulances	7	7	0	0	7	8	1	14
Nursing Homes	120	123	3	3	125	130	5	4
Law Enforcement								
Police	66	68	2	3	70	75	5	7
Police Cars	66	68	2	3	70	75	5	7
<u>EMERY</u>								
Education								
Students	3,987	4,127	140	4	4,390	4,720	330	8
Teachers	159	165	6	9	176	189	13	8
Health Facilities								
Hospital Beds	28	30	2	7	30	33	3	10
Doctors	8	8	0	0	8	9	1	13
Dentists	7	7	0	0	7	8	1	14
Nurses	28	30	2	7	30	33	3	10
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	3	3	0	0	3	3	0	0
EMTs ^d	20	21	1	5	21	23	2	10
Ambulances	3	3	0	0	3	3	0	0
Nursing Homes	35	37	2	6	36	40	4	11
Law Enforcement								
Police	28	30	2	7	30	33	3	10
Police	28	30	2	7	30	33	3	10

(continued)

Table 4-16 (cont'd.)

County	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a
CARBON								
Education								
Students	9,889	11,589	1,700	17	9,692	12,092	2,400	25
Teachers	396	464	68	17	388	484	96	25
Health Facilities								
Hospital Beds	74	88	14	19	75	92	17	23
Doctors	20	23	3	15	21	25	4	19
Dentists	19	22	3	16	19	23	4	21
Nurses	75	88	13	17	75	92	17	23
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	9	2	29	8	9	1	13
EMTs ^d	52	62	10	19	53	64	11	21
Ambulances	7	9	2	29	8	9	1	13
Nursing Homes	129	140	11	9	129	142	13	10
Law Enforcement								
Police	74	88	14	16	75	92	17	23
Police Cars	74	88	14	16	75	92	17	23
EMERY								
Education								
Students	4,716	5,916	1,200	25	4,459	6,059	1,600	36
Teachers	189	237	48	25	178	242	64	36
Health Facilities								
Hospital Beds	30	40	10	33	30	41	11	37
Doctors	8	11	3	38	8	11	3	38
Dentists	8	10	2	25	7	10	3	43
Nurses	30	40	10	33	30	41	11	37
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	3	4	1	33	3	4	1	33
EMTs ^d	21	28	7	33	21	28	7	33
Ambulances	3	4	1	33	3	4	1	33
Nursing Homes	36	44	8	22	35	43	8	22
Law Enforcement								
Police	30	40	10	33	29	41	12	25
Police Cars	30	40	10	33	29	41	12	25

(continued)

Table 16 (cont'd.)

County	1987				1990			
	Projected	Total	Impact	Percent Change a	Projected	Total	Impact	Percent Change a
	Baseline	Need w/			Baseline	Need w/		
Need	Impact	Impact	Change a	Need	Impact	Impact	Change a	
SANPETE								
Education								
Students	4,930	5,010	80	2	5,508	5,588	80	1
Teachers	197	200	3	2	220	224	4	1
Health Facilities								
Hospital Beds	38	39	1	3	40	41	1	2
Doctors	10	11	1	10	11	12	1	9
Dentists	10	10	0	0	10	10	0	0
Nurses	38	39	1	3	41	42	1	2
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	4	0	0
EMTs ^d	27	27	0	0	29	29	0	0
Ambulances	4	4	0	0	4	4	0	0
Nursing Homes	83	96	13	14	82	83	1	1
Law Enforcement								
Police	38	39	1	3	41	42	1	2
Police Cars	38	39	1	3	41	42	1	2
SEVIER								
Education								
Students	5,282	5,402	120	2	6,032	6,172	140	2
Teachers	211	216	5	2	241	247	6	2
Health Facilities								
Hospital Beds	39	41	2	5	43	45	2	5
Doctors	11	11	0	0	12	12	0	0
Dentists	10	10	0	0	11	11	0	0
Nurses	39	41	2	5	43	45	2	5
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	5	1	25
EMTs ^d	28	29	1	4	30	31	1	3
Ambulances	4	4	0	0	4	5	1	25
Nursing Homes	78	80	2	3	78	80	2	3
Law Enforcement								
Police	40	41	1	3	43	45	2	5
Police Cars	40	41	1	3	43	45	2	5

(cont Inued)

Table 4-16 (concluded)

County	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
SANPETE								
Education								
Students	6,315	6,655	340	5	6,501	6,921	420	6
Teachers	253	266	13	5	260	277	17	6
Health Facilities								
Hospital Beds	44	46	2	5	45	48	3	7
Doctors	12	13	1	8	12	13	1	8
Dentists	11	12	1	9	11	12	1	9
Nurses	44	46	2	5	45	48	3	7
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	5	1	25	4	5	1	25
EMTs ^d	31	32	1	3	31	33	2	6
Ambulances	4	5	1	25	4	5	1	25
Nursing Homes	78	79	1	1	70	71	1	1
Law Enforcement								
Police	44	46	2	5	45	48	3	7
Police Cars	44	46	2	5	45	48	3	7
SEVIER								
Education								
Students	7,203	7,783	580	8	7,619	8,329	710	9
Teachers	288	311	23	8	305	333	28	9
Health Facilities								
Hospital Beds	48	53	5	11	51	66	15	29
Doctors	13	14	1	8	14	15	1	7
Dentists	12	13	1	8	13	14	1	8
Nurses	48	53	5	10	51	56	5	10
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	5	5	0	0	5	7	2	40
EMTs ^d	34	37	3	9	36	46	10	28
Ambulances	5	7	2	40	5	7	2	40
Nursing Homes	77	81	4	5	71	75	4	6
Law Enforcement								
Police	48	53	5	10	51	56	5	10
Police Cars	48	53	5	10	51	56	5	10

a Percent Change: Change from Projected Baseline Need to Total Need with Impact.

b Clinical Psych: Clinical Psychologist.

c MSW: A person with a Master's Degree In Social Work.

d EMT: Emergency Medical Technician.

TABLE 4-17

PROJECTED DEMAND FOR WATER CONNECTIONS BY COUNTY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
<u>Carbon</u>								
East Carbon	559	8	552	16	569	40	558	44
Helper	1,238	48	1,288	64	1,319	74	1,431	170
Hiawatha	82	0	81	0	78	0	79	0
Price	4,975	208	5,559	434	6,574	117	7,016	1,328
Scofield	NA	NA	NA	NA	NA	NA	NA	NA
Sunnyside	176	3	174	5	179	13	176	14
Wellington	822	58	936	120	1,167	307	1,251	368
<u>Emery</u>								
Castle Dale	795	51	901	115	1,089	285	1,112	323
Cleveland	172	9	187	20	217	49	220	55
Elmo	106	6	115	13	136	33	138	37
Emery	147	22	176	46	246	114	254	123
Ferron	679	100	803	202	1,106	497	1,152	548
Huntington	846	36	895	82	1,008	204	1,020	231
Orangeville	564	36	624	82	750	204	767	231
<u>Sanpete</u>								
Centerfield	267	12	280	12	309	32	314	32
Ephraim	1,081	15	1,128	13	1,223	38	1,282	36
Fairview	425	35	498	36	567	97	570	99
Fountain Green	213	3	213	3	216	7	217	8
Gunnison	523	20	553	21	607	55	614	55
Manti	799	10	834	9	902	25	947	24
Moroni	373	7	393	8	411	20	413	20
Mt. Pleasant	919	32	991	33	1,066	87	1,069	88
Spring City	250	6	264	7	278	17	280	18
Wales	50	1	52	1	54	3	55	3
<u>Sevier</u>								
Aurora	353	23	375	26	436	69	450	70
Redmond	249	15	264	17	305	45	314	45
Richfield	2,506	104	2,717	138	3,167	366	3,232	375
Salina	815	63	865	69	1,022	185	1,054	187

Total columns indicate total demand for water connections, baseline plus impact.

NA - Information not available.

TABLE 4-18

PROJECTED CAPACITY FOR WASTEWATER TREATMENT FACILITIES BY COMMUNITY
(GALLONS PER DAY)
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
Carbon								
East Carbon	174,700	2,300	175,300	5,000	184,300	13,500	180,000	15,500
Helper	386,600	14,200	408,700	19,600	427,100	25,000	463,000	59,600
Hiawatha	25,700	0	25,700	0	25,100	0	25,400	0
Price	1,553,200	61,000	1,763,200	133,300	2,137,800	371,900	2,286,400	466,200
Scofield	13,500	0	14,000	0	14,800	0	15,000	0
Sunnyside	55,000	800	55,200	1,600	58,000	4,300	56,700	5,000
Wellington	256,100	16,900	296,300	36,900	380,700	103,000	411,800	129,100
Emery								
Castle Dale	282,700	14,900	322,900	35,300	393,500	96,000	402,600	112,900
Cleveland	61,100	2,600	67,200	6,100	78,600	16,500	79,900	19,400
Elmo	37,700	1,700	41,500	4,000	49,200	11,000	50,100	12,900
Emery	51,100	6,000	61,000	13,300	86,600	37,900	90,800	42,800
Ferron	239,300	30,800	285,000	65,000	400,900	175,700	421,700	200,200
Huntington	302,300	10,600	322,800	25,200	366,000	68,600	370,300	80,700
Orangeville	200,600	10,600	223,700	25,200	270,500	68,600	277,300	80,700
Sanpete								
Centerfield	91,600	3,700	97,400	3,800	111,100	11,300	113,700	11,900
Ephraim	366,900	4,400	393,500	4,100	439,600	12,400	462,100	12,400
Fairview	144,300	10,200	172,300	11,000	200,700	31,600	203,700	33,800
Fountain Green	73,000	800	73,800	800	77,600	2,400	78,100	2,600
Gunnison	179,400	6,100	192,600	6,700	218,800	19,600	222,000	20,400
Manti	271,300	2,900	290,900	2,700	324,500	8,300	341,100	8,200
Moroni	127,800	2,100	136,700	2,300	147,400	6,500	148,500	6,900
Mt. Pleasant	314,200	9,200	344,700	9,900	380,700	28,400	384,300	30,300
Spring City	85,600	1,800	91,600	2,000	99,700	5,700	100,500	6,100
Wales	17,100	300	18,200	300	19,500	800	19,800	900
Sevier								
Aurora	120,100	6,800	130,500	7,800	155,000	22,400	162,000	23,900
Redmond	84,700	4,500	92,000	5,100	109,700	15,800	113,300	15,500
Richfield	853,400	30,200	948,400	41,800	1,134,200	122,800	1,201,600	128,600
Salina	276,500	18,300	300,800	21,200	362,700	60,500	379,000	64,300

Total columns indicate baseline plus impact.

Plans to upgrade and expand the water system in the East Carbon/Sunnyside area scheduled to commence in the spring of 1983 should be adequate to handle anticipated growth in that area. The sewer system also appears adequate to accommodate the increased population.

The communities of Emery County have joined together to form the Castle Valley Special Services District which has already passed a \$2 million bond for water and a \$2.5 million bond for sewer improvements. These improvements will not provide capacity for projected baseline growth even without the increased population resulting from implementation of Alternative One. By 1987, Castle Dale would require 795 water connections which represents a 7-percent growth over baseline or just over 1 percent annually. This growth would accelerate to a 5 percent per annum increase over baseline late in the decade and grow further to 7-percent per annum increase through the year 2000. Growth of this magnitude is significant considering the limited capacity of the existing system. Ferron would also experience significant growth in the demand for water connections, reaching 12 percent per annum over baseline forecasts. Current expansion plans that have received \$450,000 from the community account should provide for this demand through 1990; however, additional expansion would be required at that time. Ferron currently faces critical problems with an inadequate sewage system. This problem would be exacerbated under Alternative One and by 1987 Ferron would experience a shortfall of capacity for 677 persons. This would grow to a 1,150 persons shortfall by 1990, and reach a 2,270 persons shortfall by 1995. This would require a 234-percent increase in capacity over existing conditions to handle the sewage demands forecast for Alternative One.

Similarly, major expansion of water and sewer capacity would be required throughout the Emery County area to provide for growth from Alternative One particularly in the decade of the 1990s and beyond.

Redmond, Richfield, and Salina would need to expand their water systems to accommodate Alternative One population increases by the 1990s. Richfield has already begun this effort and upon completion should be able to accommodate growths forecast that would call for a total of 3,167 water connections by 1995. Sanpete County communities would be required to upgrade and modernize components of their water system by the 1990s, although generally they appear adequate to handle projected growth.

Public Safety

Law enforcement needs for all counties are found in Table 4-16. The increase in demand for law enforcement services would increase approximately 23 to 25 percent over baseline forecasts in Carbon and Emery County requiring totals of 92 officers and 41 officers, respectively, by the year 2000. Sevier and Sanpete Counties would experience a 10 and 7 percent increase in demand for law enforcement services at the same time with a total need for 56 officers and 48 officers, respectively.

By 1990 a 10-person staff would be necessary to provide adequate fire protection for the community of Price. By the year 2000, an additional five full-time firemen would be needed. In addition, the expansion of water flow,

distribution, and equipment would also be necessary. The remaining communities in Carbon and Emery County would need to train additional volunteers and perhaps add fire equipment although the type and level of fire protection services they currently provide would generally be adequate to handle demand under Alternative One.

The City of Richfield would also need a full-time firefighting staff by 1995. A six or seven person full-time fire-fighting force added at that time should be adequate until the end of the century. Fire fighting equipment and in particular an expansion of the communications system would be necessary. The remaining communities would need to expand their volunteer force as well as monitor the adequacy of their fire-fighting equipment but, in general, Sanpete and Sevier Counties have adequate fire-fighting capacity to handle growth under this Alternative.

If local fire protection efforts do not keep pace with population growth, the resultant shortfall would increase the risk of personal injury, death, and property destruction.

Cumulatively, Carbon and Emery Counties would need an additional 28 hospital beds to handle projected demand by the year 2000. An additional four doctors and four dentists would be required in Carbon County. Emery County would require three additional physicians and three dentists by the year 2000.

Sanpete County would need to add three hospital beds to the existing 45 hospital beds to meet the anticipated demand by the year 2000. In addition, the need for dentists and physicians would increase by one over the baseline. Sevier County would need an additional 15 hospital beds by the year 2000, as well as one doctor and one dentist.

It would be difficult for communities to meet these additional needs for facilities and personnel. If regional facilities and personnel are not maintained, the quality and availability of necessary medical services would deteriorate.

Solid Waste

Communities within Carbon, Emery, Sevier, and Sanpete Counties should have adequate disposal areas for the additional solid waste generated under Alternative One although additional landfill acreage may be necessary in Richfield, Fountain Green, Moroni, and Mt. Pleasant. Failure to maintain adequate solid waste facilities would result in over-use of existing facilities and use of unauthorized areas resulting in possible degradation of surrounding land.

Social/Attitudes

The projected population increases in Carbon, Emery, Sanpete, and Sevier Counties represent both significant growth for the communities in those counties and the potential for changing both the social and political climates in those areas. However, the situations vary among the counties. The

cultural diversity of Carbon County would be better equipped to handle the rapid growth. Emery County whose culture has been more homogeneous, is less equipped to absorb a diverse cultural mix that would accompany substantial growth in the coal industry. The communities of both Carbon and Emery Counties are aware of the problems that can accompany rapid growth and have incorporated some of the most strict planning and zoning ordinances within the state. County officials are utilizing all available growth management tools to assure that they can handle the growth that is forecast for the area from additional coal leasing. However, during cycles of economic expansion, opposition to additional growth emerges; this occurred in Emery County which faced growth pressures during the late 1970's. As economic conditions change, so do the social and political attitudes toward growth. The current economic recession which contributed to the fall in demand for coal and to the unemployment of coal miners has resulted in a redirection of concern from problems of growth toward encouraging economic development. Thus it is difficult to adequately reflect a community's response to potential growth at some future date.

Sanpete and Sevier Counties would be able to withstand the growth within their communities with little disruption to their existing lifestyles. In fact, the creation of new job opportunities would have a positive effect on the economic climate in the communities and would help to stimulate local economics which have been stagnant during their recent past.

Transportation

Table 4-19 shows predicted increases in traffic due to development of the 20 central Utah tracts. Vehicles per day would increase by over 13,000 by the year 2000. Increased traffic would require increased road maintenance throughout the area and there would be an increased but unquantified number of traffic accidents. If road improvements are implemented as needed (see Alternative Four), the accident rate should remain typically low. The largest increases in traffic would occur on Highway U-10 in the Price area. Traffic on U-10 from Price southward to Castle Dale would exceed prudent limits for a two-lane highway, without any additional coal mining. Proposed lease development would add additional traffic on this segment.

The other highway most heavily impacted by additional mining would be US-6, a four-lane highway segment from Castle Gate to Price. This segment of highway would be capable of carrying the increased traffic volume without significant increases in accidents or safety hazards.

Assuming that one-half of the annual central Utah coal production (6.7 million tons) would pass through Price, there would be an increase of up to four 65-car railroad trains per day. This increased train traffic would cause delays on U-10 and local streets in Price varying from 20 to 40 minutes per day. Highway traffic would back up both north and south of the train crossings affecting the east and west traffic on U-6 and local streets in the downtown Price area. An additional 3,000 vehicles per day (vpd) at Price due to increased mining would increase the frequency of traffic jams and number of vehicles involved.

TABLE 4-19

CENTRAL UTAH
MAXIMUM INCREASES IN TRAFFIC AND VEHICLE USE
ALTERNATIVE ONE

Feature	Coal Trucks	Service Trucks	Commuters	Other Trucks	Other Cars	Totals
Max. Vehicles/day	2,507	534	5,987	419	3,606	13,053
Total Million Miles ^a	325	226	2,116	34	260	2,961
Total Mi. Gals. Fuel ^a	81	42	83	6	9	221
Total Vehicles Lives ^a	325	445	21,164	67	2,610	24,611

^a Within area of influence only. Travel outside this area is not included.

Four secondary roads in the Book Cliffs and southern part of Castle Valley would either be overloaded or approach overloading from traffic increases. The Alkali Creek and Ferron Canyon Roads would carry 400 vpd; the Coal Creek Road would carry 850 vpd; and the poor quality Quitchupah Road would be traveled by 2,300 vpd. Above 500 vpd on a loose-surfaced road, maintenance increases disproportionately, and the likelihood of increased numbers of accidents due to dust and poor visibility in dust also increases markedly.

Mine-related traffic in the central Utah area would add about 13,000 vpd to the highways, traveling about 2.96 billion miles, using 221 million gallons of fuel and wearing out 24,600 vehicles over the lives of the mines. Traffic associated with additional proposed mining would not by itself overload any of the highways in the area. However, this incremental traffic added to the presently overcrowded roads would exacerbate an already poor situation and require earlier upgrading and more frequent maintenance of the affected roads. A commuter bypass route around the west and southwest sides of Price would assist in removing some local commuter traffic from downtown Price, but major upgrading of U-10 would still be required.

Cultural Resources

Exploration and construction of surface facilities for underground mining could inadvertently disturb or destroy historic and prehistoric cultural resources. A 100-percent survey of development sites would be required prior to disturbance. The majority of site disturbance could be avoided by proper placement of facilities. Where avoidance is not possible, data recovery by salvage excavation would mitigate most adverse effects. The total number and significance of the affected sites is unknown. Other potential mitigation techniques include collection, mapping, testing, and photography.

Avoidance on the Blue Trail Canyon tract which would be strip mined would not be feasible. Site density on this tract is moderate to high. Salvage of as many as 50 sites could be required, placing a substantial financial burden on the lessee.

Inadvertent damage or destruction of cultural sites from mining and salvage activities would result in the loss of scientific and cultural information for future research and resources that may be valuable in terms of uniqueness in their natural setting. There are no known National Register Sites within the lease tracts (Smith, written communication, Division of State History, 1982). The loss of these values, on the other hand, would be partially offset by information gained from overall excavation and salvage programs. Such information would add to the growing data base for cultural resources in Utah and enhance our knowledge of prehistoric resource utilization and settlement patterns.

The extent of cultural resource disturbance that would result from mine-related community expansion is unknown. Mitigation of losses to cultural values in community expansion areas cannot be assured as they would be on private lands where mitigation would be subject to approval of individual land owners unless community development were funded by the Federal Government.

Indirect impacts would increase as a result of greater accessibility and local population increases. Recreational activities of two types, those intentional illegal activities associated with artifact collection and treasure hunting, and unintentional recreational use (hiking, hunting, off-road vehicles), could cause irreplaceable, unmitigable site damage. Both scientific and aesthetic site values would be lost as a result of these indirect impacts. This loss would occur to many on and off-tract significant cultural resources in Carbon, Emery, Sanpete, and Sevier Counties.

Recreation

By the year 2000, assuming continuation of present trends and use patterns, mining-related population growth would increase the local demand (users originating from within the four-county region) for both dispersed and developed recreation opportunities by approximately 26 percent from 1982 use figures and by approximately 18 percent over the baseline use figures projected for that year.

Table 4-20 shows the anticipated increase in local demand for hunting and fishing for the period 1987 to 2000. This increase in demand would occur at the same time that game numbers would be reduced from mining-related displacement and road kills. The additional competition for available game and fish would lead to less hunting and fishing success. To maintain present hunting success it would be necessary to restrict animal harvests, thereby reducing hunting opportunities. To maintain present fishing success, stocking activities would have to be increased by the Utah Division of Wildlife Resources. Because increased stocking would be difficult to achieve with the existing hatchery system, fishing success would likely decline.

TABLE 4-20
 PROJECTED INCREASE IN LOCAL HUNTER AND FISHERMAN DEMAND WITHIN THE FOUR-COUNTY REGION
 ALTERNATIVE ONE

Year	Coal-Related Population	Projected Annual Increase in Numbers					Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
		Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen	Increased Demand for Fish		
1987	3,016	543	60	271	1,357	40,710	4	4
1990	5,448	981	109	490	2,450	73,500	8	6
1995	15,184	2,733	304	1,367	6,828	204,840	22	16
2000	17,777	3,200	356	1,600	7,994	239,820	26	18

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the four-county area. Approximately 18 percent of Utah's population hunt deer, approximately 2 percent hunt elk, and approximately 9 percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UDWR, 1978).

Table 4-21 shows the anticipated increase in local demand for off-road vehicle (ORV) activities for the period 1987 to 2000. Although the four-county region has adequate miles of primitive dirt roads to absorb the ORV demand without resources damage, the increase would conflict with other recreational uses, reducing the overall opportunity for dispersed recreation and reducing the quality of the recreation experience to some visitors.

Developed camping and picnicking sites in the four-county region would receive increased use by the new population. Additional recreational use would most often occur at sites being used at greater than 20 percent of their design capacity (see Table 3-15), probably increasing use to 40 percent or more at some of the sites, which would result in overcrowding, user dissatisfaction, and deterioration of the environment. Overcrowding and deterioration would intensify at some sites presently being used at greater than 40 percent capacity. Federal and State governments would be under greater stress to provide adequate maintenance for existing developed sites and to construct new sites. These overcrowded conditions would cause additional recreational pressures on undeveloped, dispersed areas. These dispersed areas would generally be able to absorb increased recreational pressures without resource damage; however, an increase in use of the San Rafael/Buckskin Draw area would result in an intensified deterioration of the environment and facilities and an increase in user dissatisfaction.

The overcrowded conditions of available recreation facilities in the towns would accelerate, resulting in increased facility deterioration and user dissatisfaction. These impacts would be greatest in Carbon and Emery Counties due to the lack of recreational facilities and because the majority of the coal related population would live in these counties. Local governments would be under stress with limited funds to provide urban recreation facilities (e.g. playfields, swimming pools, golf courses) to meet minimum standards recommended by the Utah Outdoor Recreation Agency (UORA, 1978).

Development of the tracts, including onsite and offsite disturbance, and development of homesites, would displace dispersed recreational use from as much as 433 acres by 1987, 1,602 acres by 1990, 2,191 acres by 1995, and 2,380 acres by the year 2000. Because surrounding areas offer comparable or better opportunities and because access to these surrounding areas would not be eliminated, the recreational opportunities lost would not be significant, even when the increase in recreational demand is considered.

About 75 miles of road improved or constructed for mining purposes, would permanently improve accessibility for dispersed recreation if managing agencies allow for such use. About 102 miles of exploration access may be available for recreation use between 1987 and 1990. The visual and audio impacts from mining development would reduce the quality of the recreation experience to some people using mining-related roads to access the Wasatch Plateau and Book Cliffs areas. Others could find coal development interesting, adding to their recreational experience. Most development would be hidden from view of major recreational access roads and recreation attractions. Exceptions are noted in the Visual Resources Section.

TABLE 4-21

PROJECTED INCREASE IN LOCAL OFF-ROAD VEHICLE DEMAND WITHIN THE FOUR-COUNTY REGION
ALTERNATIVE ONE

Year	Projected Coal-Related Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
1987	3,016	754	211	4	4
1990	5,448	1,362	381	8	6
1995	15,184	3,796	1,036	22	16
2000	17,777	4,444	1,244	26	18

Note: Projections were made assuming that the percentage of the population in the four-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles, and approximately 25 percent of the population currently owns four-wheel drive vehicles or light pickups) (Utah Outdoor Recreation Agency, 1978).

Increased industrial traffic resulting from mining operations in the Soldier Creek, Whitmore Park, Alkali Creek, Coal Creek, Dugout Creek, North Trough Springs, Mud Creek, Gooseberry, Trail Mountain, and Ferron Canyon tracts would present increased danger to recreational traffic on the Myton, Coal Creek, Dugout Creek, Eccles Canyon, Huntington Canyon, Straight Canyon, Cottonwood Canyon, and Ferron Canyon roads, resulting in stress to the recreational visitor and loss of enjoyment with the recreational experience.

Upgrading of the Ferron Canyon road would likely result in destruction of the Ferron Canyon Picnic Area. Should this happen, the approximately 803 annual visitor days the site receives would be displaced to other developed sites as well as to dispersed areas. Because of the small number of visitor days involved, impacts resulting from displaced visitor use would probably be unnoticeable.

The loss in visual range (1 to 13 percent over baseline conditions by the year 2000) in scenic vistas viewed from overlooks in Canyonlands and Capitol Reef National Parks (see Air Quality Section) would, during 1 percent of the time, be perceptible to some park visitors, and may reduce the quality of their recreational experience.

Visual Resources

Development of the central Utah tracts would change the scenic character of isolated portions of the region both on- and off-tract from natural to industrial during the life of the mines. Visual disturbance in all cases would be greatest during the coal production stage. It is unlikely that disturbance from subsidence would be visible or disturbing to most people.

Development associated with underground mining of the Gooseberry tract (e.g., portal access, exploration roads and drill pads, buildings, transmission lines, etc.,) would be visible in varying degrees of contrast from many recreation attractions including segments of Utah Highway 31 and the Skyline Drive, Flat Canyon Campground, and from the roads accessing the above attractions. Mining disturbance would degrade the natural appearing vistas as seen from these areas. Although the viewing distance involved (over 1 mile in most cases), taken in conjunction with the careful use of color and location of facilities in both exploration and development phases would help soften the visual change, mining disturbance would probably conflict with visual resource management objectives of the area for the life of the mining operation. Some people may consider the mining development an unacceptable visual intrusion, while others could find it interesting.

There would be visual conflict associated with underground mining of the Trail Mountain tract, where the portal area including buildings and stockpiled coal would dominate the landscape as viewed from the Cottonwood Creek road and Utah Highway 29. Because of the sensitivity of the visual area, the development would result in an unacceptable modification of the partial retention area for the life of the mine.

Because of intervening terrain, development of the Blue Trail Canyon tract would not be visible to travelers on I-70, although fugitive dust resulting

from the surface mining operation could be visible. Because development would not be visible from the Interstate, the Visual Resource Management (VRM) Class II and IV objectives for Blue Trail Canyon tract would most likely be met. However, because surface mining would severely modify the landscape, the high quality scenery identified within tract boundaries may be irreparably disturbed.

In development of Soldier Creek, Whitmore Park, Alkali Creek, North Trough Springs, Ferron Canyon, Ivie Creek, and Walker Flat tracts, careful use of location, and color in placement of exploration roads, drill pads, and ventilation shafts to avoid unnecessary disturbance and high visibility from the Myton road, Utah Highway 31, Ferron Canyon road, I-70, and Utah Highway 10, respectively, would prevent what would otherwise be temporary degradation of visual quality and probable conflict with the VRM objectives for these tracts. Realignment of the Ferron Canyon road would result in temporary conflict with the partial retention classification during the construction period. If the Ferron Canyon picnic site is not destroyed, the visual contrast as viewed from the site would be high and disturbing to most visitors. However, upon completion the road would be constructed so as to meet visual objectives.

With the exception of the conflicts noted above, disturbance associated with development both on and off the Alkali Creek, Coal Creek, Castle Valley Ridge, Ferron Canyon, Mud Creek, North Trough Springs, Quitchupah, Skumpah, Dugout-Pace, Graves, Hoffman Creek, Soldier Creek, Whitmore Park, Acord, Ivie, and Walker Flat tracts would not significantly impact visual resource values.

Reclamation would be effective in re-establishing the present scenic quality and character of the Wasatch Plateau and Book Cliff tracts within 10 years of completion of the mining operations. The arid nature and lack of topsoil in the Blue Trail Canyon tract would make reclamation difficult, and the tract would continue to appear somewhat disturbed after reclamation was completed. Overall the average visitor would probably note little change in the region's scenic character from development and reclamation of the tracts.

Special Designation Areas

Depending on exact locations, mining activity such as construction of exploration roads and the development and use of portals and roads within Castle Valley Ridge, Trail Mountain, Ferron Canyon, The Pines and Quitchupah tracts could result in impairment of wilderness suitability within portions of RARE II nonwilderness areas 4-408, 4-415, 4-417, 4-423, 4-424 and 4-427. The Land Management Plan for the Ferron-Price Planning Unit did adequately address wilderness and leasing with recommended management permitting coal leasing. No areas were recommended for wilderness or further wilderness study (Record of Decision on EIS dated May 29, 1979).

Except as discussed above, mining activities including new mines and transportation routes would not directly impact any special designation areas. However, the increase in local recreational demand could result in increased ORV and other dispersed use of some of the 17 areas within the four-county region with special designation or potential for special designation. The more intensive use and resultant littering and vandalism would tend to degrade values for which the areas are being protected and/or reviewed. Agencies

managing the lands would be under stress to protect these values. The degree of impact is not quantifiable. However, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely even in a worse case situation that possible degradation would affect the suitability of any area for special designation.

Southern Utah

Climate, Air Quality

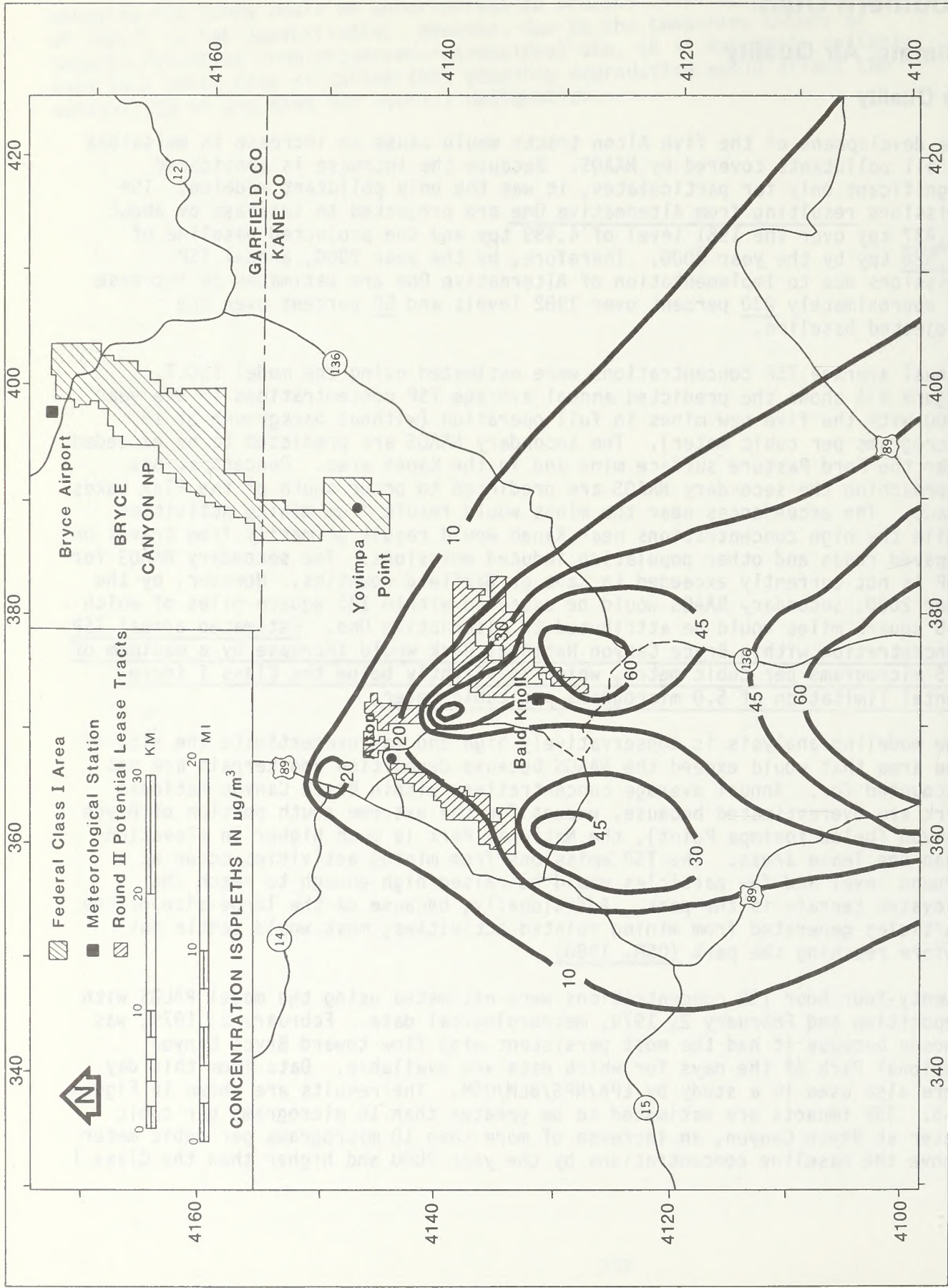
Air Quality

The development of the five Alton tracts would cause an increase in emissions of all pollutants covered by NAAQS. Because the increase is considered significant only for particulates, it was the only pollutant modeled. TSP emissions resulting from Alternative One are projected to increase by about 10,437 tpy over the 1981 level of 4,489 tpy and the projected baseline of 15,528 tpy by the year 2000. Therefore, by the year 2000, annual TSP emissions due to implementation of Alternative One are estimated to increase by approximately 230 percent over 1982 levels and 50 percent over the projected baseline.

Annual average TSP concentrations were estimated using the model ISCLT. Figure 4-4 shows the predicted annual average TSP concentrations in the year 2000 with the five new mines in full operation (without background of 15 micrograms per cubic meter). The secondary NAAQS are predicted to be exceeded near the Ford Pasture surface mine and in the Kanab area. Concentrations approaching the secondary NAAQS are predicted to occur south of the Flax Lakes tract. The exceedences near the mines would result from mining activities while the high concentrations near Kanab would result primarily from travel on unpaved roads and other population induced emissions. The secondary NAAQS for TSP is not currently exceeded in Kane or Garfield Counties. However, by the year 2000, secondary NAAQS would be exceeded within 185 square miles of which 165 square miles would be attributed to Alternative One. Estimated annual TSP concentration within Bryce Canyon National Park would increase by a maximum of 4.5 micrograms per cubic meter, which is slightly below the Class I incremental limitation of 5.0 micrograms per cubic meter.

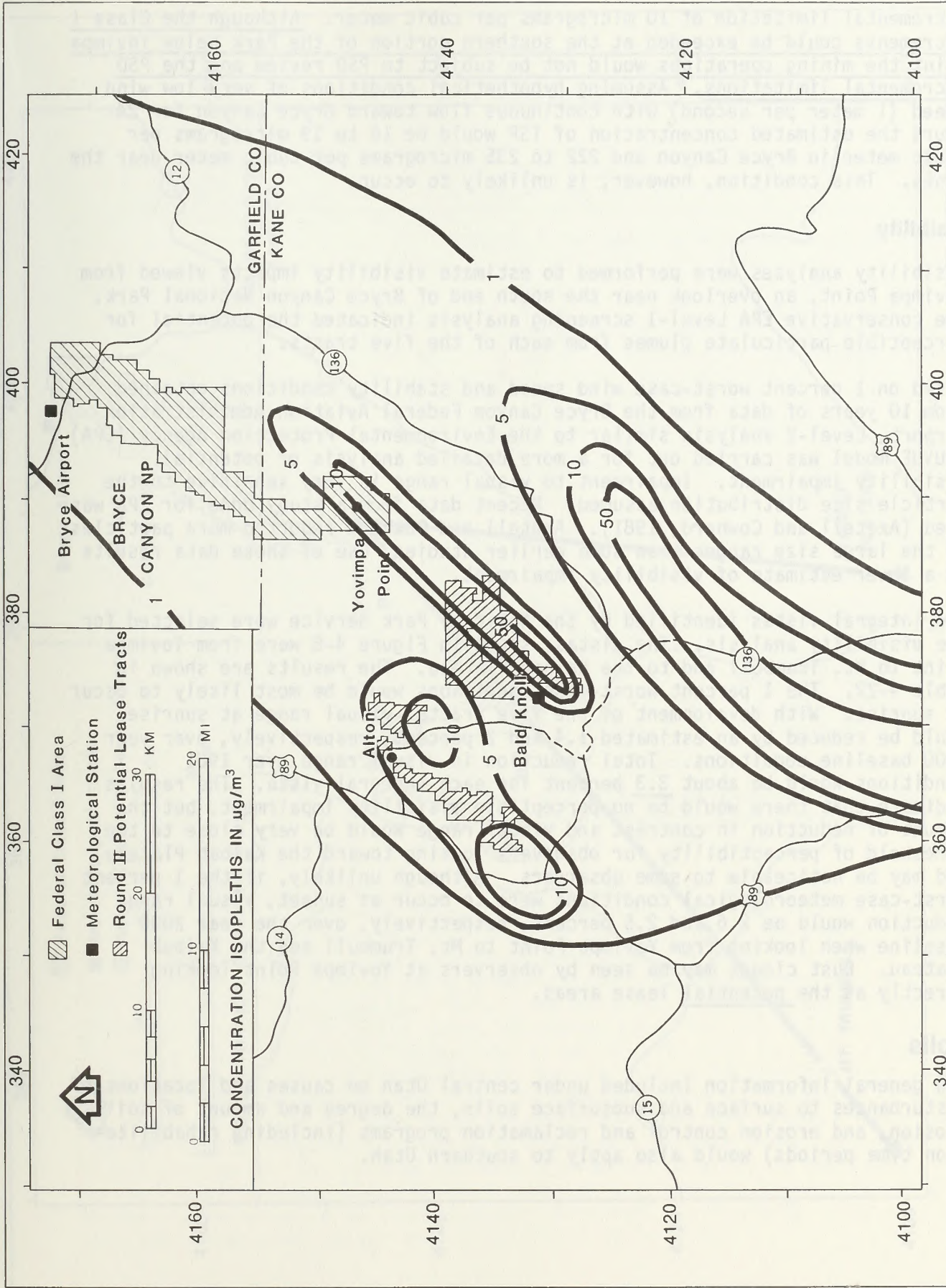
The modeling analysis is conservatively high and may overestimate the size of the area that would exceed the NAAQS because deposition and terrain are not accounted for. Annual average concentrations within Bryce Canyon National Park are overestimated because, except for the extreme south portion of Bryce Canyon (below Yovimpa Point), the National Park is much higher in elevation than the lease areas. The TSP emissions from mining activities occur at ground level and few particles would be raised high enough to reach the elevated terrain in the park. Additionally, because of the large size of the particles generated from mining related activities, most would settle out before reaching the park (OSM, 1980).

Twenty-four hour TSP concentrations were estimated using the model PALDS with deposition and February 2, 1979, meteorological data. February 2, 1979, was chosen because it had the most persistent wind flow toward Bryce Canyon National Park of the days for which data are available. Data from this day were also used in a study by EPA/NPS/BLM/OSM. The results are shown in Figure 4-5. TSP impacts are estimated to be greater than 10 micrograms per cubic meter at Bryce Canyon, an increase of more than 10 micrograms per cubic meter above the baseline concentrations by the year 2000 and higher than the Class I



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-4
ANNUAL AVERAGE TSP CONCENTRATIONS IN SOUTHERN UTAH - YEAR 2000



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-5
24-HOUR TSP CONCENTRATIONS IN SOUTHERN UTAH - YEAR 2000

incremental limitation of 10 micrograms per cubic meter. Although the Class I increments could be exceeded at the southern portion of the Park below Yovimpa Point the mining operations would not be subject to PSD review and the PSD incremental limitations. Assuming hypothetical conditions of very low wind speed (1 meter per second) with continuous flow toward Bryce Canyon for 24 hours the estimated concentration of TSP would be 16 to 19 micrograms per cubic meter in Bryce Canyon and 222 to 235 micrograms per cubic meter near the mines. This condition, however, is unlikely to occur.

Visibility

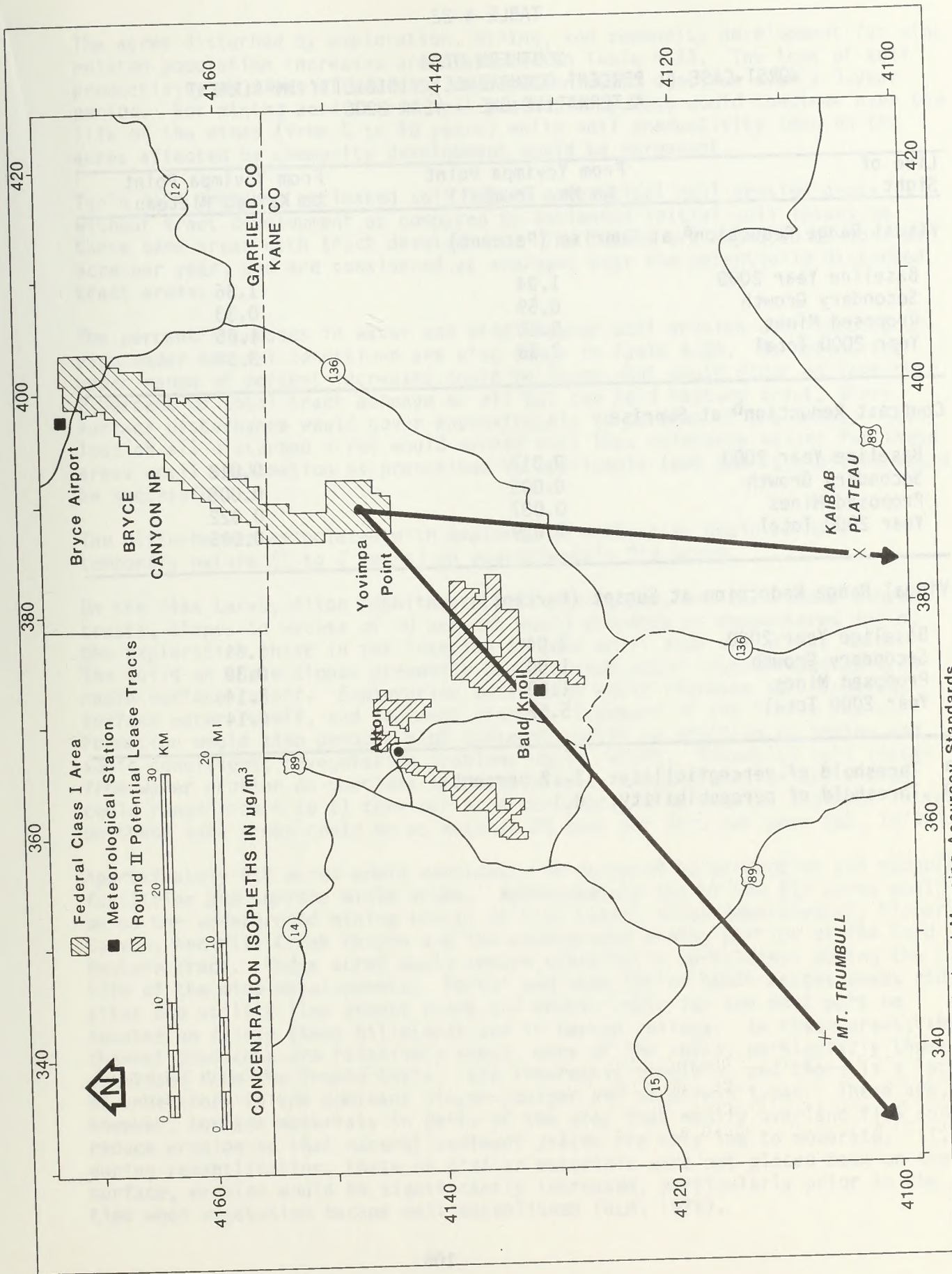
Visibility analyses were performed to estimate visibility impacts viewed from Yovimpa Point, an overlook near the south end of Bryce Canyon National Park. The conservative EPA Level-1 screening analysis indicated the potential for perceptible particulate plumes from each of the five tracts.

Based on 1 percent worst-case wind speed and stability conditions obtained from 10 years of data from the Bryce Canyon Federal Aviation Administration Airport, Level-2 analysis similar to the Environmental Protection Agency (EPA) PLUVUE model was carried out for a more detailed analysis of potential visibility impairment. Impairment to visual range is very sensitive to the particle size distribution assumed. Recent data from a study done for EPA was used (Axetell and Cowherd, 1981). Axetell and Cowherd reported more particles in the large size ranges than some earlier studies; use of these data results in a lower estimate of visibility impairment.

Two integral vistas identified by the National Park Service were selected for the visibility analysis. The vistas, shown in Figure 4-6 were from Yovimpa Point to Mt. Trumbull and to the Kaibab Plateau. The results are shown in Table 4-22. The 1 percent worst-case conditions would be most likely to occur at sunrise. With development of the five tracts, visual range at sunrise would be reduced by an estimated 1.4 and 2 percent, respectively, over year 2000 baseline conditions. Total reduction in visual range over 1981 conditions would be about 3.3 percent for each integral vista. The results indicate that there would be no perceptible visibility impairment, but the amount of reduction in contrast and visual range would be very close to the threshold of perceptibility for observers looking toward the Kaibab Plateau, and may be noticeable to some observers. Although unlikely, if the 1 percent worst-case meteorological conditions were to occur at sunset, visual range reduction would be 2.6 and 2.5 percent, respectively, over the year 2000 baseline when looking from Yovimpa Point to Mt. Trumbull and the Kaibab Plateau. Dust clouds may be seen by observers at Yovimpa Point looking directly at the potential lease areas.

Soils

The general information included under central Utah on causes and locations of disturbances to surface and subsurface soils, the degree and amount of soil erosion, and erosion control and reclamation programs (including rehabilitation time periods) would also apply to southern Utah.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-6
 LINES OF SIGHT FOR THE LEVEL-2 VISIBILITY ANALYSIS IN SOUTHERN UTAH
 ALTERNATIVE ONE

TABLE 4-22

SOUTHERN UTAH
WORST-CASE (1 PERCENT OCCURRENCE) VISIBILITY IMPAIRMENT
ALTERNATIVE ONE - YEAR 2000

Line of Sight	From Yovimpa Point to Mt. Trumbull	From Yovimpa Point to Kaibab Plateau
Visual Range Reduction^a at Sunrise (Percent)		
Baseline Year 2000	1.94	1.36
Secondary Growth	0.59	0.33
Proposed Mines	0.80	1.65
Year 2000 Total	3.33	3.34
Contrast Reduction^b at Sunrise		
Baseline Year 2000	0.017	0.018
Secondary Growth	0.005	0.005
Proposed Mines	0.007	0.022
Year 2000 Total	0.029	0.045
Visual Range Reduction at Sunset (Percent)		
Baseline Year 2000	3.04	1.61
Secondary Growth	1.00	0.39
Proposed Mines	1.63	2.14
Year 2000 Total	5.67	4.14

a Threshold of perceptibility: 7-12 percent

b Threshold of perceptibility: 0.1

The acres disturbed by exploration, mining, and community development for mine related population increases are presented in Table 4-23. The loss of soil productivity on sites affected by exploration would continue over a 3-year period. For mining activities, soil productivity loss would continue over the life of the mines (from 5 to 40 years) while soil productivity loss on the acres affected by community development would be permanent.

Table 4-24 presents estimated soil losses on critical soil erosion areas without tract development as compared to estimated initial soil losses on these same areas with tract development. The losses are depicted as tons per acre per year, and are considered as averages over the potentially disturbed tract areas.

The percent increases in water and wind induced soil erosion over that occurring under natural conditions are also shown in Table 4-24. As noted, the upper range of percent increases could be large, but would occur on less than 2 percent of total tract acreage on all but the Ford Pasture tract, where surface disturbance would cover approximately 44 percent of the tract. Soil loss on all disturbed acres would exceed soil loss tolerance values for these areas until reclamation as prescribed by applicable laws and regulations would be successful.

The disturbances associated with exploration activities would be of a temporary nature (1 to 2 years) on approximately 216 acres.

On the Flax Lakes, Alton Amphitheater, Fisher Canyon, and Mill Creek Canyon tracts, slopes in excess of 30 percent would probably be encountered during the exploration phase in the location of some drill pads and access roads. The soils on these slopes presently exhibit high water erosion hazards with rapid surface runoff. Exploration activities would increase soil erosion, surface water runoff, and sediment yields. Exposure of the Tropic Shale Formation would also produce high sediment yields in addition to saline and sodic conditions; revegetation problems would result. Potential soil losses from water erosion on portions of these slopes from exploration activities could range from 4 to 11 tons per acre per year. Wind erosion sediment losses on these same areas could be as much as 20 tons per acre per year (GS, 1979b).

Approximately 812 acres would eventually be occupied by production and support facilities and surface mined areas. Approximately 191 of the 812 acres would be on the underground mining tracts of Flax Lakes, Alton Amphitheater, Fisher Canyon, and Mill Creek Canyon and the underground mining portion of the Ford Pasture Tract. These acres would remain essentially unreclaimed during the life of the mine developments. Portal and ventilation shaft access roads and sites and utility line access roads and routes would for the most part be located on fairly steep hillslopes and in narrow valleys. In these areas, the channel gradients are relatively steep, many of the soils, particularly those developed from the Tropic Shale, are inherently erodible, and there is a lack of understory in the dominant pinyon-juniper and sagebrush types. There are, however, surface materials in parts of the area that modify overland flow and reduce erosion so that natural sediment yields are only low to moderate. If, during rehabilitation, these or similar materials were not placed back on the surface, erosion would be significantly increased, particularly prior to the time when vegetation became well established (BLM, 1975).

TABLE 4-23

SOUTHERN UTAH
ACRES OF SOIL DISTURBANCE ON COAL TRACT
AND COMMUNITY DEVELOPMENT AREAS

ALTERNATIVE ONE

Activity	Acres Disturbed				
	1987	1990	1995	2000	
Exploration ^a	216.4	216.4	216.4	216.4	The exploration and mining acres represent 4.7 percent of the total surface acres within the coal tracts.
Mining	0	239.3	521.9	812.4	
Community Development ^b	81.9	150.8	383.8	466.8	
Totals	298.3	606.5	1122.1	1495.6	

Source: Round Two Individual Tract Profiles. Round Two Leasing and socioeconomic data from the State of Utah Planning Coordinator's Office, 1982.

^a Although included in cumulative total of disturbed acres, the exploration acres would be rehabilitated within a 3-year period after completion of exploration work.

^b Soil loss productivity considered permanent on these acres.

TABLE 4-24

SOUTHERN UTAH
ESTIMATED SOIL LOSSES ON CRITICAL SOIL EROSION AREAS^a
ALTERNATIVE ONE

Coal Tract	EXPLORATION ACTIVITIES			PRODUCTION ACTIVITIES			
	Estimated Soil Loss Without Tract Developments	Estimated Soil Loss With Tract Developments	Differences Attributed to Tract Developments	Estimated Soil Loss Without Tract Developments	Estimated Soil Loss With Tract Developments	Differences Attributed to Tract Developments	Percent Increases
SOUTHERN UTAH							
Alton Coal Tracts	Water Erosion Slopes in excess of 20% = 8.0	4.0 to 11.0	0 to 3.0	0 to 38	Same as shown for exploration.		
Flax Lakes, Alton Amphitheater, Fisher Canyon, and Mill Creek Canyon	Hilly and rolling uplands = 0.6 to 4.0	4.0 to 11.0	3.4 to 7.0	0 to 200	Same as shown for exploration.		
	Wind Erosion ^d All Slopes = ?	20.0	---	Unknown	Same as shown for exploration.		
	Rolling uplands (Underground mining) = 4.0	4.0 to 11.0	0 to 7.0	0 to 300	Same as shown for exploration.		
	Rolling uplands (Surface Mining) = 4.0	4.0 to 11.0	0 to 7.0	0 to 300	Rolling Uplands (Surface Mining) = 4.0	4.0 to 14.0	0 to 14.0
	Wind Erosion ^d All Slopes = ?	20.0	---	---	20.0+	---	0 to 400

Source: ^a Tons per acre per year in water erosion rates on steep slopes unless otherwise indicated.

^b Table 3-4

^c Site-Specific Analyses for Coal Tracts to be included in the Uinta-Southwest Utah Coal Region Environmental Impact Statement: Round Two Leasing.

^d No data available on natural sediment yields from wind erosion in the Alton area.

Moderate slope cutting would be necessary for mine location to gain access to the coal on all of the proposed tracts. It is estimated that 82 of the 191 acres would consist of cut and fill slopes ranging from 25 to 50 percent. Soil losses from water erosion on exposed soils of the 82 acres could range from 4 to 11 tons per year. Wind erosion on an unestimated number of these acres could result in soil losses of 20 tons per acre per year (GS, 1979b).

Again, due to the high water and moderate wind erosion potential and rapid surface water runoff, revegetation problems would result on the disturbed acres of these tracts. Where the Tropic Shale Formation was exposed additional revegetation problems would result. An intensive revegetation and soil erosion control program could achieve successful results within a 10-year period.

The remaining 622 disturbed acres would be on the surface mining portion of the Ford Pasture tract. Approximately 56 acres per year would be surface mined from 1990 through the year 2000, with a maximum of 136 acres unreclaimed at one time in the surface mined area. The soils of the surface mined area originate from shale, sandstone, and lava flow parent materials. Soil lost by water erosion on these acres could range from 7 to 14 tons per acre per year on shale material and from 4 to 6 tons per acre per year on sandstone material (BLM, 1975). Rehabilitation could reduce soil loss to a range of 0.5 to 1.4 tons per acre per year within a 5-year period (BLM, 1975). Soil loss by wind erosion could exceed 20 tons per acre per year on sandy areas and stockpiled topsoil. Such significant soil losses would limit the amount of area that could be rehabilitated (GS, 1979b). On the portion of the surface mining area covered by lava flows (490 acres), mining activities would destroy the small amounts of soil that have accumulated. Areas covered by the lava flows could only be revegetated by bringing in large amounts of topsoil.

Mineral Resources

When considering those coal seams that are presently economical and safe to mine using current underground mining techniques, 180.6 million tons of coal would be recovered. This represents approximately 33 percent of the total reserves. Approximately 7.6 million tons or 80 percent of the total reserves to be mined by surface mining on the Ford Pasture tract would be recovered.

The mining of coal would result in a total depletion of the coal resource as the 368.8 million tons of unrecovered coal, though still in the ground, would no longer be available as a mineral resource given present mining technology.

The potential oil-bearing Kaibab Limestone underlies the tracts at depths well below the coal bearing Dakota Sandstone. While not destroying the resource itself, subsurface mining activities could hinder the subsequent exploration and location of facilities related to oil and gas development (see the Land Use section).

Topography, Geology, Paleontology

Underground mining would occur on all tracts; however, approximately 45 percent of the 1,400 acres in the Ford Pasture tract would be surface mined.

Construction of surface facilities for underground operation would cause permanent changes to the natural topography on approximately 191 acres. Because of shallow overburden depths, the effects of subsidence that would occur on portions of 21,447 acres would be similar to those effects expected for the Emery Field (see Central Utah discussion). Subsidence usually does not exceed 50 percent of the thickness of the seam extracted. As discussed for central Utah, the area of subsidence can be identified topographically within the area of the limit angle; however, the area of subsidence may be considerably less than the area above the extracted coal. Open fractures at the surface are possible. Subsidence would deform coal beds and reduce mine safety and production efficiency for underground mining (Dunrud, 1976).

Surface mining would alter 622 acres of the Ford Pasture tract. This mining method, after coal extraction and recontouring, could alter topography as much as 30 feet above the original elevation of the surface due to the swell factor of the excavated materials.

The coal-bearing Dakota Sandstone Formation has the potential for yielding scientifically important vertebrate and plant fossils. When encountered by coal mining activities, these fossils could be destroyed, resulting in a loss of scientific and educational information. Because the extent and location of the fossils in this formation are not known, the anticipated impacts resulting from coal mining activities cannot be quantified or significance determined. Significant disturbances to scientifically important fossils would likely not occur if mitigating measures are followed. With mitigation as outlined in Chapter 2, surveys and mining activities could also expose new fossils and produce new paleontological information.

Water Resources

Surface Water

Surface mines and the construction of roads and other facilities associated with both surface and underground mining would require some modification of local surface-drainage patterns. This would increase erosion and fluvial sediment but the regional impact would be small.

According to the U.S. Soil Conservation Service (SCS, 1973) annual sediment yields in the area of the southern Utah tracts range from about 0.1 to more than 3.0 acre-feet per square mile (with an average of 1.8). Kilpatrick (1979) indicated that land disturbance associated with synfuels development could increase sediment yields tenfold. Consequently, annual sediment yields on the lands that would be disturbed by mine development (including exploration) of the southern Utah tracts could increase from 8.4 in 1987 to 42.0 acre-feet by the year 2000 (Table 4-25). This amounts to about 0.9 percent of the estimated annual sediment yield of the Kanab Creek and the Virgin River drainage basins.

Development of the southern Utah tracts would have a minor impact on surface-water quality in the general area of the tracts, access roads, and affected communities. This would be due chiefly to mining and mine dewatering, population growth, and lands disturbed by construction. The regional impact on water quality, however, would be negligible.

TABLE 4-25

SOUTHERN UTAH
 IMPACTS ON WATER RESOURCES AND REGIONAL SIGNIFICANCE
 ALTERNATIVE ONE

Item	1987	1990	1995	2000
Water requirement (acre-ft/year)				
Mining and exploration	45.0	114.4	114.4	114.4
Public supply	371.5	684.2	1741.1	2117.1
Total	416.5	798.6	1855.5	2231.5
Consumptive water use				
Total (acre-ft/year) ^a	230.8	456.5	984.9	1172.9
Percent of runoff ^b	.13	.26	.56	.66
Increased annual sediment yield				
Total (acre-ft)	8.4	17.0	31.6	42.0
Percent ^c	.18	.36	.68	.90
Increase in salinity				
(milligrams per liter) ^d	.03	.04	.08	.10

^a Assumed to be 50 percent of withdrawal for public supply and 100 percent of withdrawal for mining.

^b Percent of combined average annual runoff of Kanab Creek near Fredonia, Arizona, and the Virgin River near Hurricane, Utah.

^c Percent of estimated annual yield upstream from the stations cited in footnote b.

^d As determined for Imperial Dam. Does not include reduction in salinity from reduced irrigation return flow.

Diversions and consumption of as much as 2,232 acre-feet per year more water for mining activities and associated population growth would increase salt concentration in the Colorado River Basin. The increased population would increase fluid and solid waste production thus increasing salt loading in the basin. The increased population and mining-related activities would also increase the potential for local contamination of both ground and surface water.

The salt concentration resulting from freshwater diversions and the salt loading resulting from fluid-waste disposal to streams would have a minor adverse impact on local surface-water quality. The resulting increase in salinity in the lower stream reaches probably would be masked by the relatively large amount of salt loading due to natural runoff from the salt-bearing Tropic Shale and irrigation return flows to lower stream reaches. A beneficial regional impact could incur with regard to the Colorado River salinity problem. It is estimated that development of the southern Utah tracts would by the year 2000 increase the salinity of the Colorado River at Imperial Dam by about 0.1 milligrams per liter. This increase, however, would be more than offset by a decrease in salt loading from irrigated lands that would be retired to accommodate population growth. For example, irrigation return flows from the irrigated land that would be retired locally dumps up to 7 tons per acre foot of salt into the Colorado River system annually. The unconsumed water diverted (chiefly from irrigation) for public supply probably would dump less than 1.5 tons per acre-foot of salt into the river system.

Land subsidence (see Topography Section of this Chapter) tends to change local drainage patterns. Rock fracturing associated with the subsidence diverts more snowmelt and rainfall underground increasing ground water recharge at the expense of overland runoff. This fracturing, however, could also cause near-surface aquifers to drain downward through the fractures toward the mine workings at a faster rate than normal. Consequently, the flow of springs that provide baseflow to streams could be reduced. The flow of those springs that provide water for the wildlife, livestock, irrigation, and public supply could either be reduced or increased. Although this water would not be lost from the hydrologic system, it would move through newly formed fractures in shale-bearing rocks, degrade in quality more rapidly than it would as overland runoff. The probability of a spring (or a stream) being diverted underground by subsidence-caused fracturing is discussed briefly in the Alternative One discussion for the central Utah tracts. At least 30 springs are known to exist on the Fisher Canyon tract. There is a good chance that one or more of those springs, and perhaps even Thompson Creek could be affected by subsidence caused fracturing.

Ground Water

Surface mining of the Ford Pasture tract would disrupt aquifers in the mined-out areas; however, there appear to be no important aquifers on that part of the tract most likely to be affected by surface mining. Mining and mine dewatering would create pressure gradients in the local ground water systems causing ground water to move toward the mine workings. This could induce the movement of saline water into fresh water aquifers, thus locally reducing the

utility of the fresh water aquifers. For example, the Dakota Sandstone contains both fresh and saline water aquifers, and the Tropic Shale contains generally saline water. The pressure gradients created by mine dewatering could induce saline water from the Tropic and saline water aquifers of the Dakota into the fresh water aquifers of the Dakota. Available data indicate that the probability exists for this to occur on the Mill Creek Canyon and Fisher Canyon tracts.

Underground mine workings would disrupt local ground water flow systems causing a redistribution of ground water discharge as discussed for the central Utah tracts, however, no water would be lost from the ground water system. Mine workings on the Flax Lakes tract could divert some water from the Kanab Creek basin to the Virgin River basin. The annual diversion, however, would be negligible compared to the water yields of the respective drainage subbasins. This is because the fine-grained, poorly permeable coal-bearing beds transmit water very slowly.

Water Supply and Use

Maximum development of the southern Utah tracts by the year 2000 would require up to 2,232 acre-feet per year of water for mining and associated activities and public water supply needs. Sources of the water probably would be springs and streams currently used for public water supply and irrigation, water-producing mines, and wells. The estimated volume of water that would be consumed is 1,173 acre-feet which is about 0.66 percent of the combined average annual discharge of Kanab Creek at Fredonia, Arizona, and the Virgin River at Hurricane, Utah, (Table 4-25). It is about 0.08 percent of Utah's share of Colorado River water. Impacts on the available supply in individual drainage subbasins would be much larger. For example, the estimated annual water requirement is nearly 50 percent of the average annual discharge of Kanab Creek at Fredonia, Arizona.

Vegetation

Anticipated impacts to vegetation would be similar in nature to those discussed in detail for central Utah and are only summarized here.

Implementation of this alternative would result in development of coal on five southern Utah tracts and the direct disturbance of 1,029 acres of vegetation by the year 2000, mainly in Pinyon-Juniper woodland.

By the year 2000, an additional 817 acres of vegetation would be lost as a result of community expansion. Included would be 234 acres of irrigated cropland and 233 acres of nonagricultural lands lost to actual community development and an additional 382 acres of cropland retired from irrigation to provide water for community needs. Thirty-two acres of cropland would be retired to provide water for mining. Acres of vegetation that would be lost by year and vegetation type are shown in Table 4-26.

The following summarizes major vegetation disturbing activities and if or when vegetation reclamation would likely occur.

TABLE 4-26

CUMULATIVE VEGETATION DISTURBANCE BY
VEGETATION TYPE: SOUTHERN UTAH

ALTERNATIVE ONE

Vegetation Type	Direct Mining Impacts ^a (Acres)				Indirect Impacts ^b (Acres)	Total ^c
	1987	1990	1995	2000	2000	2000
Agriculture	-	-	-	-	615.6 ^d	615.6
Riparian	-	-	-	-	-	-
Desert Shrub	-	-	-	-	77.2	77.2
Sagebrush-Grass	21.0	52.7	100.0	160.0	30.0	190.0
Pinyon-Juniper Woodland	129.8	293.0	528.3	757.8	80.6	838.4
Mountain Brush	49.1	65.0	65.0	65.0	35.5	100.5
Ponderosa Pine	16.5	45.0	45.0	46.0	-	46.0
Aspen	-	-	-	-	-	-
Conifer-Aspen	-	-	-	-	-	-
Non-Productive	-	-	-	-	10.0	10.0
Other (Douglas fir, Mountain Meadow, Grassland, etc.)	-	-	-	-	-	-
TOTAL	216.4	455.7	738.3	1028.8	848.9	1877.7

^a Includes surface facilities, portal access, mining operations, exploration activities, powerlines, and ventilation construction.

^b Total lands lost to community expansion including agricultural lands retired from irrigation to provide water for community needs. This acreage was computed for the year 2000 only.

^c Total vegetation disturbance by the year 2000.

^d Includes 233.5 acres lost to community growth and 382.1 acres retired from irrigation to provide water for mining and community needs.

Strip mining and associated developments on the Ford Pasture tract would result in total removal of vegetation from 644 acres by the year 2000. Approximately 56 acres would be disturbed annually by strip mining activities. Based on a projected reclamation plan it is anticipated that a maximum of 136 acres would be unreclaimed at any one time in the surface mined area.

Exploration activities involving construction of drill pads and access roads would disturb a total of 216 acres by the year 1990. By the year 2000 this acreage, while included in the cumulative total of acres disturbed, would be in advanced stages of reclamation.

Implementation of this alternative would result in the loss of 813 acres of vegetation for which no reclamation would begin until completion of mining activities. This would include areas used for surface facilities, portal access, powerlines, and ventilation installation. Certain access roads may continue to be used for other purposes following completion of mining and would not be reclaimed. Irrigated cropland and nonagricultural lands which would be lost to community expansion (234 and 233 acres, respectively) or retired from irrigation (382 acres) to provide water for mining and community expansion would not be reclaimed for agricultural purposes but would be reclaimed as part of residential development.

For areas that would eventually be reclaimed, the duration of the impact of total vegetation loss would depend upon the success of reclamation. Based on the EMRIA No. 4 study in the Alton area (BLM, 1975), 42 percent of the general area would be well suited for supporting revegetation efforts. Seventeen percent of the area would be unsuitable, and the remaining 41 percent is classified as marginal for revegetation suitability.

The majority of disturbance (758 acres) would occur in the Pinyon-Juniper Woodland which contains little or no vegetation understory. Areas thus disturbed would be revegetated with native grasses and shrubs. This disturbance would actually result in an increase of vegetation production which would favor large herbivores such as deer or livestock. These areas would eventually revert to a Pinyon-Juniper Woodland.

Revegetation efforts would be positive on marginal areas in years with above normal precipitation, but success in dry years may depend on supplemental irrigation. Without irrigation the extreme variability of precipitation would reduce the success of revegetation. Limited success-to complete failure could be expected on the average of 2 of every 3 years.

One area considered unsuitable for revegetation would be the lava flows which cover approximately 35 percent (490 acres) of the Ford Pasture tract. Although vegetation has become established on portions of the flows, topsoil is almost nonexistent. Surface mining activity on an unestimated number of acres of lava flows would destroy the small amounts of soil that have accumulated. Areas covered by the lava flows could only be revegetated by bringing in large amounts of topsoil from other areas.

No known threatened or endangered plant species would be disturbed by mining activities. However, suggested stipulations regarding survey and clearance of proposed disturbance areas would protect any uninventoried species present.

Wildlife

Terrestrial

The 813 acres disturbed for coal production activities by the year 2000 would displace about nine deer annually from transitional and winter ranges (Table 4-27). Sage grouse leks and brood habitat would not be directly affected by this disturbance. Seeding trials demonstrate that the disturbed sites could be reclaimed possibly to a more productive level for wildlife.

About 14 miles of new and improved portal access roads would be constructed to accommodate a peak load of 1,109 coal trucks daily. The initial mortality to resident deer could be as high as 7 deer annually. Deer should disperse away from the road activity because of the large amounts of similar adjacent range available. Mine traffic could cause mortality of an unknown number of sage grouse and other small animals in and around Sink Valley and the Ford Pasture seedings.

All of the tracts except Ford Pasture contain raptor nesting territories (UDWR 1982b) but there would not be any direct conflict with buteo and horned owl nesting territories.

Construction of a minimum of 14 miles of new utility lines in the area would provide additional perching and hunting sites for raptors. This would be a beneficial impact; however, use of these structures along roadsides or in areas open to human access would expose the birds to illegal shooting and disturbance (BLM, 1981a).

The population in Kane and Garfield counties would increase by approximately 71 percent over the projected baseline by 2000. Kane County would more than double its 1982 population level. An additional 1,470 deer hunters would be located here due to the proposed action. The management plan for deer herd unit 60A would accommodate 1,200 to 1,400 hunters annually harvesting 450 bucks. This plan estimates that only 350 hunters could come from Kane and Garfield Counties. If the majority of the 1,513 new hunters chose to hunt in herd unit 60A this unit would not be open buck hunting in the foreseeable future and UDWR would be forced to operate 60A on a permit basis.

To accommodate this population increase, community development would occupy 496 acres of irrigated cropland in Kane County. This land is an integral part of the habitat for pheasants, cottontail rabbits, quail, doves, and numerous small birds and mammals in the Upper and Lower Sonoran life zones. Community development would eliminate 4 percent of this habitat which is one of the most productive in the region.

The number of two-wheel drive and four-wheel drive trucks in the area would almost double by 2000, and the increased use of unimproved roads would depreciate the value of adjacent habitat to wildlife. Two possible impacts of

TABLE 4-27

SOUTHERN UTAH
BIG GAME HABITAT DISTURBANCE
ALTERNATIVE ONE

Tract	Acres Disturbed	Plant Community ^a	Wildlife Use	Species	Losses/ Year ^b
Alton Amphitheater	71	P-J	Yearlong	Deer	1
Fisher Canyon	60	P-J/Sagebrush	Yearlong	Deer	1
Flax Lakes	123	P-J/Mtn. Shrub	Yearlong	Deer	2
Ford Pasture	644	P-J/Sagebrush	Yearlong	Deer	7
Mill Creek	131	P-J/Sagebrush	Yearlong	Deer	2
Totals	813				13

^a P-J = Pinyon-Juniper

^b Includes 0.1 mile influence zone. Based on optimum herd management objective levels (UDWR, 1980a).

this activity could be the curtailment of the establishment of elk on the Paunsugunt Plateau and inhibition of raptor use of winter feeding areas and nesting sites because of continual harassment.

Fisheries

Road construction and traffic would add sediments to the Kanab Creek drainage. However, the short stretches of trout habitat in the upper reaches of the stream would not be directly affected. The additional sediments in the Virgin River would probably not affect the indigenous fish as they are accustomed to high sediment loads. The increased fishing pressure on the trout fisheries of the Markagunt and Paunsugunt Plateaus would require additional stocking or a reduced limit to maintain an acceptable harvest level. The large warm water fisheries at Lake Powell would not be significantly affected.

Threatened or Endangered Species

The peregrine falcon nesting territory is located at a distance from the proposed mining area but portions of the hunting territory are located around Alton. The hunting territory would either be shifted by the peregrine to avoid the activity or the present hunting-nesting complex relocated in another remote site. No threatened or endangered fish would be affected by development of coal on the five tracts in the Alton coal field.

Land Use

Agriculture and Range

Land use changes associated with community expansion would affect cropland agriculture and community development in Garfield and Kane Counties. By the year 2000, these counties would experience a permanent change of approximately 467 acres from grazing and agricultural uses to community development. Of the 467 acres, 234 acres (50 percent) would be irrigated cropland converted to meet community growth and associated water requirements; this land is presently producing alfalfa and small grains. The remaining 233 acres would come from non-irrigated lands adjacent to existing communities. An additional 350 acres of irrigated cropland would be retired to provide water for community expansion (Table 4-28). Overall, permanent land changes would occur on 817 acres (Table 4-29).

Irrigated cropland would also be impacted by the diversion of water for exploration and mining activities. Water that would have been used to irrigate approximately 36 acres of cropland would be diverted to exploration activities over a 3-year period. For mining activities, irrigation water for approximately 32 acres of cropland would be diverted during the life of the mines.

In summary, by the year 2000, total agricultural lands impacted due to the conversion of irrigated cropland for community development, retirement of irrigated cropland for community water supply, and the diversion of water for exploration and mining activities would be 652 acres. The 36 acres of cropland affected by exploration activities would be available for cropland uses upon completion of exploration activities, i.e., a 3-year period.

TABLE 4-29

SOUTHERN UTAH
 ACRES OF LAND USE CHANGES DUE TO COAL TRACT DEVELOPMENTS
 BY YEAR 2000
 ALTERNATIVE ONE

Projected Maximum ^d Total Acres Changed From One Land Use to Another	Temporary Land Changes Acres of Land Change Due to Mining Operations, Including On-Tract and Offsite Support Facilities	Permanent Land Changes--Acres Changed ^c for Community Development and Acres Irrigated Cropland Retired to Provide Community Water Needs
	1,029 (329 acres involved in access) ^b 32 (acres retired for mine water)	817
Totals	1,878	817

Source: Utah State Office - Bureau of Land Management (BLM, 1982a).

a Projected Maximum Total Acres Changed From One Land Use to Another are totals of Temporary Land Changes plus Permanent Land Changes.

b Exploration drill pads counted as part of access acres.

c Figures shown are totals taken from Table 4-28 (Total Acres Converted for Community Development column plus Additional Irrigated Acreage Retired column for year 2000).

All of the affected cropland would be located off of the coal tracts with the exception of 95 acres of irrigated cropland on the Alton Amphitheater tract which could be affected by land conversion and/or water diversion on or near the tract area. The total agricultural lands impacted represent less than 2-percent of the two-county total of agricultural land; but as with the central Utah cropland areas, the impacted acres would be lands that are among the most favorable for agricultural uses, with such lands comprising only a small percentage of the overall land base in the region (Utah Department of Agriculture, 1982). Prime farmland would be among that affected if land conversion and/or water diversion occurred in the Alton area (the five coal tracts, including the areas south of the tracts to the Glendale Bench and Skutumpah Terrace). An undetermined amount of prime farmland could be utilized for community expansion near Orderville and Kanab communities, unless community plans avoid such land. No prime farmland would be affected in the Panguitch area.

At present the communities within Kane County are located on lands that, if available, would be highly productive agricultural lands. Projected community developments would result in the loss of 496 acres of highly productive farmland adjacent to the Kane County communities. This represents 76 percent of the agricultural land that would be affected in southern Utah under Alternative One.

Due to the high carrying capacity of the existing cropland areas that are being grazed, agricultural land conversion in the Kanab and Panguitch areas could significantly reduce grazing of cattle, sheep, and horses. Such grazing is an important part of small farm and ranch operations but actual AUM losses cannot be predicted.

There would be temporary land changes on 1,061 acres (see Table 4-29). The following discussions present the short- and long-term effects of these land changes on existing uses.

Coal exploration and development activities on the Alton Amphitheater tract could interrupt water flows and damage canals, ponds, and stream intake structures on portions of the tract. Such damage would interfere with livestock watering and the irrigation of approximately 310 acres of cropland in the immediate vicinity of Alton, Utah. This impact should be temporary as the lessee would be required to replace any water lost as a result of mining activity.

Subsidence occurring on the tract areas could affect the flows of an undetermined number of natural springs and streams presently providing water to cropland irrigation systems and livestock water impoundments. Reduced flows from these water sources could reduce the number of acres that could be irrigated and the livestock numbers on grazing allotments until water availability is again restored by the lessee.

Exploration and production activities on the five coal tracts would result in only minor reductions of grazing acreages. There would be less than a 2-percent annual reduction in grazing for all BLM and private lands involved.

Grazing reductions on all but the Ford Pasture tract would not exceed a 2-percent annual reduction on the associated BLM or private allotments; a 4-percent annual reduction would occur on the allotments in the Ford Pasture tract. As discussed in the central Utah analysis, small operators could be required to reduce their animal numbers up to two AUMs for every AUM lost on the tracts (Jacobson, 1981).

The seasonal trailing of livestock into and out of grazing allotments on the coal tracts would be affected by exploration and production activities. The construction of access roads and portal sites and mine-related vehicle traffic would impede normal trailing schedules and patterns and increase the probability of vehicle collisions with migrating livestock.

Energy and Minerals Development

The coal lease and oil and gas development impacts in the Alton area would be similar to those discussed for central Utah. Development of coal resources could interfere with oil and gas drilling schedules and locations. Oil and gas drilling would either be precluded from mining areas or the drilling methods would have to be modified. The effects on potential oil and gas production cannot be determined as no oil and gas exploration data are available.

Rights-of-Way, Special Uses, Other Land Uses

The flow and quality of domestic water supplies (springs and streams) could be temporarily reduced by disruption of aquifers and introduction of pollutants resulting from coal exploration and production activities (see Water Resources section). Water pipelines running from these supplies to scattered summer cabins and ranches located on the Mill Creek Canyon tract could be broken by subsidence or construction of access roads. Lease stipulations would require that any water lost by mining activities be replaced by the lessee. As discussed for central Utah, adherence by a lessee to EPA Water Quality Criteria and State of Utah Water Protection Standards would protect the quality of the water.

The rights-of-way for the proposed coal slurry pipelines and power distribution lines associated with the Allen-Warner Valley Energy System have been applied for and if granted before mine development would have priority over proposed surface mining on the Ford Pasture tract. Protection of the rights-of-way would interfere with mining operations and prevent full recovery of coal from the surface mined portion. This would reduce the amount of recoverable coal projected for the tract.

Land Use Plans, Controls, and Constraints

Federal Plans

All tracts identified in southern Utah have been addressed in Federal Land Use Plans (see Chapter 1). With mitigation as outlined in Chapter 2, leasing and subsequent development would not conflict with any applicable Federal Land Use Plans.

County Plans

All tracts and alternatives were evaluated in light of county plan direction and zoning ordinances. Although county plans and zoning restrictions are not applicable to Federal lands, plan and zoning direction has been considered in coal leasing proposals on Federal lands as well as on State and private lands.

With appropriate mitigation as enforced by Kane County, development of the coal resources within the five coal tracts would not conflict with the general direction of the Kane County Master Plan. The Chapter 3 discussion of Land Use Plans and Controls for southern Utah describes the major concerns of the county plan. Development of the coal tracts and related community expansion would conflict with the specific Kane County Master Plan direction for (1) protection of existing and potential irrigated cropland from incompatible uses and (2) developing the water resource (springs and streams) for existing county needs prior to the development of mineral resources. Under Alternative One, 616 acres of irrigated cropland would be converted and retired for community development and to supply mine water. The Kane County Master Plan direction is that such development be confined within existing community boundaries so as to avoid use of irrigated cropland areas. Also under Alternative One, exploration and production activities and related community development would require utilization of water resources that might not have been fully developed for existing county uses. All tract developments in southern Utah would be in county zones where coal development would be a permitted conditional use. County zoning ordinances address potential impacts from coal mining and emphasize the mitigation of socioeconomic impacts and protection of agricultural land.

Socioeconomics

Population, Income, and Employment

A summary of population and employment growth for southern Utah (Garfield and Kane Counties) is provided in Table 4-30. Kane County would receive the greatest growth from Alternative One with about 85 percent of the new population and 94 percent of the new employment. Population in southern Utah would increase by 8,407 by the year 2000 representing a 96 percent increase over 1982 population and 71 percent over the projected baseline by the year 2000. Employment would increase by 3,175 jobs by the year 2000 representing an 88 percent increase over 1982 levels and 74 percent over the projected baseline.

Projections for wages and personal income in southern Utah are provided in Table 4-31. Relatively higher per capita income would be anticipated with the projected increases in coal mining and the higher wages paid in the mining sector. The effect of increased mining would be to increase per capita incomes in both counties. Per capita income in Kane County would increase by as much as 21 percent over baseline projections.

TABLE 4-30

SOUTHERN UTAH
POPULATION AND EMPLOYMENT
INCREASE BY COUNTY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	Population	Employment
Garfield		
1987	222	33
1990	410	62
1995	1,044	161
2000	1,271	202
Kane		
1987	1,252	721
1990	2,307	1,108
1995	5,869	2,743
2000	7,136	2,973
Total (year 2000)	8,407	3,175

TABLE 4-31

SOUTHERN UTAH
TOTAL PERSONAL INCOME PROJECTIONS BY COUNTY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	1987	1990	1995	2000
Garfield				
Total Personal Income (\$1,000)	<u>38,097</u>	<u>43,216</u>	<u>56,509</u>	<u>64,720</u>
Total Population (Baseline + Impact)	<u>4,620</u>	<u>5,010</u>	<u>5,800</u>	<u>6,300</u>
Per Capita Personal Income	\$ <u>8,246</u>	\$ <u>8,626</u>	\$ <u>9,743</u>	\$ <u>10,273</u>
Kane				
Total Personal Income (\$1,000)	<u>63,716</u>	<u>77,728</u>	<u>134,587</u>	<u>152,122</u>
Total Population (Baseline + Impact)	<u>6,800</u>	<u>8,200</u>	<u>12,300</u>	<u>13,900</u>
Per Capita Personal Income	\$ <u>9,370</u>	\$ <u>9,479</u>	\$ <u>10,942</u>	\$ <u>10,944</u>

Infrastructure

Housing

The largest percentage increase in demand for housing would occur in Kane County where the demand for additional single family units would reach 1,260 units by the year 2000, a 77 percent increase over 1982 levels and a 34 percent increase over the projected baseline. Table 4-32 provides a summary of the projected additional demand for housing by type for each county. Garfield County would see a demand for an additional 222 single family units, 56 multi-family units, and 92 mobile home units by the year 2000.

The large increases noted above could result in a housing shortage. If required housing units are not available as needed, housing prices could increase to the point of causing personal hardship and the use of substandard housing.

Education

Forecasts of educational needs are found in Table 4-33. Under this alternative, the Kane School District would receive the most substantial growth in demand for educational services over baseline forecasts. As early as 1987, a 15-percent growth over baseline projections would occur. This would stress the capacity of the school district facilities even though a major building program is currently underway. Without additional construction, the currently programmed capacity would be exceeded by late in the decade and a serious shortfall could face the school district by the 1990s. In addition, local planners have identified a multipurpose auditorium facility for cultural activities and multipurpose events as necessary if the development of coal leases occurs on the Alton coal fields. By the year 2000, the total number of school-age children could reach nearly 4,000, a 92-percent increase over baseline forecasts. This alternative would require an additional 76 new teachers, over current baseline needs. The majority of growth is expected to occur in the Kanab area.

In addition to classroom teachers, there would also be an increase in the number of guidance counselors, administrative staff, and special education services required; that would tend to increase the operations costs for the school district. The school district would also need to both add and replace school buses at a more rapid rate because of the additional usage from an expansion of this size. Growth of this magnitude would require careful planning and considerable cooperation between developers and school officials to prevent deterioration within the Kane County education systems.

Garfield School District, which currently has excess capacity, should be able to handle the impacts of additional demand on education services through 1990. The 8 to 16 percent per annum growth in the number of students forecast for Garfield County in the 1990s, however, would require expanded facilities as well as support services.

TABLE 4-32

SOUTHERN UTAH
HOUSING DEMAND BY TYPE
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	Single Family	Multi-Family	Mobile
Garfield			
1987	48	12	20
1990	84	21	35
1995	192	48	80
2000	222	56	92
Kane			
1987	256	65	107
1990	456	114	190
1995	1,080	270	450
2000	1,260	315	525
Total (year 2000)	1,482	371	617
Total New Units (year 2000)	2,470		

TABLE 4-33

SOUTHERN UTAH
 IMPACTS ON EDUCATION, HEALTH, AND LAW ENFORCEMENT
 ALTERNATIVE ONE
 1987, 1990, 1995, 2000

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
<u>GARFIELD</u>								
Education								
Students	1,088	1,140	52	5	1,175	1,270	95	8
Teachers	44	46	2	5	47	51	4	8
Health Facilities								
Hospital Beds	9	9	0	11	9	10	1	11
Doctors	2	3	1	50	3	3	0	0
Dentists	2	2	0	0	2	3	1	50
Nurses	9	9	0	0	9	10	1	11
Clinical Psych ^b	0	0	0	0	0	0	0	0
MSWs ^c	1	1	0	0	1	1	0	0
EMTs ^d	6	7	1	17	6	7	1	17
Ambulances	1	1	0	0	1	1	0	0
Nursing Homes	20	21	1	5	20	21	2	10
Law Enforcement								
Police	9	9	0	0	9	10	1	11
Police Cars	9	9	0	0	9	10	1	11
<u>KANE</u>								
Education								
Students	1,511	1,741	230	15	1,682	2,092	410	24
Teachers	60	70	10	17	67	84	17	25
Health Facilities								
Hospital Beds	11	14	3	27	12	16	4	33
Doctors	3	4	1	33	3	5	2	67
Dentists	3	4	1	33	3	4	1	33
Nurses	11	14	3	27	12	16	4	33
Clinical Psych ^b	0	0	0	0	0	0	0	0
MSWs ^c	1	1	0	0	1	2	1	100
EMTs ^d	8	10	2	25	8	11	3	38
Ambulances	1	1	0	0	1	2	1	100
Nursing Homes	23	26	3	13	24	29	5	21
Law Enforcement								
Police	11	14	3	27	12	16	4	33
Police Cars	11	14	3	27	12	16	4	33

(continued)

Table 4-33 (concluded)

County	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
GARFIELD								
Education								
Students	1,318	1,530	212	16	1,358	1,740	382	28
Teachers	53	61	8	16	54	70	16	30
Health Facilities								
Hospital Beds	10	12	2	20	10	13	3	30
Doctors	3	3	0	0	3	4	1	33
Dentists	2	3	1	50	2	3	1	50
Nurses	10	12	2	20	10	13	3	30
Clinical Psych ^b	0	0	0	0	0	0	0	0
MSWs ^c	1	1	0	0	1	1	0	0
EMTs ^d	7	8	11	14	7	9	22	22
Ambulances	1	1	0	0	1	1	0	0
Nursing Homes	19	22	3	16	18	2	3	17
Law Enforcement								
Police	10	12	2	20	10	13	3	30
Police Cars	10	12	2	20	10	13	3	30
KANE								
Education								
Students	1,949	3,249	1,300	67	2,066	3,966	1,900	92
Teachers	78	130	52	67	83	159	76	92
Health Facilities								
Hospital Beds	13	25	12	92	14	28	14	100
Doctors	4	8	4	100	4	8	4	100
Dentists	3	8	5	167	3	7	4	133
Nurses	13	25	12	92	14	28	14	100
Clinical Psych ^b	0	1	1	100	0	1	1	100
MSWs ^c	1	3	2	200	1	3	2	200
EMTs ^d	9	17	8	89	9	24	15	167
Ambulances	1	3	2	200	1	3	2	200
Nursing Homes	24	36	12	50	23	36	13	54
Law Enforcement								
Police	13	25	12	92	14	28	14	100
Police Cars	13	25	12	92	14	28	14	100

a Percent Change: Change from Projected Baseline Need to Total Need with Impact.

b Clinical Psych: Clinical Psychologist. There is an Impact although it does not justify a full time person.

c MSW: A person with a Master's Degree in Social Work.

d EMT: Emergency Medical Technician.

Water and Sewer

Kanab, with some minor modification to its existing sewer system, should be able to handle anticipated growth demands that could reach 920,000 gallons per day of sewage by 1995. Additional capacity could then be required. Improvements in the collection system, hookups, and lift pumps are estimated at \$300,000. Site improvements necessary to Kanab's water system to handle anticipated growth would include an additional 5,000,000 gallons of water storage capacity and internal improvement in distribution. These expansions and improvements are estimated at \$1,639,344 which is in addition to the \$1,127,000 planned upgrade of water supply lines, wells, and pumping facilities which are currently under consideration. The Long Valley communities would need to expand their lagoon size from the existing 9 acres to 20 acres. This expansion as well as the expansion of flow capacity has been estimated to cost \$500,000. Orderville, which is currently undertaking a \$600,000 water improvement project to add storage and complete new supply and distribution systems, would be able to accommodate projected growth through the turn of the century when 262 additional connections would be required.

Glendale is currently 65 acre-feet short of adequate water rights; this shortage would be accelerated if new water rights are not acquired. By the year 2000, the shortfall could reach 125 acre-feet. Improvements to the distribution system, as well as additional water rights and storage capacity have been estimated at \$250,000. Alton has adequate water rights to handle the 94 connections that could be required in the year 2000; however, improvement to the storage capacity would be necessary.

Panguitch has adequate water rights to meet projected demand through the year 2000 although additional storage capacity estimated at \$500,000 would be required.

Projected water and sewer needs for each county are shown in Table 4-34 and Table 4-35.

Public Safety

Law enforcement needs for the counties are found in Table 4-33. Kane County would experience the largest growth in demand for law enforcement services. In the year 2000, there would be an increase of 100 percent over the projected baseline demand for law enforcement services which would require a total of 28 police officers and patrol cars.

Garfield County would require three new police offices and patrol cars, a 30-percent growth over baseline demand.

Kane County would see the largest increase over baseline forecasts in the demand for health care services. Ample excess capacity within the current hospital system would meet projected demand by the year 2000. In addition, four new doctors, four dentists, 14 nurses, 15 EMTs, and two ambulances would be needed. Garfield County would need one additional doctor and a dentist by the year 2000. Additional details are presented in Table 4-33.

TABLE 4-34

SOUTHERN UTAH
PROJECTED DEMAND FOR WATER CONNECTIONS BY COUNTY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	1987	1990	1995	2000
Garfield				
Hatch	63	78	121	134
Panguitch	600	672	870	946
Kane				
Alton	42	53	86	94
Glendale	98	106	124	133
Kanab	1,444	1,806	2,905	3,227
Mt. Carmel	NA	NA	NA	NA
Orderville	180	198	242	262

Note: Numbers indicate total demand for water connections, baseline plus impact.
NA - Information not available.

TABLE 4-35

SOUTHERN UTAH
PROJECTED CAPACITY FOR WASTEWATER TREATMENT FACILITIES BY COMMUNITY
ALTERNATIVE ONE
1987, 1990, 1995, 2000

County	Gallons per Day			
	1987	1990	1995	2000
Garfield				
Hatch	19,000	23,700	37,700	43,400
Panguitch	180,600	205,700	271,700	302,600
Kane				
Alton	12,900	16,500	27,400	30,900
Glendale	30,600	33,700	40,200	43,700
Kanab	442,900	561,400	920,000	1,061,900
Mt. Carmel	NA	NA	NA	NA
Orderville	56,200	62,800	78,400	87,900

Note: Numbers represent total sewer capacity, baseline plus impact.
NA - Information not available.

Kane County has established a special services district in fire protection in the western part of the county and has agreements between the communities and the Forest Service. Additional trained volunteers will be necessary by the late 1980s in Kanab and the Long Valley communities. Additional fire fighting equipment would be necessary in all communities affected by the implementation of Alternative One.

Solid Waste

Under conditions cited for this alternative, an undetermined additional amount of landfill space may be necessary in Panguitch, Garfield County, and the creation of a landfill may be necessary for the Long Valley area of Kane County.

Social/Attitudes

In Kane County the Alton coal field is located near Bryce Canyon National Park and environmental groups have opposed development in the area. It is generally perceived by local spokesmen that the proposed leases would not significantly deteriorate the value of the resources of the park. Local elected officials who express strong support for growth are also aware of the problems that can occur when rapid growth occurs. A review and update of county master plans and local zoning ordinances is either underway or recently completed in Garfield and Kane Counties. It is generally felt that with the proper growth management tools the positive aspects of growth can be maximized and the negative aspects minimized. However, a large population influx under the proposed leasing would introduce new people with different backgrounds, and significantly alter the cultural homogeneity predominant in the area.

Transportation

Table 4-36 shows anticipated increases in traffic in the Alton area (Figure 3-18). A major impact resulting from coal hauling and increasing traffic due to population increases would be the rapid deterioration of secondary roads in the absence of increased maintenance and upgrading. Due to large volumes of traffic on dusty roads, the incidence of traffic accidents is likely to increase markedly unless road improvements were made. Although the number of vehicle accidents would rise, it is anticipated that the rate of vehicle accidents would remain at or below Utah averages.

The greatest increases in traffic on secondary roads would be within the area bounded by Alton on the north, Johnson Canyon road on the east, and US-89 on the south and west. These roads presently carry only 5 to 35 vpd and are graded and loose-surfaced. The asphalt road from US-89 into Alton and the loose-surfaced road eastward from Glendale would receive moderate increases in traffic. Greater increases in traffic would occur on the paved road into Alton, the road passing through the proposed Ford Pasture mine tract, and an access road from US-89 into the Flax Lakes tract. Increases in traffic on the road from the Alton road to Bald Knoll from the northwest and the road connecting Bald Knoll with the Mill Creek Canyon tract would not result in road deterioration and accidents because these roads would likely be upgraded as part of the mine portal access.

TABLE 4-36

SOUTHERN UTAH
MAXIMUM INCREASES IN TRAFFIC AND VEHICLE USE
ALTERNATIVE ONE

Feature	Coal Trucks	Service Trucks	Commuters	Other Trucks	Other Cars	Totals
Max. Vehicles/day	1,109	213	2,800	198	1,804	6,124
Total Million Miles ^a	48	95	717	6	40	906
Total Million Gallons of Fuel ^a	11	17	28	1	1	58
Total Vehicles Lives ^a	48	189	7,162	10	401	7,810

^a Within area of influence only. Travel outside this area is not included.

Because most new miners would live in Kanab, traffic there would almost double by the year 2000. This would contribute to traffic congestion along the main streets. Other communities would see proportionate rises in traffic volume, but since present traffic volumes are low, increases would not cause traffic congestion.

Mine-related traffic would add some 6,100 vpd to the traffic of the area, traveling some 906 million miles over the lives of the mines, using 58 million gallons of petroleum-based fuels, and wearing out more than 7,800 vehicles.

Cultural Resources

As discussed for central Utah, construction of surface facilities for underground mining could inadvertently disturb or destroy historic and prehistoric cultural resources. The majority of such effects could be avoided by proper placement of facilities. Where avoidance is not possible, data recovery by salvage excavation would mitigate most adverse effects. However, even with present salvage techniques, some scientific and educational information would be lost. The loss of information would be partially offset by information gained from the salvage program. Based on an estimated 11 sites per square mile, the placement of surface facilities for underground mining could require mitigation efforts for 7 cultural resource sites. Mitigation techniques are varied and include collection, mapping, testing, photography and excavation.

Surface mining on the Ford Pasture tract could require mitigation for 11 cultural resource sites since avoidance of sites would not be possible. The significance of the sites is generally low and there are no known sites within the tracts that are on or nominated to the National Register of Historic Places. The number of sites affected by mining would depend on the final location of facilities.

The extent of cultural resource disturbance that would result from mine-related community expansion in Kane and Garfield Counties is unknown. Mitigation of losses to cultural values in community expansion areas cannot be assured as they would be on private lands where mitigation would be subject to approval of individual land owners unless community development were funded by the Federal Government.

Indirect impacts resulting from greater accessibility and local population increases could cause irreplaceable, unmitigable site damage and loss of both scientific and aesthetic site values. This loss would occur to many on- and off-tract significant cultural resources in Kane and Garfield Counties.

Recreation

By the year 2000, mining-related population growth would increase the local demand for both dispersed and developed recreation opportunities in the two county region by approximately 96 percent over 1982 use figures and by 71 percent over projected baseline demand.

Table 4-37 and Table 4-38 show the increases in demand for hunting, fishing, and ORV activity during the life of the mining operations. Increased demand

TABLE 4-37
 PROJECTED LOCAL INCREASE IN HUNTER AND FISHERMAN DEMAND WITHIN GARFIELD AND KANE COUNTIES
 ALTERNATIVE ONE

Year	Coal-Related Population	Projected Annual Increase in Numbers					Increased Demand for Fish	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
		Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen				
1987	1,474	258	25	125	663	19,890	17	15	
1990	2,717	489	54	245	1,222	36,660	31	26	
1995	6,913	1,244	138	622	3,109	93,270	79	62	
2000	8,407	1,513	168	756	3,781	113,430	96	71	

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the two-county area. Approximately 18 percent of Utah's population hunt deer, approximately 2 percent hunt elk, approximately 9 percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under 12 and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UDWR, 1978).

TABLE 4-38

PROJECTED LOCAL INCREASE IN OFF-ROAD VEHICLE DEMAND WITHIN GARFIELD AND KANE COUNTIES
ALTERNATIVE ONE

Year	Projected Coal-Related Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
1987	1,474	516	100	17	15
1990	2,717	951	190	31	26
1995	6,913	2,420	484	79	62
2000	8,407	2,943	589	96	71

Note: Projections were made assuming that the percentage of the population in the two-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles, and approximately 35 percent of the population currently owns four-wheel drive vehicles or light pickups) (UORA, 1978).

for dispersed activities would result in the same types of impacts as identified for the central Utah region. In summary, the additional competition for fish and game would lead to less hunter and fisherman success or restricted harvests. Although the two-county region has adequate miles of primitive dirt roads to absorb the ORV demand without resource damage, the increase would conflict with other recreation uses, reducing the overall variety of dispersed recreation available and reducing the quality of the recreation experience to some visitors.

Developed camping and picnicking sites in the region would receive increased use by the new population. This would intensify present overcrowding, vandalism, and littering, and cause user dissatisfaction and deterioration of the environment and facilities. This overcrowded condition would cause additional recreational pressures on developed as well as dispersed areas. Federal and State governments would be under stress to provide adequate maintenance for existing developed sites and to construct adequate new sites.

Overcrowded conditions of recreation facilities in the towns would intensify, resulting in their deterioration and user dissatisfaction. Stress would be placed on local governments to provide urban recreation facilities to meet minimum standards recommended by UORA (1978).

Development of the tracts and related community expansion would displace dispersed recreational use from as much as 298 acres by 1987, 607 acres by 1990, 1,122 acres by 1995, and 1,496 acres by the year 2000. Because surrounding areas offer comparable or better opportunities, and access to these areas would not be eliminated, the recreational opportunity lost would not be significant, even when the increase in recreational demand is considered.

About 14 miles of road that would be improved or constructed for mining purposes would permanently improve accessibility for dispersed recreation if managing agencies allow for such use. About 66 miles of exploration access roads may be available for recreation use from 1987 through 1990.

The visual and audio impacts from development of the Alton Amphitheater and Ford Pasture tracts would reduce the quality of the recreation experience to many people using the Alton-Skutumpah road for sightseeing south of Bryce Canyon. Other visitors would find the mining operations to be an interesting addition to their recreational experience. The increased industrial traffic on the Alton-Skutumpah route would result in danger and stress to the recreational visitor.

Fugitive dust visible from Yovimpa Point plus a possible loss in visual range in scenic vistas from Yovimpa Point (up to 2.6 percent over the baseline range in the year 2000 as discussed in the Air Quality section) could reduce the quality of the recreational experience for some of the approximately 650,000 annual park visitors. According to a visitor survey at Bryce Canyon National Park (Kelly, 1980) a large proportion of the visitors are concerned about possible changes in visual air quality, both at Yovimpa Point and in other areas of the park. Over 95 percent of the survey sampled stated that air quality affects their enjoyment of viewing overlooks or scenery in the Park.

Blasting and coal truck operation would be the main sources of noise from the mining operations. The proposed lease tracts, particularly the Ford Pasture tract proposed for surface mining, lie in-between the existing east and west Alton areas studies by Foch and Oliver (1980) for noise impacts on Bryce Canyon National Park. They concluded that noise in the Park from the west Alton area would be less than from the east Alton area but would be audible during a major portion of the time. Truck noise would be perceived as a droning (555 coal haul and truck round trips per day) while blasting would be louder but less frequent. Surface mine blasting on the Ford pasture tract would be distinctly perceptible throughout the park (OSM, 1980). According to Foch and Oliver (1980), truck noise from the east Alton area would cause a 2- to 16-fold increase in the perceived loudness of sound levels in the park while blasting could be perceived as 64 times louder than natural background sound levels. Even though the proposed tracts are further from the park than east Alton and would have less impact because of distance, increases in noise would be significant as "even the detectability of man-made noise in pristine areas can be of significant annoyance to people" (EPA, 1977).

In a visitor survey conducted at Bryce Canyon National Park (NPS, 1980) 89 percent of those surveyed said that natural forest, wildlife and solitude are important attributes of the park. Noise from coal mining would affect solitude and would detract from the park experience of a large percentage of the visitors during a major portion of the time.

Visual Resources

Development of the five proposed southern Utah tracts would change the scenic character of portions of the tracts from natural to industrial during the life of the mines. Visual disturbance would in all cases be greatest during the active mining stage.

Development of the Ford Pasture tract through surface mining and associated onsite developments would modify the landform and create high manmade contrast to the natural setting. It is probable that the dragline, in excess of 200 feet high, as well as fugitive dust would be visible throughout the tract. Mining development would dominate the landscape as viewed from the Alton-Skutumpah road (Highway U-136). Visual contrast would be most obvious in the VRM Class III portion of the tract that is within the foreground of the road. Because of the visual impacts of mining, management objectives for VRM Class III and VRM Class IV areas would not be met during the life of the mine. Many people using the Alton-Skutumpah road would find the operations objectionable, as they would reduce the scenic qualities of the area, especially views of the pink cliffs. Others could find the surface mining operation to be an item of interest adding to the visual qualities of the area.

Developments associated with underground mining on the Alton Amphitheater tract would likely be highly visible from the Alton-Skutumpah road and from the town of Alton. Because the tract is close to Alton, mining roads, drill pads, and shaft hoists could be clearly visible and mining noise could be clearly audible from some dwellings, depending on placement of facilities. Thus, mining disturbance could degrade the visual resources enjoyed by many residents. However, it is unlikely that disturbance resulting from subsidence

would be visible to most people. Because of the sensitivity of the visual area, development would probably exceed both VRM Class III and IV objectives during the life of the mine.

Visual conflicts resulting from underground mining development of the Flax Lakes, Fisher Canyon, and Mill Creek Canyon tracts would be less significant. Disturbance of the Flax Lakes tract may be visible from the Alton-Skutumpah road, but because of the viewing distance of approximately 6 miles, the manmade contrast would not be obvious to most people. Mining-related disturbance on the Fisher Canyon and Mill Creek Canyon tracts would not be visible from the Alton-Skutumpah road. It is also unlikely that subsidence occurring on any of the tracts would be perceptible to most people. Because these three tracts would not lose their natural landscape character as viewed from the Alton-Skutumpah road, their VRM Class III and IV standards would most likely be met.

Reclamation would be effective in reestablishing the present scenic quality and character of the Alton tracts within 10 years of completion of the mining operations. No outstanding or unique scenic qualities would be lost from development of any of the tracts. Because of these factors and also because manmade contrast would not be visible from any scenic attraction of national significance, nor from any major tourist travel route, development of the tracts would have little effect on the overall scenic character of the two-county region.

The mining facilities and disturbance would not be visible from Bryce Canyon National Park, but fugitive dust from development of all the tracts (particularly the Ford Pasture tract) could be visible at times from Yovimpa Point. This may adversely affect the recreational experience of some viewers.

Special Designation Areas

Mining activities, including new mines and transportation routes, would not directly impact any special designation area. However, the projected 71-percent increase in local recreational demand over the year 2000 baseline may result in increased ORV and other dispersed use of some of the 40 areas within the two-county region with special designation or potential for special designation. More intensive use and resultant littering and vandalism would degrade values for which the areas are being protected and/or reviewed. Agencies managing the lands would be under stress to protect these values. The degree of impact is not quantifiable. However, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely even in a worst case situation that possible degradation would affect the suitability of any area for special designation.

West-Central Colorado

Climate, Air Quality

As outlined in Chapter 3, several atmospheric pollutants in Delta County are approaching or exceed air quality standards. Any new emission source in the region would compound this situation. In order to determine the contribution of additional coal lease developments to the existing situation, pollutant concentrations were estimated using atmospheric dispersion modeling (principally PALDS and ISCLT). These models predict the resulting ground level pollutant concentrations by taking into account topography, wind speed and direction, and industrial/residential emission characteristics.

Figure 4-7 shows the region modeled and major emission sources. Table 4-39 summarizes the emission and production/population rates assumed for sources located in Figure 4-7. Increases in pollutants for population centers were estimated by scaling current (1978-82) pollutant levels with increased population projections. Concentration values were only projected in areas with significant current population or industry. Gaseous pollutant concentrations were not modeled due to the relatively small amount of gaseous emissions compared to the TSP levels. Overall, TSP emissions due to Alternative One are estimated to be 35 percent greater than 1981 levels and 13 percent greater than the projected baseline.

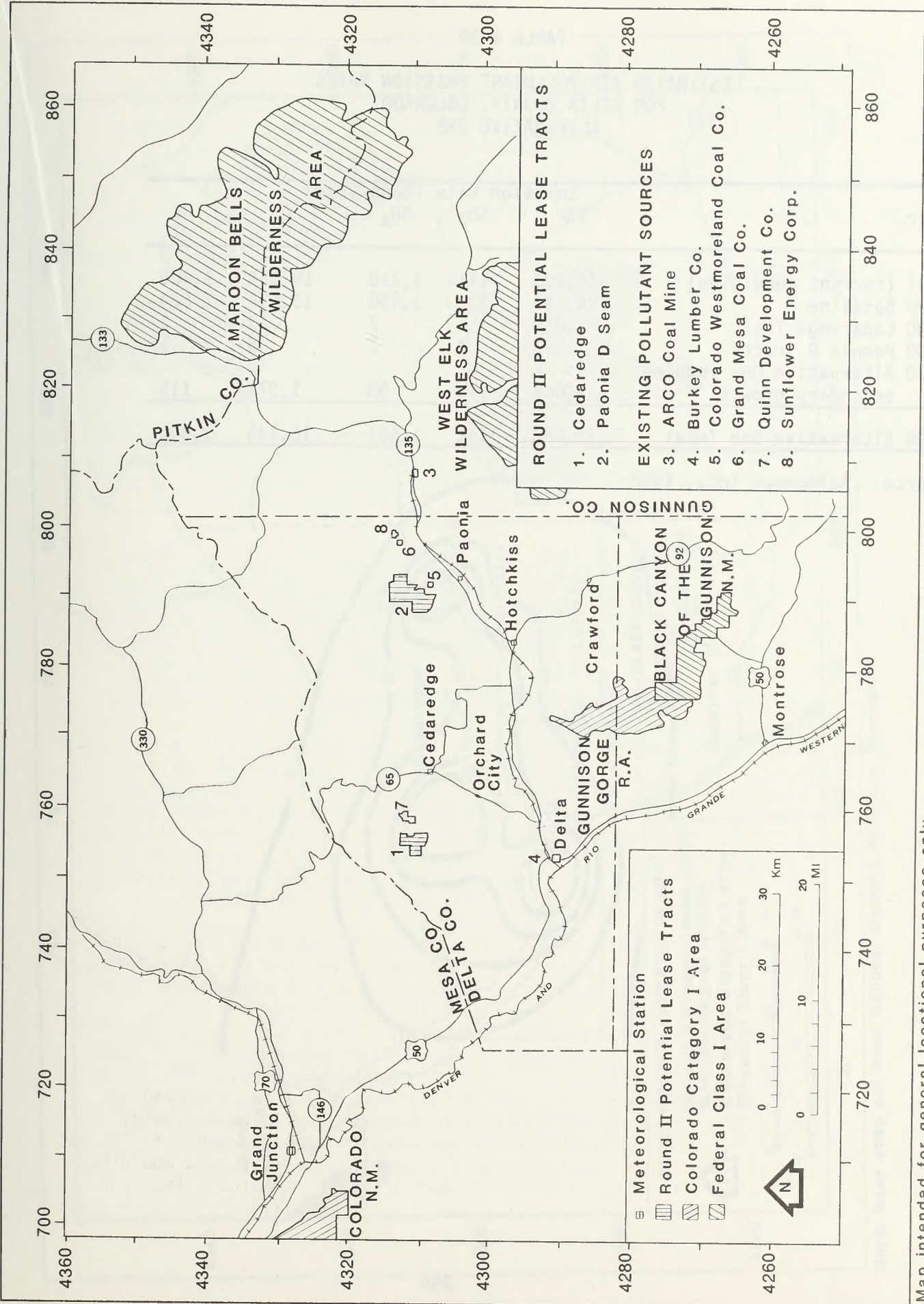
The most probable pollutants that would increase in towns are TSP, nitrogen dioxide, and carbon monoxide, but the level of uncertainty in predicting future pollution sources limits current modeling capabilities to accurately predict regional pollutant levels 20 years into the future.

The predicted annual average TSP concentrations (above a background concentration of 15 micrograms per cubic meter) for the year 2000 are shown in Figure 4-8. These levels represent the maximum concentrations which could result from direct mining activities, induced impacts, and regional growth. While most of the rural region is predicted to remain below the annual NAAQS, an area around Delta and one between Cedaredge to Orchard City may exceed the annual standard. Under worst-case 24-hour conditions it is likely that these same locations may also approach or exceed the 24-hour NAAQS. The secondary NAAQS for TSP is presently exceeded within an 85-square mile area. By the year 2000, the secondary NAAQS would be exceeded within a 190-square mile area of which 70 square miles would be attributable to Alternative One.

No perceptible visibility impairment is anticipated for the Black Canyon area of Gunnison National Monument and West Elk Wilderness Area. Also, due to the limited levels of sulfur and nitrogen-related pollutants, no significant impacts due to atmospheric deposition are anticipated.

Soils

Construction of mine facilities (portal facilities, vent shafts, and roads) and associated urban area expansion would cumulatively disturb approximately 180 acres by the year 2000. Mine facilities construction would result in 80 acres of this disturbance from 1987 through the year 2000. This land would be reclaimed at the end of the mine life and restored to its pre-mining land use.



Map intended for general locational purposes only.
 Base does not meet National Mapping Accuracy Standards.

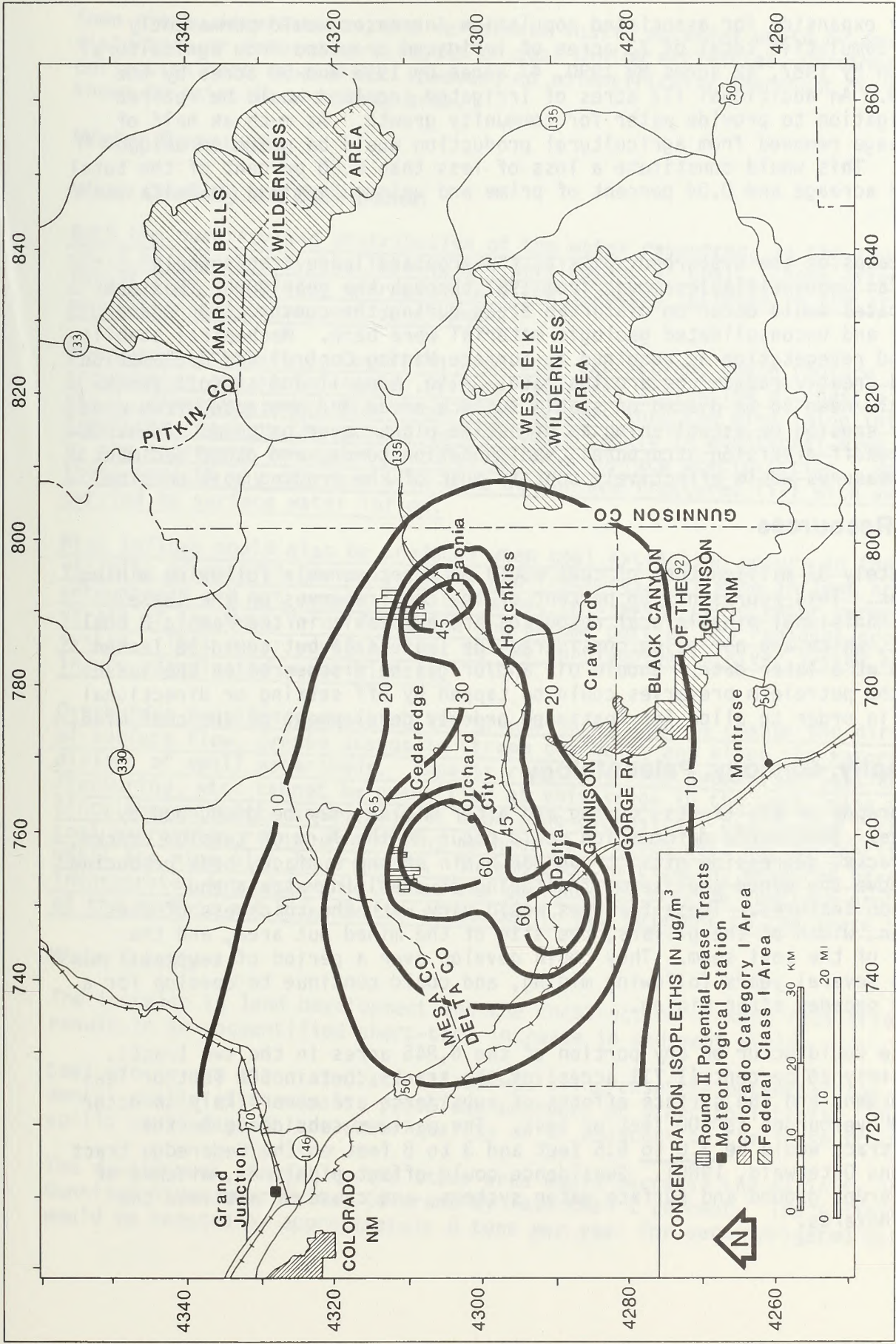
FIGURE 4-7
 LOCATION OF MAJOR EMISSION SOURCES AND SENSITIVE RECEPTOR AREAS IN WEST CENTRAL COLORADO
 ALTERNATIVE ONE

TABLE 4-39

ESTIMATED AIR POLLUTANT EMISSION RATES
FOR DELTA COUNTY, COLORADO
ALTERNATIVE ONE

Year	Emission Rate (tons/year)				
	TSP	SO ₂	NO _x	CO	HC
1981 (current condition)	20,703	111	1,210	13,058	1,405
2000 Baseline	24,743	132	1,450	15,654	1,684
2000 Cedaredge Tract	1,019	1	2	12	2
2000 Paonia D Tract	575	4	1	6	1
2000 Alternative One induced secondary growth	1,666	8	98	1,071	115
2000 Alternative One Total	28,003	141	1,551	16,743	1,801

Source: AeroComp, Inc., 1982



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-8
ANNUAL AVERAGE TSP CONCENTRATIONS IN WEST CENTRAL COLORADO - YEAR 2000
ALTERNATIVE ONE

Community expansion for associated population increases would permanently remove a cumulative total of 23 acres of irrigated cropland from agricultural production by 1987, 42 acres by 1990, 47 acres by 1995 and 50 acres by the year 2000. An additional 112 acres of irrigated cropland would be retired from irrigation to provide water for community growth. As much as half of this acreage removed from agricultural production would be prime or unique farmland. This would constitute a loss of less than 0.50 percent of the total irrigated acreage and 0.04 percent of prime and unique farmland in Delta County.

Erosion rates on the disturbed soils of the proposed lease tracts would increase an unquantifiable amount from 1987 through the year 2000. Maximum erosion rates would occur on disturbed areas during the construction phase when soil and unconsolidated geologic material were bare. Mechanical stabilization and revegetation as required by Surface Mining Control and Reclamation Act would greatly reduce the erosion rate. Also, topsoil and subsoil stockpiles would need to be placed on stable surface areas and protected from wind and water erosion by establishing an effective plant cover on them. Construction of runoff diversion structures, sedimentation ponds, and other sediment control measures would effectively contain most of the eroding soil on site.

Mineral Resources

Approximately 87 million tons of coal would be unrecoverable following mining activities. This represents 58 percent of the coal reserves on the lease tracts. Additional minable coal resources are available in the Paonia D coal bed tract, which are not being considered for lease sale but could be leased and mined at a later date. Should oil and/or gas be discovered on the lease tracts, the petroleum preserves could be tapped by off setting or directional drilling in order to allow for continued orderly development of the coal mine.

Topography, Geology, Paleontology

The topography of the tracts, during and after mining, may be disturbed by subsidence. Subsidence deformation could occur in the form of tension cracks, linear cracks, depression pits, trough or basin at the surface, beds producing rubble above the mined coal seam, fracturing of overlying strata and compression features. These features would vary with the thickness of the overburden, width of the pillars, the size of the mined out area, and the thickness of the coal seam. They could develop over a period of several months to several years following mining, and could continue to develop for a period of decades after mining.

Subsidence could occur on any portion of the 6,845 acres in the two tracts. Approximately 25 percent (1,711 acres) of the tracts contain 500 feet or less of overburden, and the surface effects of subsidence are more likely to occur where the overburden is 500 feet or less. The maximum subsidence on the Paonia D tract would be 3.0 to 8.5 feet and 3 to 8 feet on the Cedaredge tract (Dunrud and Osterwald, 1980). Subsidence could offset pipelines, ditches or roads, disrupt ground and surface water systems, and cause or activate the geologic hazards.

Some plant, invertebrate, and vertebrate fossil material would be destroyed, disturbed, or removed as a result of coal mining activities, unauthorized collection, and vandalism. However, no scientifically important fossils are known to exist in the study area.

Water Resources

Water Quantity and Distribution

Both the quantity and distribution of the water resources, in the study area, could be affected by the leasing and development of coal. These effects could result from the mining operations and the expected increase in the areas population and subsequent development.

Overburden fracturing, resulting from coal extraction, could rupture local groundwater and surface water systems (streams, irrigation ditches, pipelines, etc.), diverting water flow from these systems into the mine (mine inflow). Fractures reaching the ground surface could result in additional mine inflow by the increased volume of percolation from surface precipitation. However, these impacts may decrease with time as surface fractures fill with sediment carried by surface water inflow.

Mine inflows could also be produced when coal extraction occurs in the vicinity of natural geologic faults and fractures. If mine inflows are encountered and not pumped from the mine, this water could enter permeable strata of the Mesa Verde Formation and become part of the regional groundwater system. This water would be lost to the Gunnison Basin River System and could injure adjudicated water rights.

Overburden subsidence reaching the ground surface could change the direction of surface flow, create scarps in stream channels, and alter the natural divides of small watersheds. Impacts resulting from overburden subsidence, fracturing, etc. cannot be quantified at this stage in the coal lease process since these impacts are dependent upon mine dimensions, overburden lithology, coal extraction rates, and mining methods etc. which will not be specified until the mine plan is prepared. In addition, mitigating measures have been incorporated into Appendix 3 that are designed to provide complete protection of the surface and groundwater resources in and adjacent to the lease tracts.

Water Quality

The increase in land development and the construction of mine facilities would result in an unquantified short-term increase in sediment yield.

Coal mining and associated activities would increase the potential for accidental spills of chemicals, petroleum products or other pollutants. These spills could degrade the water quality on or adjacent to the lease tracts.

The development of coal in the study area would decrease the salinity in the Gunnison River near Delta, Colorado by less than 1 percent. The salinity would be reduced by approximately 8 tons per year for each irrigated acre lost

to development and domestic water needs. However, half of the increase in domestic water needs would be discharged as sewage effluent which would increase total dissolved solids by approximately 200 milligrams per liter. In the year 2000, the change in water use on irrigated acreage would eliminate approximately 22 times more salt from entering the river system than would be added by the increased amount of sewage effluent (Table 4-40).

Water Rights and Use

The leasing and development of coal would result in an increase in the consumptive use of water in the area (Table 4-40). This would cause a less than 1 percent reduction in the annual discharge of the Gunnison River. The water making up this additional use would come from existing permitted uses that are not being fully utilized or from the lease or purchase of current water rights for other uses such as irrigation.

The conversion of irrigation water to industrial (mine use) and domestic uses would result in a decrease in the number of irrigated acres (Table 4-40). The consumptive use of water for mining would decrease when mining ceases; however, demand for domestic use would continue if the related population increase remains in the area.

All water in the area has been appropriated by the State of Colorado, therefore, any additional decrees would have to be purchased, leased, or accompanied with an augmentation plan. This would be done in accordance with Colorado water laws.

Vegetation

Approximately 80 acres of Pinyon-Juniper and Mountain Brush vegetation types would be removed on the lease tracts for the life of the mines. This loss of vegetation would be for the life of the mine and could eventually be successfully reclaimed. Vegetation composition and structure would differ from pre-mining conditions. Several years would be required to attain premining vegetation conditions.

In addition to the onsite disturbance there would be a loss of rural and agricultural land in the study area of about 100 acres for housing and related development by the year 2000. Of this figure, about 50 acres would be irrigated cropland. These lands would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of community development. An additional 112 acres of irrigated croplands would be retired to provide water for community growth. No known listed or candidate threatened or endangered plant species would be disturbed by mining activities.

Wildlife

Eighty acres of wildlife habitat would be destroyed due to the construction of mine facilities and the production of coal. An additional 100 acres of habitat on private farmland and rangeland would be permanently converted to housing and commercial uses. Big game populations would be reduced due to

TABLE 4-40

WEST-CENTRAL COLORADO
CUMULATIVE IMPACTS ON WATER RESOURCES
ALTERNATIVE ONE

	1987	1990	1995	2000
Consumptive Water Use From Population Increase ^a (Acre-Feet/Year)	101	188	213	227
Consumptive Water Use From Mining Operations (Acre- Feet/Year)	78	109	109	109
Total Consumptive Water Use (Acre-Feet/ Year)	179	297	322	336
Percent Change in Discharge of Gunnison River near Delta, CO, From Consumptive Water Use	-0.01	-0.02	-0.03	-0.03
Irrigation Water Lost To Coal Development And Related Pop. Inc. (Acre-Feet/Year)	288	487	533	558
Decrease In Salinity From Loss of Irri- gated Land (Tons/Yr)	702	1,187	1,299	1,360
Increase in Salinity from Sewage Effluent (Tons/Year)	27	51	58	62
Net Change in Salinity (Tons/Year) (+) Increase (-) Decrease	- 675	-1,136	-1,241	-1,298
Percent Change In Salinity at Gunnison River near Delta, CO	-0.09	-0.15	-0.16	-0.17

^a Based on 225 gal./person/day and 50 percent return flow through sewage effluent.

this reduction of crucial winter range. This primary habitat loss would result in approximately 52 fewer deer and 8 fewer elk in the two herd units encompassing these tracts. This is slightly less than 1 percent of the 1981 legal elk harvest and about 4 percent of the 1981 legal deer harvest for the two herd units involved. Human activity and noise around the mine sites and other developments could cause some abandonment of otherwise suitable habitat even after the animals became accustomed to human presence. This in combination with the permanent loss of winter range on private land, increased disturbance on the winter range, increased poaching and additional recreation and hunting pressure would result in a long-term indefinite reduction in big game populations. After reclamation, habitat for 22 deer and four elk would once again be available.

During the production phase, big game vehicle mortality in the Cedaredge area would likely increase by approximately 20 deer and one elk per year. This estimate is based upon the current situation for a similar mining operation in the North Fork Valley. There would be a slight but unquantified increase in vehicle/big game collisions throughout the county due to increased human population and the attendant increase in vehicle traffic. This would persist beyond the life of the mines.

Although the known Golden Eagle nests on public land are protected by a buffer zone, uncontrolled activity associated with increased human population could result in eyrie abandonment or loss of the young. Other birds of prey which nest in this area would also be susceptible to this type of disturbance. Some raptors, including eagles, could suffer increased mortality from vehicle collisions, especially when feeding on road-killed deer during the winter.

The 100 acres of small game and non-game habitat on private land that would be lost to domestic and commercial uses could be considered a permanent loss. Some wildlife species such as pigeons, starlings, English sparrows and robins would prosper from this habitat alteration. Other species, such as bluebirds, towhees, chipping sparrows, pheasants, reptiles, amphibians, and rabbits would not find this altered habitat suitable.

The limited aquatic habitat located on the Paonia and Cedaredge tracts should not be adversely affected by the proposed mining activities. Water quality regulations that apply to mine operations should prevent significant negative impacts to the North Fork of the Gunnison or the Gunnison River.

As shown in the Water Resources section, coal development would have some effect on the quantity of water in the Gunnison River downstream from Delta. The endangered Colorado River fishes are sensitive to changes in water quantity (Holden, 1982). However, the water quantity reduction, 0.03 percent of the flow of the Gunnison at Delta, Colorado, appears to be insignificant (telephone conversation, Robert Smith, USFWS, August 13, 1982).

Land Use

Existing land uses would not change significantly on either of the tracts or adjacent areas. By the year 2000, 100 acres of land would be devoted to urban expansion in order to accommodate the increased populations, fifty acres of which would be irrigated croplands. In addition to the 100 acres, 112 acres

of irrigated cropland would be retired to provide water for community growth. This represents less than 0.50 percent of the irrigated acreage in the county and would not result in a significant loss of agricultural production or income. No lands used primarily for livestock grazing would be affected. Anticipated impacts to water systems on the tracts are discussed in the Water Resources Section.

Portal facilities and ventilation site would increase the noise level adjacent to those facilities by up to approximately 90dBA.

Land Use Plans, Controls, and Constraints

Federal Plans

The two tracts have been addressed in Federal Land Use Plans (see Chapter 1), with mitigation as outlined in Chapter 2. Leasing and subsequent development would not conflict with any applicable Federal Land Use Plans.

County Plans

All coal mine developments will be required to comply with city and county laws and regulations. Leasing coal does not conflict with existing county plans.

Socioeconomics

Population is expected to increase 8 percent, employment by 6 percent and per capita income by 3 percent over the projected baseline between 1982 and 2000 (Table 4-41). Employment in North Fork coal mines may be expected to increase 50 percent by the year 2000 (PAS Model). Delta County would receive an additional \$376,000 annually (a 60-percent rise) in coal tax revenues over the years 1990 to 2000.

Infrastructure

Communities that currently have infrastructural deficiencies would find them magnified by expanding populations. Difficulties in financing infrastructural expansion in the town of Delta would be expected to continue.

The communities expected to encounter the most infrastructural difficulties are Orchard City with a 10-percent population increase, Cedaredge and Orchard City unincorporated areas with a 16-percent increase, and Cedaredge with a 18-percent increase. Other Delta County communities are expected to experience population growth of less than 10 percent. Cedaredge and Orchard City are currently deficient in fire fighting facilities. Cedaredge is also deficient in water facilities. These deficiencies would become more critical as population growth continues to outstrip the communities' ability to expand infrastructural capacity.

Delta County with 600 additional students would require 25 additional classrooms and teachers by the year 2000; community population projections are not considered accurate enough to predict the school requirements of each community.

TABLE 4-41

WEST-CENTRAL COLORADO
ECONOMIC GROWTH PROJECTIONS
ALTERNATIVE ONE

Year	Without Leasing	With Leasing	Difference	Percent Change
Population (PAS Model 1982)				
1982	22,830	22,830	0	0
1987	24,890	25,691	801	3
1990	25,399	26,891	1,492	6
1995	25,856	27,549	1,693	7
2000	26,047	28,212	2,165	8
Total Employment (PAS Model 1982)				
1982	8,712	8,712	0	0
1987	9,213	9,742	529	6
1990	9,411	9,982	571	6
1995	9,521	10,098	577	6
2000	9,925	10,507	582	6
Per Capita Income in 1980 Dollars (PAS Model 1982)				
1982	9,793	9,793	0	0
1987	9,397	9,854	457	5
1990	9,421	9,819	398	4
1995	9,435	9,776	341	4
2000	9,614	9,915	301	3

Social Conditions

Delta County residents would experience a 1.3 percent annual population growth rate between 1982 and 2000. This is less than half of the 1974-1981 rate of 3.7 percent, but 0.5 percent greater than the baseline growth rate. Number of crimes, while increasing at a lower rate than during the 1974-1981 period, would increase 24 percent over the projected baseline by the year 2000.

Transportation

Traffic on State Highway 65 at the intersection with State Highway 92 would increase by approximately 400 vehicles per day by the year 2000. The accident rate would increase by less than 1 per year. In addition, it is estimated that there would be 63 coal trucks and 12 service truck round trips per day resulting from coal production from the Cedaredge tract. This traffic increase would continue to be a safety concern of nearby Delta residents that would continue as long as the loadout facility near Delta is in operation.

The county road which would be used to transport coal from the Cedaredge tract is not designed to accommodate projected coal related traffic. The road would need to be redesigned and substantially improved to handle the increased traffic load. Lease stipulations for coal transportation from the Paonia D tract would reduce coal traffic on Highway 133, which has been a concern of local citizens.

County-wide traffic associated with coal related population growth would not be expected to significantly overload any county or State road system. While traffic accidents would increase an unspecified amount, the accident rate (accident per vehicle mile) itself would not be expected to increase.

Cultural Resources

The construction of surface facilities such as roads, vent shafts, and structures would result in surface disturbance; however, these could be designed so as to avoid existing cultural sites. If sites cannot be avoided, mitigation measures would be applied as discussed. Mitigation techniques are varied and include collection, mapping, testing, photography, and excavation.

Unquantified indirect impacts would increase as a result of greater accessibility and local population increases. Recreational activities of two types, intentional, illegal activities associated with artifact collection and treasure hunting, and unintentional recreational use (hiking, hunting, ORV), would cause irreplaceable, unmitigatable site damage. Both scientific and aesthetic site values would be lost as a result of these indirect impacts. No known National Register Properties would be directly disturbed as a result of coal leasing.

Recreation

Increased recreation use on public and private lands is a natural outgrowth of population increases. This increased use would create a need for additional maintenance and administration in areas providing those settings and activity

opportunities most utilized by the public. The utilization of other recreation opportunity areas would also occur as the increased use saturates those areas which currently provide the most desirable settings and activities, or as new demands surface. These anticipated impacts have not been quantified but would be expected to be minor.

Visual Resources

Coal development subsequent to leasing both tracts would increase the dominance of industrial and urban landscape features in the North Fork Valley. Visual impact resulting from underground mining and associated development on the tracts would modify the natural appearing landscape in areas, but overall the scenic character of the tracts would remain natural. Visual impact would be similar through all mining years. No outstanding or unique scenic qualities would be lost.

Development of new portals and associated facilities (e.g., buildings, transmission lines, and access roads) both on and off the tracts would not be anticipated to significantly impact visual resource values. Generally, development and disturbance would be similar to existing disturbance in the areas affected. Reclamation would be effective in re-establishing the present scenic quality and character of the tracts upon completion of the mining operations.

Special Designation Areas

The Adobe Badlands and Gunnison Gorge Wilderness Study Areas could receive increased dispersed recreation use because of the coal related population increase, as would the West Elk Wilderness Area, Gunnison Gorge Recreation Lands, the Black Canyon of the Gunnison National Monument, and the Needle Rock Natural Area. However, the increase in anticipated use of these areas would be anticipated to be low as a result of coal leasing and no significant impacts would be expected.

Unavoidable Adverse Impacts

Four areas near Price, Castle Dale, Mt. Pleasant, and Alton, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. Annual TSP emissions would increase 34 percent over 1981 levels and 19 percent over the projected baseline in these areas by the year 2000. Secondary NAAQS would be exceeded in a 2,845 square mile area by the year 2000 of which 1,275 square miles would be attributed to implementation of Alternative One. The greatest contribution to the predicted concentrations would be coal related vehicular travel on unpaved roads. Visual impacts would be noticeable from many roads and highways often used for recreation purposes; however, the most significant impact to visual range would result from increased populations in towns and cities.

The loss of soil and vegetation productivity on 5,257 acres would be unavoidable. Approximately 2,503 acres would be eventually reclaimed following mining operations. The remaining 2,754 acres lost to community development,

including irrigated croplands, would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of community development. An unquantified amount of soil would be lost from disturbed areas prior to reclamation. The mining of coal in the region would result in 1,174.3 million tons of coal (62 percent) becoming unrecoverable by present technology. Changes in aquifers such as redistribution of ground water discharge and distribution of surface water due to subsidence could not be avoided. Consumptive use of water in the region would increase by 7,041 acre-feet by the year 2000. An additional 484 acre-feet would be required annually for mine development.

Consumptive water loss from the Colorado River system of 3,529 acre-feet per year due to coal mining and community development directly related to Round Two leasing in Utah and Colorado would not likely result in adverse effects on threatened or endangered fish species in the river system. However, in combination with other proposed water consumptive developments, Round Two Leasing may affect threatened and endangered fish in the Green and Colorado Rivers. Therefore, BLM has requested informal consultation with the U.S. Fish and Wildlife Service (USFWS) and has added a standard mitigating measure to the Final EIS requiring lessees to develop a plan for formal Section 7 Consultation with USFWS prior to on-the-ground development.

In affected drainage basins, tract development would result in a total sediment yield of approximately 80 acre-feet annually by the year 2000. About 48 acre-feet would come from the southern Utah tracts. Sediment from tracts in the Wasatch Plateau could end up in local reservoirs important as fisheries and community water sources. Approximately 81,266 acres would be susceptible to subsidence of up to 16 feet. Surface mining would alter topography on an additional 687 acres. The loss of wildlife due to occupation, disturbance of habitat, and illegal killing would increase. Highway mortality, mostly in central Utah, would be in excess of 200 deer and elk annually and would be unavoidable; however, vitality of the various herds should not be significantly affected. An unquantified amount of big game habitat, including winter range and calving grounds would be lost. Regionwide, the loss would be insignificant; however, in some specific areas, big game populations would be reduced.

Conversion of irrigated cropland to urban use and retirement of irrigated land to provide water for mining and community needs would result in a loss of less than 1 percent (approximately 1,978 acres) of agricultural land in the region; however losses would be relatively larger within the vicinity of certain communities.

Portions of three tracts on the Wasatch Plateau lie within Carbon County's land use zone where coal mining is not allowed. Zoning variances or rezoning would be necessary before mining could proceed. A potential conflict would exist with the Kane County Master Plan in the areas of water development and protection of irrigated croplands.

Population in the region would increase by 28,349 persons or 21 percent over the projected baseline by the year 2000. Housing needs would increase by over 8,000 units. Employment in the region would increase by 11,237 jobs or 20

percent by the year 2000 over the projected baseline. Capital and operating expenditure requirements of local counties, school districts, and municipalities would rise as a result of the need to expand public services and facilities. Unless communities plan needed improvements in advance and ensure adequate funding, there would be at least a temporary deterioration in the quality of services, causing inconvenience and dissatisfaction among those affected. These impacts would be most acute in central Utah.

Mine-related traffic would add over 20,000 vpd (21-percent increase) to highways in the region, over 13,000 of which would occur in the central Utah area. The largest increase in traffic would occur on Highway U-10 south of Price, Utah, and US-6 east of Price where travel limits would be exceeded. Traffic congestion in downtown Price would result from increased numbers of vehicles and increased numbers of coal trains going through the community. Unpaved secondary roads in the region would experience deterioration and safety problems due to increased coal related traffic.

Inadvertent destruction or disturbance of undetected cultural and paleontological resources and losses through illegal collection or vandalism could not be avoided. The increase in demand for recreational activities over the projected baseline resulting from population increases (71 percent in southern Utah, 18 percent in central Utah, and an undetermined but slight amount in west-central Colorado) could result in an undetermined amount of overutilization and crowding of existing recreation developments and reduced hunting and fishing success. The landscape modifications that would result from mining and associated development would degrade the visual quality of those areas; in some areas VRM standards would not be met.

During a major portion of the time mining related noise and fugitive dust would be detected by visitors to Bryce Canyon National Park. Overall noise level in Bryce Canyon National Park would be increased and would be perceived as significant by a majority of the visitors to the pristine National Park environment.

The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The increased population associated with mining development would result in a long-term decrease in air quality in the region.

Implementation of Alternative One would increase annual coal production in the region from 13 million tons in 1980 to about 55 million tons by the year 2000. Average annual production from the tracts alone would be 20.78 million tons when full production is reached. This would represent a significant commitment to coal mining in the region.

The short-term use of the environment for coal production and associated housing development would result in a long-term loss of soil and vegetation productivity on 2,754 acres permanently occupied by housing and acres retired from irrigation to provide water for community needs.

The extraction of 732.6 million tons (38 percent) of coal would render the remaining unmined 1,174.3 million tons (62 percent) of coal unrecoverable over the long term. Changes in aquifers and points of surface discharge due to subsidence would result in a long-term local change in surface water distribution and ground water storage. The short-term community and mining use of 7,525 acre-feet of water per year would be reduced by 484 acre-feet when mining ceases. The use of 7,041 acre-feet per year for community use would continue in the long term. Over the long-term, salinity at Imperial Dam would actually be reduced as water normally used for irrigation and returned to the system would be used for community development. This would more than offset salinity produced by active mining operations. Overall, the cumulative effect would be less than 1 percent.

Disturbance or occupation of habitat up to 40 years by mining activity would result in a long-term redistribution of wildlife populations and migration routes. Permanent occupation of 2,754 acres by urban development would cause a long-term loss of wildlife habitat occupied by pheasants, cottontail rabbits, mourning doves, and other small game. The loss of crop production on 776 acres occupied by housing and 1,202 acres retired due to conversion of water use would be a long-term loss in productivity.

The growth in population of 23,117 people in the region (21 percent over the projected baseline) would increase the area's potential productivity by enlarging its labor force, but the 11,237 jobs (20 percent over the projected baseline) associated with Federal lease mining would not continue in the long-term. Infrastructure improvement such as water systems would also contribute to increased community capacity by providing facilities useful for commerce and industry as well as the residential population. However, until these improvements are operational, deficiencies in community services could be anticipated.

Excavation and salvage of sites would expand knowledge of cultural resources in the region. The development of recreational facilities as a result of demand by the increased population would be a long-term increase in capacity of recreation developments in the region.

Irretrievable or Irreversible Commitment of Resources

Emissions attributable to coal related population growth and mining activity in the region would result in an irretrievable deterioration in air quality during the life of the mining operations. Soil and vegetation productivity on 5,257 acres would be irretrievably lost for the life of the mines or until reclamation was successful. Productivity on 2,754 acres occupied by housing or retired from irrigation would be irreversibly lost. Soil lost to wind and water erosion prior to reclamation would be irretrievable.

The 732.6 million tons of coal mined would be irreversibly lost as a resource and the 1,174.3 million tons of coal left in the ground would be irreversibly unrecoverable by present technology. Increased water consumption for mining and community needs would be irretrievable. Any change in aquifers, ground

water storage potential, or point of discharge due to subsidence would be irreversible. The increased consumptive use of water for community and mining use (7,298 acre-feet per year) would be irreversible.

Big game losses through displacement from habitat, traffic mortality, and illegal killing would be irretrievable. With these increased losses some individual herds would be adversely affected but overall vitality of the deer population would be maintained. Habitat for pheasants, cottontail rabbits, mourning doves, and other small game occupied by community development would also be irretrievably lost. Overall population vitality would be maintained, but local populations, especially in Carbon County, would be significantly reduced.

The growth in population of 23,117 persons foreseen under this alternative would be irreversible except at considerable economic and human cost. Likewise, the commitment of capital, physical resources, and labor to build over 8,000 housing units and infrastructure that would be required to support the growth in population, commerce, and industry would be an irretrievable impact. The loss of smalltown atmosphere and community solidarity in some communities as a consequence of coal development would be irreversible.

Development of the coal mines as proposed would result in the irretrievable consumption of over 300 million gallons of petroleum fuels.

The loss of cultural and paleontological resources in context would be irretrievable and any loss of interpretive values would be irreversible. The adverse impacts to visual resources would be irretrievable for the life of the mines, but in most cases would be reversible following reclamation. However, any loss of high quality scenery that would occur from surface mining the Blue Trail Canyon tract would be permanent. Noise produced by coal development in southern Utah could result in an irretrievable degradation of a recreation experience to some visitors to Bryce Canyon National Park.

Significant Cumulative Impacts

The cumulative impact assessment was developed by adding the impacts of Alternative One to those of the baseline (Alternative Four) for the year 2000. Only the most significant impacts are summarized below. The cumulative impacts are discussed by geographic area, i.e., central Utah, southern Utah, and west-central Colorado, to allow meaningful comparisons to present conditions within each area.

Central Utah

By the year 2000, in central Utah there could be a 112-percent increase in TSP emissions over the 1981 emission levels. Three areas would exceed primary NAAQS for TSP and there could be approximately a 2,470 square mile or 1,500-percent increase in area where the secondary NAAQS for TSP would be exceeded. About 1,040 square miles or 45 percent of the increase would be attributable to Alternative One.

Visual range from selected points in Canyonlands and Capitol Reef National Parks would be reduced by 6 to about 64 percent during 1 percent of the time. Such reductions could be perceptible to park visitors. Also, during 1 percent of the time a plume may be visible looking from Cathedral Valley in Capitol Reef National Park to the San Rafael Swell. About 21 to 24 percent of the reduction would result from Alternative One.

Community development resulting from mining would result in a permanent loss of soil productivity for about 2,685 acres by the year 2000. Approximately 985 acres or 37 percent of the loss would be attributable to Alternative One. Up to 123,562 additional acres of surface would be subject to subsidence of which 57 percent would be affected by Alternative One. A maximum subsidence of 16 feet with surface fractures could result.

An estimated 12,529 acre-feet of water would be required by the year 2000 for coal development and selected population growth of which 38 percent would be required by Alternative One. About 6,438 acre-feet of water would be consumptively used. This is about 0.44 percent of Utah's share of Colorado River water.

Projected mining activities would disrupt local aquifers, alter local ground water flow systems and cause redistribution of natural ground water flow systems. These impacts are not quantifiable but about 193 additional square miles would be subject to mining.

The four-county population would increase from an estimated 69,598 in 1982 to 117,977 in 2000, a 70-percent increase. Alternative One would contribute about 17,777 people or 36 percent of the increase. Corresponding increases in hunters, fishermen, and ORV use can be expected. The presence of a larger human population would exert greater pressures on wildlife populations through legal and illegal harvest, harassment, and displacement from habitat.

Cumulative loss of pheasant habitat would be insignificant on a regional basis but locally a 13-percent reduction in cock harvest could result in Carbon County.

Irrigated cropland lost as a result of community expansion and retired due to use of water for community purposes would be about 3,357 acres or 1.5 percent of the four-county agricultural land base. About 1,232 acres or 37 percent of the affected acreage would result from Alternative One. The retired lands would be among the most favorable for agricultural use in the four-county region.

By the year 2000 the four-county population would increase approximately 70 percent over the 1982 level which would lead to similar increases in the demand for housing, water connections, and other community infrastructural services. Front-end financing of these services would be a major problem and the quality of community services could deteriorate.

Traffic congestion would occur on U-10 between Price and Castle Dale, and on US-6 across Soldier Summit. Severe traffic congestion would occur in downtown Price as increased numbers of vehicles would be blocked by increased numbers

of coal trains. Alternative One would contribute to an already poor situation. Nearly all highways affected by proposed coal development are approaching or have already exceeded the 20-year design traffic volume and the need for maintenance would increase.

By the year 2000 total population growth would increase the local recreational demand by approximately 70 percent over 1982 levels. By itself, Alternative One would increase the demand by only 26 percent. Such increases would result in overcrowding, user dissatisfaction, and deterioration of the environment at many sites in the four-county region.

Because of large increases in population, overcrowded conditions and user dissatisfaction at recreational facilities in towns and cities would also accelerate.

Southern Utah

By the year 2000, in southern Utah there would be a 480 percent increase in TSP emissions over the 1981 emissions level. There would be approximately a 185 square mile increase in area where the secondary NAAQS for TSP would be exceeded. About 89 percent of the increase would be attributable to Alternative One.

Visual Range from Yovimpa Point in Bryce Canyon National Park would be reduced from present conditions by about 3.3 percent.

Community development resulting from mining would result in a permanent loss of soil productivity on about 634 acres by the year 2000. Approximately 467 acres or 74 percent of the loss would be attributable to Alternative One.

An estimated 2,988 acre-feet of water would be required by the year 2000 for coal development and related population growth of which 75 percent would be required by Alternative One. About 1,551 acre-feet of water would be consumptively used. This is about 0.10 percent of Utah's share of Colorado River water. In conjunction with water requirements in central Utah, 0.54 percent of Utah's share of Colorado River water would be required for Alternative One.

The two-county population would increase from an estimated 8,800 in 1982 to 20,207 in the year 2000 for an increase of 130 percent. Alternative One would account for about 8,400 people or 75 percent of the increase. Corresponding increases in hunters, fishermen, and ORV use can be expected. The presence of a larger human population would exert greater pressures on wildlife populations through legal and illegal harvest, harassment, displacement from habitat, and highway mortality. Deer herd unit 60A would require even stricter control by the UDWR.

Irrigated cropland lost as a result of community expansion and retired due to use of water for community purposes would be about 793 acres or 1.7 percent of the two-county agricultural land base. About 584 acres or 74 percent of the loss would result from Alternative One. The affected irrigated croplands would be among the most favorable for agricultural use in the two-county region.

By the year 2000 the two-county population would increase approximately 130 percent over the 1982 level which would lead to similar increase in the demand for housing, water connections, and other community infrastructural services. Front-end financing would be a major problem and the quality of community services could deteriorate.

Traffic in Kanab would more than double by the year 2000 and traffic on Main Street would become congested.

By the year 2000 total population growth would increase the local recreational demand by 130 percent over 1982 levels. By itself Alternative One would increase demand by 96 percent. Such increases would result in overcrowding, user dissatisfaction, and deterioration of the environment at many sites in the two-county region.

Because of increases in population, overcrowded conditions and user dissatisfaction at recreational facilities in towns and cities would also accelerate.

West-Central Colorado

Subsidence could occur over areas that have been or would be mined in Delta County by the year 2000. The amount of surface that could be impacted is undetermined but would be greater than anticipated for Alternative One or Four independently. Some unquantifiable impacts to water resources, roads, pipelines, and ditches could result from overburden fracturing and subsidence.

By the year 2000 consumptive water use for mining and related community development would be about 857 acre-feet per year. This would reduce the average annual flow of the Gunnison River in Northern Delta County by about 0.08 percent. By the year 2000, the human population in Delta County would increase about 24 percent over the 1982 level. This would lead to increased poaching, hunting, and fishing pressure, more wildlife disturbance, and increased wildlife highway mortalities.

Community expansion and water leasing needs would remove or retire approximately 272 acres of irrigated cropland in Delta County by the year 2000. About half of the affected croplands would be prime and unique farmland. Leasing of the two proposed tracts would be responsible for about 172 acres of the affected land. Overall, less than 1 percent of the Delta County's agricultural land would be lost. Delta County's population would increase from 22,830 in 1982 to 28,212 in the year 2000. The communities of Delta, Orchard City, and Cedaredge would experience difficulty in financing infrastructural and education and recreational expansion to meet increased demands.

Alternative Two: (Preferred Alternative)

High Level (1.670 Billion Tons)

The following analysis addresses the projected impacts of Alternative Two in central Utah. The impacts of implementing Alternative Two on southern Utah and west-central Colorado would be identical to those described for Alternative One and are not repeated here.

Central Utah

Climate, Air Quality

Air Quality

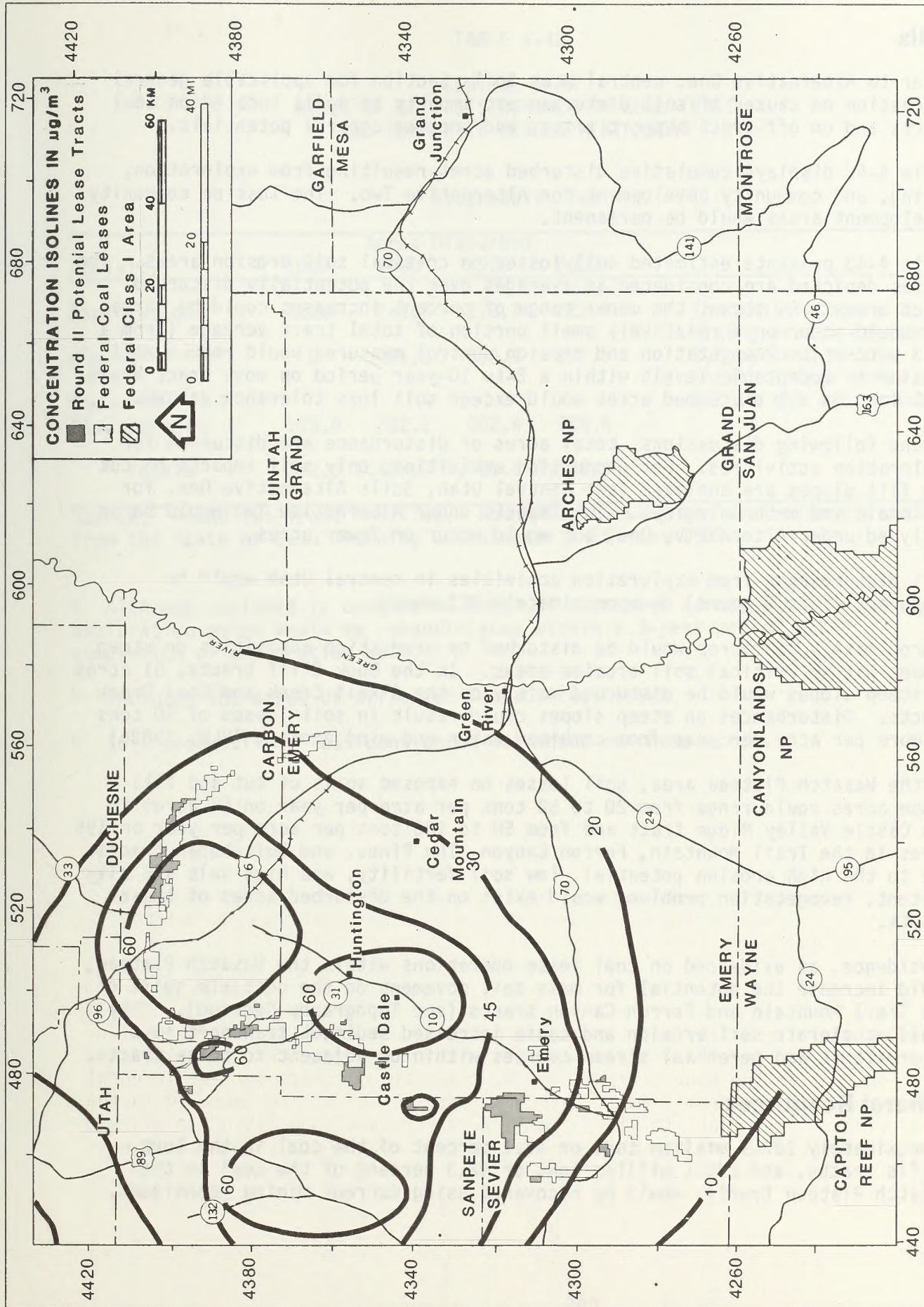
The models as discussed for Alternative One were also used to develop the Alternative Two analysis.

Development of the 15 central Utah tracts would increase emissions of all pollutants covered by the NAAQS. Estimated increases were considered significant only for particulates; therefore it was the only pollutant modeled. Total annual TSP emissions are projected to increase by 7,323 tons over the 1982 level of 111,981 tons per year and the projected baseline of 204,273 tons per year by the year 2000. Therefore, by the year 2000 TSP emissions due to Alternative Two are estimated to increase by 7 percent over 1982 levels and 4 percent over the projected baseline. Figure 4-9 shows the estimated annual average ground level TSP concentration. A background concentration of 15 micrograms per cubic meter should be added to the annual average values shown. Three areas near Price, Castle Dale, and Mt. Pleasant are predicted to exceed the primary NAAQS for TSP. Secondary NAAQS is presently exceeded within a 160-square mile area; by the year 2,000 secondary NAAQS would be exceeded within a 2,355-square mile area, of which 925 square miles would result from Alternative Two developments. The greatest contribution to the predicted concentrations would be vehicular travel on unpaved roads.

Maximum 24-hour TSP concentrations would occur near Price. The impacts to Class I PSD areas would be less than 1 microgram per cubic meter, due to dispersion and deposition over the long transport distances.

Visibility

The regional visibility impacts as discussed for Alternative One would also apply to Alternative Two. In summary, the visual range reduction values looking towards the Book Cliffs from the five National Park Service integral vistas would range from 1 to 13 percent greater than that anticipated in the year 2,000. The impact to visual range from increased population in cities and towns would be greater than the impact from coal production activities.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-9
 AVERAGE ANNUAL TSP CONCENTRATIONS IN CENTRAL UTAH — YEAR 2000
 ALTERNATIVE TWO

Soils

Refer to Alternative One, central Utah Soils Section for applicable general discussion on causes of soil disturbances, impacts to soils located on coal tracts and on off-tract support sites, and erosion control potentials.

Table 4-42 displays cumulative disturbed acres resulting from exploration, mining, and community development for Alternative Two. The loss on community development areas would be permanent.

Table 4-43 presents estimated soil losses on critical soil erosion areas. The losses depicted are considered as averages over the potentially disturbed tract areas. As shown, the upper range of percent increases could be large, but would occur on a relatively small portion of total tract acreage (from 1 to 3 percent). Revegetation and erosion control measures would reduce soil erosion to acceptable levels within a 2-to 10-year period on most tract areas. Soil loss on all disturbed acres would exceed soil loss tolerance values.

In the following discussions, total acres of disturbance are discussed for exploration activities. For production activities, only soil impacts on cut and fill slopes are analyzed (see Central Utah, Soils Alternative One, for rationale and methodologies). The impacts under Alternative Two would be as analyzed under Alternative One, but would occur on fewer acres.

Soil disturbances from exploration activities in central Utah would be temporary (1 to 2 years) on approximately 223 acres.

Approximately 313 acres would be disturbed by production activities on steep slopes within critical soil erosion areas. In the Book Cliff tracts, 51 acres of steep slopes would be disturbed mainly on the Alkali Creek and Coal Creek tracts. Disturbances on steep slopes could result in soil losses of 50 tons or more per acre per year from combined water and wind erosion (BLM, 1982b).

In the Wasatch Plateau area, soil losses on exposed soils of cut and fill slope acres could range from 20 to 50 tons per acre per year on 67 acres in the Castle Valley Ridge tract and from 50 to 100 tons per acre per year on 195 acres in the Trail Mountain, Ferron Canyon, The Pines, and Quitchupah tracts. Due to the high erosion potential, low soil fertility, and high salt and clay content, revegetation problems would exist on the disturbed acres of these tracts.

Subsidence, as evidenced on coal lease operations within the Wasatch Plateau, could increase the potential for mass soil movement on the unstable soils of the Trail Mountain and Ferron Canyon tracts (see Topography Section). This could accelerate soil erosion and cause increased sediment transport into intermittent and perennial stream courses within or adjacent to these tracts.

Mineral Resources

Approximately 107.9 million tons or 47.1 percent of the coal in the Book Cliffs tracts, and 295.1 million tons or 42.3 percent of the coal in the Wasatch Plateau tracts, would be recovered using current mining techniques.

TABLE 4-42

CENTRAL UTAH
ACRES OF SOIL DISTURBANCE ON COAL TRACT
AND COMMUNITY DEVELOPMENT AREAS

Alternative Two

Activity	Acres Disturbed				
	1987	1990	1995	2000	
Exploration ^a	222.7	222.7	222.7	222.7	The exploration and mining acres represent 2.7 percent of the total surface acres within the coal tracts.
Mining ^b	0	921.8	956.4	977.5	
Community Development ^c	159.9	282.2	802.4	968.4	
Totals	382.6	1,426.7	1,981.5	2,168.6	

Source: Round Two Tract Profiles. Round Two Leasing and socioeconomic data from the State of Utah Planning Coordinator's Office, 1982.

^a Although included in cumulative total of disturbed acres, these exploration acres would be rehabilitated within a 3-year period after completion of exploration work.

^b Includes 100 acres of off-tract loadout facilities.

^c Soil productivity loss considered permanent on these acres.

TABLE 4-43

CENTRAL UTAH
ESTIMATED SOIL LOSSES^a ON CRITICAL SOIL EROSION AREAS
ALTERNATIVE TWO

Coal Tracts	EXPLORATION ACTIVITIES			PRODUCTION ACTIVITIES		
	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments
Book Cliffs Tracts	0.5 to 3.0	5.0 to 50.0	4.5 to 47.0	900 to 1600	900 to 1600	Same as shown for exploration ^d
Alkali Creek,		(Moderately steep areas)				
Coal Creek, Graves		50.0 to 100.0	49.5 to 97.0	1000 to 3200	0.5 to 3.0	5.0 to 50.0
Hoffman Creek,		(steep escarpment areas)				4.5 to 47.0
Soldier Creek,						
and Whitmore Park						
Wasatch Plateau Tracts						
Gooseberry, and	0.2 to 22.0	20.0 to 50.0	19.8 to 28.0	130 to 100	Same as shown for exploration.	
Castle Valley Ridge						
Trail Mountain,	20.0+	50.0 to 100.0	30.0 to 80.0	150 to 400	Same as shown for exploration.	
Ferron Canyon, The						
Plines, & Quitcupah						

^a Tons per acre per year in water erosion rates on steep slopes unless otherwise indicated. Lack of site specific project and soil survey information prevents projection of cumulative total soil losses from construction activities on critical soil erosion areas as compared to total cumulative soil losses from natural erosion on these same areas.

^b Source: Table 3-4.

^c Site specific analyses for coal tracts to be included in the Ultra-Southwest Utah Coal Region Environmental Impact Statement: Round Two Leasing.

^d Soil loss for production activities on the Book Cliffs tracts would be the same as for exploration activities with the exception of utility line routes where soil loss with tract development would be 0.5 to 20.0 tons per acre per year.

The mining of coal would result in total depletion of the coal resource as 552.3 million tons of unrecoverable coal, though still in the ground, would no longer be available as a mineral resource given present mining technology.

Surface and subsurface mining activities and subsidence could hinder the subsequent exploration and location of facilities related to oil and gas development in the Book Cliff and Wasatch Plateau areas. The potential reduction in recoverable resources cannot be estimated (see Land Uses).

Topography, Geology, Paleontology

Construction of surface facilities would cause permanent changes in topography on 1,100 acres in central Utah.

The subsidence impacts described for central Utah under Alternative One would also result under Alternative Two, but topography would be altered as a result of subsidence on portions of 43,900 total acres. Tension cracks, buckling, and troughs could be expected in these areas.

Moore and Nawrocki (1980) predict a maximum subsidence of 12 feet in the Book Cliffs and 16 feet in the Wasatch Plateau. Because of shallow overburden, the effects of subsidence would be greatest on the Ivie tract. The lateral extent of the surface effects of subsidence could be considerably less than the area above the extracted coal, but theoretically could range up to 168 to 170 percent of the mined area.

As discussed for Alternative One, significant plant fossils used for correlation and paleo-environmental guides could be destroyed by coal removal activities in the fossil-rich Blackhawk Formation of the Book Cliffs and Wasatch Plateau Coal Fields. Significant disturbances to other scientifically important fossils would be avoided if mitigating measures are followed (Appendix 3). Surveys and mining activities could also expose new fossils and enhance paleontological studies.

Water Resources

Anticipated impacts on water resources as discussed under Alternative One for the central Utah tracts would also occur under Alternative Two.

Surface Water

Annual sediment yields on the lands that would be disturbed by mining and associated development of the 15 central Utah tracts could increase to about 25 acre-feet by the year 2000 (Table 4-44). This is .07 percent of the estimated combined annual sediment yield in the Green and Dirty Devil River basins.

Table 4-45 shows by river drainage basins the estimated increase in annual sediment yields from areas that would be disturbed by maximum development of the central Utah tracts.

TABLE 4-44
 CENTRAL UTAH
 IMPACTS ON WATER RESOURCES AND REGIONAL SIGNIFICANCE
 ALTERNATIVE TWO

Item	1987	1990	1995	2000
Water requirement (acre-ft/year)				
Mining and exploration	89.0	222.4	222.4	222.4
For public supply	725.2	1280.8	3639.5	4392.8
Total	814.2	1503.2	3861.9	4615.2
Consumptive water use				
Total (acre-ft/year) ^a	451.6	862.8	2042.2	2418.8
Percent of runoff ^b	0.01	0.02	0.04	0.05
Increased annual sediment yield				
Total (acre-ft)	4.5	16.7	23.2	25.4
Percent ^c	0.01	0.04	0.06	0.07
Increase in salinity				
(milligrams per liter) ^d	0.04	0.07	0.18	0.21

^a Assumes 50 percent of withdrawal for public supply and 100 percent of withdrawal for exploration and mining.

^b Percent of combined average annual runoff of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, Utah.

^c Percent of estimated annual yield upstream from the stations cited in footnote b.

^d As determined at Imperial Dam. Does not include reduction in salinity from reduced irrigation return flow.

TABLE 4-45

CENTRAL UTAH
SEDIMENT YIELD INCREASE

ALTERNATIVE TWO

River Drainage Basins	Estimated Increase in Sediment Yield (acre-feet per year)	Percent of estimated annual basin yield
Price River	11.1	0.96
Dirty Devil River	7.8	0.64
Sevier River	5.2	0.17
San Rafael River	1.3	0.13
Total	25.4	N/A

Development of the Gooseberry tract in the Upper Price River subbasin could increase annual sediment inflow to Scofield Reservoir by less than 0.06 acre-feet. This is less than 0.11 percent of the average annual inflow from 1943 through 1979. The effect on the life and utility of the reservoir would be small. The effect of increased sediment production due to development of the Ferron Canyon tract would have a slightly larger impact on the life and utility of Millsite Reservoir. Annual sediment yields for acres disturbed by development of the Ferron Canyon tract could increase by an estimated 1.2 acre feet, or about 1.0 percent of the estimated annual sediment inflow to Millsite Reservoir.

Development of the 15 central Utah tracts would have only a minor impact on surface-water quality in the general area of the tracts, access roads, loadouts, and affected communities. The regional impact on water quality would be negligible. However, there could be serious local impacts due to increases in sediment yield or accidental spills of contaminants.

Water discharged from mines would generally increase the salinity in the receiving stream up to 2 or 3 milligrams per liter. Localized changes on small intermittent streams would be larger. Except in the case of transbasin diversion of water by mines and possible contamination of the mine water, the salt load of the receiving streams would not be significantly increased. Any increase in salt loading from mine dewatering would be negligible compared to the salt loading from irrigated lands in the lower stream reaches, especially those in the Price, San Rafael, and Dirty Devil River basins.

Recent GS studies by the (K.M. Waddell, written communication, GS, 1983) indicate that Scofield Reservoir in the Upper Price River basin is borderline between meso-eutrophic and eutrophic. Accidental pollution and pollution control failures on the Gooseberry tract could add nutrients to streams flowing into Scofield Reservoir. This would contribute to eutrophication of the reservoir for short periods of time.

According to the GS study there is no indication that present and past mining in the Scofield Reservoir basin has increased dissolved trace element concentrations in the reservoir water. Considering the amount of mining that has been done in the basin to date, it seems unlikely that mining of the tracts would significantly increase trace element concentrations in the reservoir or in runoff.

By the year 2000, 4,615 acre-feet per year more water would be diverted for mining and associated population growth under the Alternative Two. The annual consumption rate would be 2,419 acre-feet (Table 4-44). Salt concentration resulting from withdrawal of the water and salt loading resulting from return of the unconsumed water (chiefly from fluid-waste disposal systems) would have a minor effect on the salinity of the Colorado and Sevier Rivers. For example, the salinity of the Colorado at Imperial Dam would be increased by an estimated 0.21 milligrams per liter which is negligible compared to the salt loading of irrigation and natural runoff from the salt-bearing Mancos Shale.

Rock fracturing associated with the subsidence tends to divert more snowmelt and rainfall underground increasing ground-water recharge at the expense of overland runoff. Fracturing, could divert ground water and either reduce or increase the flow of springs that provide base flow to headwater streams. Subsidence-caused fracturing could also divert streamflow directly underground if the fracture intersects a stream channel and remains open.

Springflow and streamflow diverted underground by subsidence-caused fracturing would not be lost from the hydrologic system and might not be lost from the drainage subbasin in which it originates. The water would move through newly formed fractures and would degrade in quality more rapidly than it would as overland runoff. The chance of a subsidence-caused fracture reaching the land surface and diverting the flow of even one spring (or headwater stream) is very small.

Ground Water

Mining and mine dewatering would create pressure gradients in the local ground water systems causing ground water to move toward the mine workings. This could induce the movement of saline water (such as that found in the Mancos Shale) into freshwater aquifers such as the Star Point Sandstone, thus locally reducing the quality of the freshwater aquifers (Lines et al., 1982).

Underground mine workings would disrupt local ground water flow systems in the Blackhawk Formation and adjacent formations causing a redistribution of ground water discharge. New discharge points would generally be in the same drainage subbasins as the former natural discharge points, however, several of the tracts straddle the divides between drainage subbasins and mine workings would divert water from one subbasin to another. Mining of the Book Cliffs tracts could divert some ground water from the Uintah Basin to the Price River basin.

The volume of ground water that would be diverted from one drainage subbasin to another is probably very small compared to the total water yield of the individual subbasins affected. The fine grained, poorly permeable beds of the

Book Cliffs probably transmit about 30 acre-feet of water per year from the tracts to the Uinta Basin. This is only about 0.02 percent of the estimated mean annual runoff from the southern Uinta Basin as estimated by Price and Miller (1975). Proportionately small amounts of water probably are transmitted through the rocks in the area of the other central Utah tracts assuming mine workings on those tracts do not intersect as yet unmapped faults similar to those intersected in the Wilberg and Deer Creek mines.

Water Supply and Use

Development of the 15 central Utah tracts would require up to 4,615 acre-feet of water per year for mining and public water supply needs (Table 4-44). An estimated 2,419 acre-feet of water per year would be consumed annually. This is about 0.05 percent of the combined average annual runoff in the Green River at Green River, Utah and the Dirty Devil River near Hanksville, Utah. The estimated volume consumed annually would be about 0.16 percent of Utah's share of Colorado River water. Impacts on the available supply in individual drainage subbasins could be larger. Table 4-46 shows the estimated annual mine-and-population-related water requirement from affected drainage subbasins as related to average annual discharge at maximum flow gaging stations.

Maximum annual water requirement from affected drainage subbasins would range from about 0.5 percent of the annual discharge in the Sevier River basin to about 2.6 percent of the discharge of the Price River.

Vegetation

Implementation of this alternative involving development of coal on 15 central Utah tracts would directly disturb a total of 1,200 acres of vegetation by the year 2000. This disturbance would result from exploration activities, construction of surface facilities, access roads, powerlines, and loadout facilities. The majority of this disturbance would occur in the Pinyon-Juniper Woodland and Conifer-Aspen forest (Table 4-47).

An additional 1,757 acres of vegetation would be lost or altered as a result of community expansion and mine water use. By the year 2000, 968 acres of land would be required for community housing of which 484 acres would be irrigated croplands. In addition, 789 acres of agricultural lands would be retired from irrigation to provide water for mining and community needs. Table 4-47 summarizes disturbance by year and vegetation type.

Since mining plans have not been submitted or housing areas identified, the figures used are only estimates based on projected areas of development and the percentage of vegetation types found in those areas. The actual acreage of vegetation types that would be disturbed, should this alternative be implemented, may vary from these projected figures.

While cumulative vegetation disturbance would total 2,957 acres, actual activities resulting in vegetation loss would occur at different periods of time following lease issuance. As a result, disturbed portions of the acreage identified in Table 4-47 would be in various stages of reclamation by the year

TABLE 4-46
CENTRAL UTAH WATER REQUIREMENTS COMPARED TO RIVER BASIN RUNOFF

ALTERNATIVE TWO

River Drainage Basin	Gaged site (Figure 3-4)	Combined average annual discharge at gaged site (acre-feet)	Approximate total Round Two Leasing water requirement	
			Acre-feet	Percent of average annual gaged discharge
Price River	18	103,600	2,752.3	2.6
San Rafael River	46, 47	96,940	689.4	0.7
Dirty Devil River	55	16,820	318.2	1.9
Sevier River	58	162,300	855.3	0.5
Total	N/A	N/A	4,615.2	N/A

TABLE 4-47

CUMULATIVE VEGETATION DISTURBANCE BY
VEGETATION TYPE: CENTRAL UTAH

ALTERNATIVE TWO

Vegetation Type	Direct Mining Impacts ^a (Acres)				Indirect Impacts ^b (Acres)	Total ^c
	1987	1990	1995	2000	2000	2000
Agriculture	-	-	-	-	1269.2 ^d	1269.2
Desert Shrub	1.0	85.0	85.0	85.0	105.3	190.3
Sagebrush-Grass	49.0	102.1	115.9	120.9	10.5	131.4
Pinyon-Juniper Woodland	14.8	377.7	396.5	408.6	283.6	692.2
Mountain Brush	3.9	50.9	51.9	51.9	20.4	72.3
Ponderosa Pine	15.0	123.1	123.1	125.1	-	125.1
Aspen	8.0	36.8	36.8	36.8	-	36.8
Conifer-Aspen	81.5	272.9	272.9	274.9	-	274.9
Non-Productive	4.0	11.0	12.0	12.0	67.9	79.9
Other (Douglas fir, Mountain Meadow, Grassland, etc.)	45.5	85.0	85.0	85.0	-	85.0
TOTAL	222.7	1144.5	1179.1	1200.2	1756.9	2957.1

a Includes surface facilities, portal access, mining operations, exploration activities, powerlines, ventilation construction, and loadouts.

b Total lands lost to community development including agricultural lands retired from irrigation to provide water for community needs. This acreage was computed for the year 2000 only and does not include 75 acres of irrigated cropland that would be retired for exploration water requirements from 1987 through 1990.

c Total vegetation disturbance by the year 2000.

d Includes 484.1 acres lost to community development, 788.5 acres retired from irrigation to provide water for mining and community needs.

2000. The following summarizes major vegetation disturbing activities and if or when vegetation reclamation would likely occur.

Exploration activities involving construction of drill pads and access roads would disturb a total of 223 acres by the year 1990. By the year 2000 this acreage, while included in the cumulative total of acres disturbed, would be in advanced stages of reclamation.

Implementation of this alternative would result in the loss of 978 acres of vegetation for which no reclamation would begin until completion of mining activities. This would include areas used for surface facilities, portal access, powerlines, ventilation installation, and loadout facilities. Certain access roads may continue to be used for other purposes following completion of mining and would not be reclaimed. Agricultural and nonagricultural lands surrounding local communities that would be lost to community expansion or retired from irrigation to provide water for community expansion would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of residential development.

Even though less than 50 acres of Douglas fir communities in the Book Cliffs would be removed, it would represent a permanent commitment of the resource as the stands are not reproducing themselves. The areas disturbed would eventually revert to a Mountain Brush community.

Implementation of this alternative would not directly impact any listed or candidate threatened or endangered plant species; however, inadvertent destruction of threatened or endangered species found in the region could occur through housing development, off-road vehicle activities, or unlawful collecting of these species.

For areas that would be reclaimed, the duration of the impact of total vegetation loss would depend upon the success of reclamation. As discussed in Alternative One, because of the well developed soils and annual average precipitation of 25 inches, reclamation attempts on the Wasatch Plateau and Book Cliffs tracts are expected to be 50 to 80 percent successful (Hagihara et al., 1972). On steep slopes and poorly developed soils in this area, 30 percent of revegetation attempts are expected to be successful.

Reestablishment of native species would be expected to occur through natural succession over the long term. On areas of Aspen-Conifer, Ponderosa Pine, or Pinyon-Juniper Woodland, restoration to the original type would take longer. Fifteen to 20 years or more would be required for a return to original conditions.

Wildlife

Terrestrial

The surface disturbance from production activities of 878 acres by the year 2000 could decrease the deer populations in herd units 33, 34, 35, 36, 38, 43, and 45 by 117 deer. Elk loss from habitat destruction including migration routes and calving grounds would be 28 animals per year or 0.3 percent of the

potential Manti elk herd. The majority of the elk loss would be in critical winter range. No comparable losses of elk from the proposed mining activity would occur in the Avintaquin-White Rocks-Anthro-Argyle herd unit (Table 4-48).

Encroachment by mining activity on mountain lion and black bear home ranges, illegal killing, and loss of prey species such as deer and elk would reduce lion and bear populations by an unknown amount until reclamation was completed. The increased development and widespread human disturbance on this range would cause abandonment of some home areas and a reduction in size or use of others.

Acreage utilized in community development would be irreversibly lost as wildlife habitat. Half of the acreage would come from irrigated cropland adjacent to expanding communities. Many species inhabit these lands, notably pheasants, cottontail rabbits, doves, small birds, and mammals. With 1,273 acres of irrigated agricultural land committed to urban use or retired by 2000 (subdivisions and water right purchases), the regional pheasant population could be reduced by 329 birds potentially reducing the cock harvest by 241. Regionally this would be insignificant, but in Carbon County where about one-half of the community development would occur, the potential cock harvest loss would be up to 5.7 percent of the average annual harvest.

Surface expression of subsidence such as cracks, bulges, and displacements are not expected to directly affect wildlife, but any reduction or elimination of surface water flows and associated vegetation communities could adversely affect some species. Loss of water sources would result in reduced utilization of habitat by mobile species such as deer, elk, beaver, and birds, and elimination of species such as small mammals, reptiles, and amphibians that are unable to relocate. Because of lack of data on wildlife populations and the unpredictability of subsidence and its effects, the number of animals that could be affected cannot be quantified. At the projected production level up to 43,900 acres would be susceptible to subsidence.

Construction of a minimum of 39 miles of new utility lines (estimated length of new utility and new portal access) in the area would provide additional perching and hunting sites for raptors. This would be a beneficial impact; however, use of these structures along roadsides or in areas open to human access would expose the birds to illegal shooting and disturbance (BLM, 1981a). The extent of losses from this activity cannot be tabulated but approximately 12 miles of the new utility lines would be adjacent to portal access roads.

With this proposed level of production, 59 miles of new and improved portal access roads would be needed for access and truck hauling of coal. Most of these roads would be in deer and elk summer and winter ranges and vehicle traffic on them would present an additional hazard to wildlife (BLM, 1981). In the 1980-81 field year 292 deer were recorded as traffic mortalities in deer herd units 33, 34, 35, 36, 3, 43, and 45. By 2000 the 19-percent increase in traffic from coal hauling and commuting could increase the deer traffic mortality on existing roads to 347 animals per year. An additional

TABLE 4-48

CENTRAL UTAH
BIG GAME HABITAT DISTURBANCE
ALTERNATIVE TWO

Tract	Acres Disturbed	Plant Community	Wildlife ^a Use	Species	Losses/ ^b Year
Alkali Creek	39.1	P-J/P. Pine ^c	HP Winter	Deer	5
Coal Creek	83.5	P-J/Sagebrush	HP Winter	Deer	6
Graves	0	P-J	HP Winter	Deer	2
Hoffman Creek	0	-	-	-	-
Soldier Creek	11.8	Sagebrush	S Summer	Deer	1
Whitmore Park	0	-	-	-	-
Acord	0	Sagebrush	HP Summer C Winter	Deer Elk	0 0
Castle Valley Ridge	155.0	Conifer/ Grass	HP Summer HP Summer	Deer Elk	26 7
Ferron Canyon	129.9	P-J/ Sagebrush	HP Winter HP Winter	Deer Elk	10 7
Gooseberry	34.1	Aspen/Grass	HP Summer HP Summer	Deer Elk	13 2
Ivie	2.0	Mt. Shrub	S Winter C Winter	Deer Elk	0 0
Quitcupah	155.1	P-J/P.Pine	C Winter C Winter	Deer Elk	11 7
Skumpah	76.0	Mt. Shrub	HP Summer C Winter	Deer Elk	18 4
The Pines	114.1	P-J/Sagebrush	C Winter C Winter	Deer Elk	21 5
Trail Mountain	76.9	P-J/Sagebrush	HP Winter	Deer	4
Totals	877.5			Deer Elk	117 28

^a See Appendix 8. HP, High priority; S, Substantial; C, Critical

^b Includes 0.1 mile influence zone. Based on optimum herd management level objectives Deer/acre/habitat type, UDWR, 1981a.

^c Pinyon-Juniper/Pinyon pine

176 deer could become traffic mortalities on new roads (Table 4-49). However, this could decrease after the initial years of use because of habituation and dispersal of deer by human activity. Total traffic mortality (523) when combined with habitat losses would result in the loss of 1 percent of the region's deer population. Elk mortality due to increased traffic has not been estimated but is expected to be low.

Heavily traveled portal access roads could be a limiting factor to small, isolated animal populations and become a barrier to small animal movement especially among forest dwelling species (BLM, 1981a).

The escarpments of the Wasatch Plateau and the Book Cliffs are favored nesting sites for raptors especially golden eagles. Nesting concentrations are located in the south Wasatch Plateau and around Alkali Creek in the Book Cliffs. Impacts to raptor nesting sites would be as analyzed for Alternative One, central Utah.

The human population increase in 1987 is expected to be 3 percent above the projected baseline, peaking at 17 percent above by 2000. Similar increase in hunters, fishermen, and ORV use (Recreation Section) would result. The presence of a larger human population and pressures on the wildlife populations through harvest, harassment, and displacement from habitat would be as analyzed in Alternative One, central Utah.

By 2000 an additional 4,175 2-wheel drive and 4-wheel drive trucks could be located in the four-county region. An increase in unregulated use of unimproved roads on the Wasatch Plateau and Book Cliffs would result and would adversely affect the elk habitat in the Manti herd unit (Lyon, 1979). This effect would also apply to other wildlife species inhabiting these areas.

Assuming a rate equal to the reported increases in population and issued citations discussed for Alternative One, the 17 percent human population increase projected by the year 2000 could result in a 62-percent increase in illegal taking of wildlife. Illegal killing of wildlife could significantly reduce big game populations.

Fisheries

Pollution of fisheries from coal wastes and coal mine drainage would not be anticipated with reasonable enforcement of applicable State and Federal laws. The impacts resulting from accidental mine related pollution, including fugitive dust from coal hauling trucks would be as analyzed for Fisheries in Alternative One. Such impacts would affect fisheries in Straight Canyon, Ferron and Salina Creeks.

Ferron Creek, Muddy Creek, Quitcupah Creek, and some tributaries of Huntington Creek could suffer dewatering in short sections if subsidence occurred and altered the channels. Mitigation measures could repair the channel and restore the flow avoiding permanent damage and total loss of fisheries.

TABLE 4-49

CENTRAL UTAH
POTENTIAL DEER TRAFFIC MORTALITY FROM NEW ROADS
ALTERNATIVE TWO

Tract	New Roads (miles)	Deer Range ^a	Deer Loss/ Year ^b	Mine Life ^c
Alkali Creek	1.6	HP Winter	2	25
Coal Creek	4.8	HP Winter	6	40
Soldier Creek	0	S Summer	0	40
Acord	0	HP Summer	0	18
Castle Valley Ridge	14.1	HP Summer	69	40
Ferron Canyon	11.7	HP Winter	28	20
Gooseberry	1.5	HP Summer	10	40
Ivie	0	S Winter	0	40
Quitcupah	8.5	C Winter	13	40
Skumpah	4.05	HP Summer	16	40
The Pines	7.9	C Winter	19	40
Blue Trail Canyon	2.1	Yearlong	0	20
Trail Mtn.	4.6	HP Winter	13	40
Totals	58.75		176	

^a See Appendix 8. HP, High priority; S, Substantial; C, Critical

^b 1,280 acres (1 mile each side of road) X road length/deer density X 0.076 = deer loss/year. Divided again by 2 because occupancy of summer or winter range for 6 months.

^c Deer losses at this rate only apply to initial years of road use.

Fishing pressure on popular waters such as Electric Lake, Huntington Creek, Joe's Valley Reservoir, Scofield Reservoir, Johnson Valley Reservoir, and Fish Lake could require additional hatchery production or limited harvests.

Threatened or Endangered Species

No significant impacts to threatened or endangered species or known habitats would be expected. However informal consultation has been initiated with USFWS to confirm these findings and to determine the overall impact to threatened and endangered species in connection with other central Utah projects (e.g. tar sand development).

Land Use

Agriculture and Range

During the construction and production phases of coal resource development there would be changes from grazing to mining and support uses, from agricultural land to community use, and from irrigated cropland to retired cropland. Table 4-50 displays projected total acres of temporary and permanent land change by activity. Table 4-51 displays acreage permanently converted to community development, agricultural acreage permanently converted to community development, and irrigated cropland retired to provide community water. Impacts to non-agricultural and irrigated croplands located off of coal tract areas as well as the effects to existing uses on coal tract areas are discussed below.

Permanent land changes associated with community expansion would affect cropland agriculture and community development in Carbon, Emery, Sanpete, and Sevier Counties. By the year 2000, these counties would experience a permanent change of approximately 968 acres from grazing and agricultural uses to housing and community infrastructures. Of the 968 acres, 484 acres (50 percent) would be irrigated cropland (consisting mainly of alfalfa and small grains). The remaining 484 acres would be non-irrigated lands adjacent to existing communities. An additional 727 acres of irrigated croplands would be retired to provide community water requirements (Table 4-51). Permanent land changes would occur on 1,695 acres (Table 4-50) due to conversion of land for community expansion and the retirement of irrigated cropland to provide community water needs.

Water requirements for exploration and mining activities would also impact irrigated cropland. Water for approximately 75 acres of irrigated cropland would be diverted to exploration activities over a 3-year period. For mining activities, irrigation water sufficient for approximately 62 acres of cropland would be diverted annually during the life of the mines.

In summary, total agricultural lands affected by the year 2000 due to the conversion of irrigated croplands for community development, retirement of irrigated croplands for community water supply, and the diversion of water for exploration and mining activities would be 1,348 acres. Water for approximately 75 acres of cropland (retired by exploration activities) would be available for cropland use upon completion of exploration (1989). All of the

Table 4-50

CENTRAL UTAH
 ACRES OF LAND USE CHANGES DUE TO COAL TRACT DEVELOPMENTS
 BY YEAR 2000
 ALTERNATIVE TWO

Projected Maximum ^d Total Acres Changed From One Land Use to Another	Temporary Land Changes Acres of Land Change Due to Mining Operations, Including On-Tract and Off Site Support Facilities	Permanent Land Changes--Acres Changed for Community Development and Acres Irrigated Cropland Retired to Provide Community Water Needs
	778 acres for access routes, ^b 322 acres for on-tract facilities 100 acres for off-site loadout facilities 62 acres of irrigated land retired for mine water	1,695
Totals	2,957	1,695

Source: Utah State Office - Bureau of Land Management (BLM, 1982a).

^a Projected Maximum Total Acres Changed From One Land Use to Another are totals of Temporary Land Changes plus Permanent Land Changes.

^b Exploration drill pads counted as part of access acres.

TABLE 4-51
CENTRAL UTAH
LANDS AFFECTED BY COMMUNITY DEVELOPMENT AND WATER REQUIREMENTS
ALTERNATIVE TWO

County	1987			1990			1995			2000		
	Total Acres Community a Development	Irrigated Acres for Community b Development	Additional Irrigated Acreage c Retired	Total Irrigated Lands Affected	Total Acres Community a Development	Irrigated Acres for Community b Development	Additional Irrigated Acreage c Retired	Total Irrigated Lands Affected	Total Acres Community a Development	Irrigated Acres for Community b Development	Additional Irrigated Acreage c Retired	Total Irrigated Lands Affected
<u>Carbon</u>	62.5	31.4	46.9	78.3	121.7	60.9	91.3	152.2	444.6	222.3	333.5	555.8
<u>Emery</u>	44.4	22.1	33.0	55.1	100.0	50.0	75.1	125.1	335.3	167.7	251.5	419.2
<u>Sanpete</u>	20.5	10.3	15.5	25.8	19.8	9.9	14.9	24.8	60.7	30.4	45.5	75.9
<u>Sevier</u>	32.9	16.5	24.7	41.2	40.7	20.4	30.5	50.9	127.8	63.9	96.0	159.9
<u>Total</u>	160.3	80.3	120.1	200.4	282.2	141.2	211.8	353.0	968.4	484.3	726.5	1,210.8

Source: Utah State Office, Bureau of Land Management (BLM, 1982a).

a,b,c Figures based on Analysis Assumptions and Guidelines listed in Chapter Four.

d Total Irrigated Lands converted and/or retired = b+c.

affected irrigated cropland would be off the proposed coal tracts. These acres represent less than 1 percent of the total four-county cropland acreage, but they include lands that are among the most favorable for agricultural use (Utah Department of Agriculture, 1982). Some prime farmland could be among that which is converted and retired, unless planning avoided such areas. About 972 of the 1,348 acres of affected irrigated cropland would be in Carbon and Emery Counties. This would be 1.5 percent of the cropland in the two-county area (Utah Department of Agriculture, 1982). The remaining 376 acre irrigated cropland loss would occur in Sanpete and Sevier Counties, with no significant impacts to the two-county agricultural land base (0.2 percent).

Land changes from irrigated cropland to community use and from irrigated cropland to retired cropland would eliminate cattle, sheep, and horse grazing on such land. Due to variability of grazing numbers and season of use on the existing cropland acres, actual AUM losses could not be predicted. Due to the high grazing capacity on such areas, overall losses could be high, i.e., one AUM lost for every 5 acres converted. Such losses would significantly affect small operators.

There would be temporary land changes on 1,262 acres (Table 4-50). The following discussion presents the effects of these land changes on existing uses. Some of the effects would be long-term, extending beyond mine life.

Losses of livestock grazing numbers (AUMs) on BLM and FS allotments would be insignificant with a loss of less than 2 percent of the total AUM capacity of any Federal allotment and less than a 2 percent annual reduction on directly affected private surface.

As discussed for Alternative One, grazing reductions on BLM and FS allotments and private surface could require corresponding reductions of animal numbers on private off-tract areas during late fall, winter, and early spring months (seasons of nonuse on the tract areas).

There would be increased difficulty in moving livestock to and from grazing areas served by Deadman, Coal, Soldier, Dugout, Pace, Rock, and Cottonwood Creek and Straight Canyons and in Ferron and Link Canyons. Congestion caused by new developments and increased traffic in these canyons would result in greater hazards of vehicle collisions with migrating livestock.

As described for Alternative One, subsidence and dewatering of aquifers due to mining operations could temporarily reduce or eliminate livestock water sources, however, the lessee would be required to replace any water lost as the result of mining activities.

Energy and Minerals Development

Conflicts could result between the development of the coal tracts and the development and operation of existing leases if there were different lessees involved. These conflicts would mainly involve transportation and utility access.

Oil and gas development could be hampered by underground coal mining. In the Book Cliffs, quantification of the effects are unknown since the area of the tracts has not been sufficiently drilled to determine oil and gas potential. Coal development would be favored over oil and gas development (BLM, 1981a).

In the Wasatch Plateau area, exploration and development of coal resources on the Castle Valley Ridge, The Pines, and Trail Mountain tracts could conflict with the existing oil and gas exploratory well drilling and the development of potential and known oil and gas fields located within the boundaries of the above coal tracts. Quantification of the effects are unknown since information on oil and gas reserves and production potentials for the fields has not been published by the companies involved.

Rights-of-Way, Special Uses, Other Land Uses

As discussed under Alternative One adherence to EPA and State water discharge criteria and standards would protect the established beneficial uses of affected streams, including those streams classified as sources for domestic water systems. However, water contamination accidents or periodic system failures at mine locations (such as cited for Huntington Canyon - see Chapter 3, Land Uses) could require that the coal lessees or communities in Carbon and Emery Counties plan and fund new water treatment facilities and measures.

Subsidence within the tracts could degrade the quality and reduce the quantity of water from seven municipal watersheds in Carbon and Emery Counties. Communities deriving domestic water from affected springfed streams would have to upgrade existing treatment facilities and/or develop new water sources. Alternative water sources are generally not available to the affected communities.

Exploration and production activities on the Trail Mountain and Ferron Canyon tracts could disturb the mechanical watershed treatment areas located on portions of these tracts and nullify past erosion control investments. However, the lessee would be required to repair the damage.

Land Use Plans, Controls, and Constraints

Federal Plans

All tracts identified in central Utah have been addressed in Federal Land Use plans (see Chapter One). National Forest System lands are being reevaluated in new Land Use Plans. The Secretary of the Interior would consult with the Secretary of Agriculture for consent to offer tracts located on National Forest Service System lands (43 CFR 3420.4-2). The Secretary of Agriculture's decision would be based on land and resource management plans directed by the National Forest Management Act of 1976. The Manti-LaSal and Fishlake National Forests are scheduled to complete the plans by late 1985. For all other tracts it has been determined that leasing would not conflict with any Federal Land Use plans if mitigating measures are applied as directed by the surface managing agency.

County Plans

All tracts and alternatives were evaluated in light of county plan direction and zoning ordinances. Although county and zoning restrictions are not applicable to Federal lands, plan and zoning direction has been considered in coal leasing proposals on Federal land as well as on State and private lands.

Most tract developments in Carbon County would be in the CE-1 zone where coal mining is not allowed. Zoning variances or rezoning of potentially disturbed areas to the CE-2 zone would have to be approved by Carbon County before mining could proceed. All coal mine developments on tracts in Emery, Sanpete, and Sevier Counties would be in zones where coal development is permitted.

All coal mine developments would be required to implement county mitigation requirements for protection of other land resources as well as for social and economic concerns (see Chapter 3 for description of county plan concerns). If such measures are applied and met, potential conflicts could be resolved to the satisfaction of the counties.

Socioeconomics

The assumptions pertaining to economic activity described in Alternative One also apply to Alternataive Two.

Population, Income, and Employment

Table 4-52 summarizes population and employment projections by county. Population increases would occur unevenly among the four counties with Carbon and Emery Counties receiving the largest part of the increase. By the year 2000 the distribution pattern would remain similar to that of 1987 with the exception of Carbon County which would receive the greatest proportion of the projected growth. By the year 2000 the population would increase by 16,700 persons or 24 percent over the 1982 population level and 17 percent over the projected baseline.

Assumptions described under Alternative One that were applied in generating personal income projections were also used in projecting the personal income of Alternative Two. The employment growth was used to project total wage payments and projected average per capita incomes. The county level projections of total personal incomes and per capita incomes are provided in Table 4-53. As stated previously this may tend to understate total income; however, these figures do clearly indicate that per capita income could be expected to increase with an increase in coal mining activities. By the year 2000 per capita personal incomes for 3 of 4 counties are projected to from 0.3 percent to 11 percent greater than the baseline projections (in 1980 dollars). The Carbon County projection is slighly lower than the baseline projection; the difference is not significant but does indicate that the economy is less dependent on relatively higher mining wages in determining per capita incomes than for projections of other years.

TABLE 4-52

CENTRAL UTAH
POPULATION AND EMPLOYMENT PROJECTIONS BY COUNTY
ALTERNATIVE TWO
1987, 1990, 1995, 2000

County	Population	Total Employment
Carbon		
1987	1,100	750
1990	2,100	910
1995	6,100	2,500
2000	7,600	2,800
Emery		
1987	800	180
1990	1,800	370
1995	4,900	1,000
2000	5,700	1,100
Sanpete		
1987	370	340
1990	360	230
1995	1,000	610
2000	1,100	620
Sevier		
1987	590	620
1990	730	870
1995	2,200	2,200
2000	2,300	2,300
Total (year 2000)	16,700	6,820

TABLE 4-53

CENTRAL UTAH
TOTAL PERSONAL INCOME PROJECTIONS BY COUNTY
ALTERNATIVE TWO
1987, 1980, 1995, 2000

Year	1987	1990	1995	2000
Carbon County				
Total Personal Income (\$1,000)	<u>358,360</u>	<u>399,297</u>	<u>459,933</u>	<u>515,967</u>
Total Population (Baseline + Impact)	<u>34,000</u>	<u>37,300</u>	<u>43,300</u>	<u>45,300</u>
Per Capita Personal Income	<u>\$10,540</u>	<u>\$10,705</u>	<u>\$10,622</u>	<u>\$11,390</u>
Emery County				
Total Personal Income (\$1,000)	<u>143,115</u>	<u>166,681</u>	<u>224,280</u>	<u>238,435</u>
Total Population (Baseline + Impact)	<u>14,900</u>	<u>16,600</u>	<u>20,000</u>	<u>20,400</u>
Per Capita Personal Income	<u>\$ 9,605</u>	<u>\$10,041</u>	<u>\$11,214</u>	<u>\$11,688</u>
Sanpete County				
Total Personal Income (\$1,000)	<u>129,514</u>	<u>143,535</u>	<u>175,446</u>	<u>194,557</u>
Total Population (Baseline + Impact)	<u>19,470</u>	<u>20,760</u>	<u>22,800</u>	<u>23,500</u>
Per Capita Personal Income	<u>\$ 6,652</u>	<u>\$ 6,914</u>	<u>\$ 7,695</u>	<u>\$ 8,279</u>
Sevier County				
Total Personal Income (\$1,000)	<u>169,706</u>	<u>214,212</u>	<u>285,828</u>	<u>321,431</u>
Total Population (Baseline + Impact)	<u>20,290</u>	<u>22,330</u>	<u>26,300</u>	<u>27,700</u>
Per Capita Personal Income	<u>\$ 8,364</u>	<u>\$ 9,593</u>	<u>\$10,868</u>	<u>\$11,604</u>

Note: Figures are in 1980 dollars.

Infrastructure

Housing

The largest percentage increase in demand for housing would occur in Carbon County where the demand for additional single family units would reach 1,260 units by the year 2000. Table 4-54 provides a summary of the projected additional demand for housing by type for each county. Emery County would require 900 additional single family units, 225 additional multi-family units and 375 additional mobile home units under this alternative in the year 2000. Sanpete County would require 180 new single family dwelling units by the year 2000, and Sevier County would need an additional 378 single family units.

If required housing units are not available as needed, housing prices could increase to the point of causing personal hardship and the use of substandard housing would also increase.

Education

Educational growth by county is listed in Table 4-55. Emery School District would experience a 36 percent growth over baseline by the year 2000. This requires an additional 64 teachers and additional classrooms to instruct the 1,600 additional students. By the year 2000 an additional 88 teachers would be needed to instruct the 2,207 additional school-age children in Carbon County representing a 23 percent increase in the school-age population over the baseline forecast.

By the 1990s, projected growth would stress the two school districts to meet required accommodations and maintain quality education. Careful planning would be required to ensure an adequate capital availability for operating costs and new facilities.

Sanpete County would receive a 5 percent growth over the projected baseline by the year 2000. This would mean 329 additional students over baseline forecasts of 6,501, requiring 13 additional teachers and additional classrooms. Sevier County would experience an 8 to 9 percent growth by the year 2000 culminating in a demand for 27 additional teachers to teach 693 additional students. With assistance from potential developers and lessees, the Sevier and Sanpete School Districts should be able to accommodate the anticipated growth.

Water and Sewer

The projected demand for water connections and capacity for wastewater treatment facilities are provided in Tables 4-56 and 4-57, respectively. Price would see an increase in demand for water connections that would reach 6,847 water connections by the year 2000. Sewage needs would grow to over 3.5 million gallons per day (mgd) of wastewater. Castle Dale in Emery County would need 1,095 water connections to handle growth forecasts by the year 2000. This would be coupled with a demand for a sewage treatment capacity that would reach 401,600 gallons per day by that time. In Sanpete County

TABLE 4-54

CENTRAL UTAH
HOUSING DEMAND BY TYPE
ALTERNATIVE TWO
1987, 1990, 1995, 2000

County	Single Family		Multi-Family		Mobile	
	Total	Increase	Total	Increase	Total	Increase
<u>Carbon</u>						
1987	6,522	222	1,631	56	2,625	92
1990	7,062	402	1,751	101	2,750	167
1995	7,920	1,020	1,980	255	2,875	425
2000	8,340	1,260	2,085	315	2,950	525
<u>Emery</u>						
1987	2,496	156	624	39	975	65
1990	2,730	330	683	83	1,000	137
1995	3,300	840	825	210	1,025	350
2000	3,300	900	825	225	1,000	375
<u>Sanpete</u>						
1987	3,372	72	843	18	1,375	30
1990	3,546	66	887	17	1,450	27
1995	3,834	174	959	44	1,525	72
2000	3,900	180	975	45	1,550	75
<u>Sevier</u>						
1987	3,594	114	899	29	1,450	47
1990	3,792	132	948	33	1,525	55
1995	4,386	366	1,097	92	1,675	152
2000	4,578	378	1,145	95	1,750	157
Total (year 2000)	20,118	2,718	5,030	680	6,950	1,132
Total additional units (year 2000)	4,530					

TABLE 4-55

IMPACTS ON EDUCATION, HEALTH, AND LAW ENFORCEMENT BY COUNTY
 ALTERNATIVE TWO
 1987, 1990, 1995, 2000

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
CARBON								
Education								
Students	7,890	8,096	206	3	8,863	9,265	402	5
Teachers	316	324	8	3	355	371	16	5
Health Facilities								
Hospital Beds	66	68	2	3	70	75	5	7
Doctors	18	19	1	6	19	21	2	11
Dentists	16	17	1	6	18	19	1	6
Nurses	66	68	2	3	70	75	5	7
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	7	0	0	7	7	0	0
EMTs ^d	46	48	2	4	49	52	3	6
Ambulances	7	7	0	0	7	7	0	0
Nursing Homes	120	122	2	2	125	130	5	4
Law Enforcement								
Police	66	68	2	3	70	75	5	36
Police Cars	66	68	2	3	70	75	5	36
EMERY								
Education								
Students	3,987	4,127	140	4	4,390	4,720	330	8
Teachers	159	165	6	9	176	189	13	8
Health Facilities								
Hospital Beds	28	30	2	7	30	<u>33</u>	<u>3</u>	<u>10</u>
Doctors	8	8	0	0	8	<u>9</u>	<u>1</u>	<u>13</u>
Dentists	7	7	0	0	7	<u>8</u>	<u>1</u>	<u>14</u>
Nurses	28	30	2	2	30	<u>33</u>	<u>3</u>	<u>10</u>
Clinical Psych ^b	1	1	0	0	1	<u>1</u>	<u>0</u>	<u>0</u>
MSWs ^c	3	3	0	0	3	<u>3</u>	<u>0</u>	<u>0</u>
EMTs ^d	20	21	1	5	21	<u>23</u>	<u>2</u>	<u>10</u>
Ambulances	3	3	0	0	3	<u>3</u>	<u>0</u>	<u>0</u>
Nursing Homes	35	37	2	6	36	<u>40</u>	<u>4</u>	<u>11</u>
Law Enforcement								
Police	28	30	2	7	30	<u>33</u>	<u>3</u>	<u>10</u>
Police	28	30	2	7	30	<u>33</u>	<u>3</u>	<u>10</u>

continued

TABLE 4-55 (cont'd.)

County	1995				2000			
	Projected Baseline Need ^a	Total Need w/ Impact	Impact	Percent Change ^a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a
CARBON								
Education								
Students	9,889	11,425	1,536	16	9,692	11,899	2,207	23
Teachers	396	457	61	15	388	476	88	23
Health Facilities								
Hospital Beds	74	87	13	18	75	91	16	21
Doctors	20	24	4	20	21	25	4	19
Dentists	19	22	3	16	19	23	4	21
Nurses	75	87	12	14	75	90	15	20
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	9	2	29	8	9	1	13
EMTs ^d	52	61	9	17	53	63	10	19
Ambulances	7	9	2	29	8	9	1	13
Nursing Homes	129	139	10	8	129	140	11	9
Law Enforcement								
Police	74	87	13	18	75	90	15	20
Police Cars	74	87	13	18	75	90	15	20
EMERY								
Education								
Students	4,716	5,916	1,200	25	4,459	6,059	1,600	36
Teachers	189	237	48	25	178	242	64	36
Health Facilities								
Hospital Beds	30	40	10	33	30	41	11	37
Doctors	8	11	3	38	8	11	3	38
Dentists	8	10	2	25	7	10	3	43
Nurses	30	40	10	33	30	41	11	37
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	3	4	1	33	3	4	1	33
EMTs ^d	21	28	7	33	21	28	7	33
Ambulances	3	4	1	33	3	4	1	33
Nursing Homes	36	44	8	22	35	43	8	22
Law Enforcement								
Police	30	40	10	33	29	41	12	25
Police Cars	30	40	10	33	29	41	12	25

continued

TABLE 4-55 (cont'd.)

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
SANPETE								
Education								
Students	4,930	5,002	72	1	5,508	5,572	64	2
Teachers	197	200	3	2	220	223	3	2
Health Facilities								
Hospital Beds	38	39	1	3	40	41	1	2
Doctors	10	11	1	10	11	11	0	0
Dentists	10	10	0	0	10	10	0	0
Nurses	38	39	1	3	41	42	1	2
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	4	0	0
EMTs ^d	27	27	0	0	29	29	0	0
Ambulances	4	4	0	0	4	4	0	0
Nursing Homes	83	84	1	1	82	83	1	1
Law Enforcement								
Police	38	39	1	3	41	42	1	2
Police Cars	38	39	1	3	41	42	1	2
SEVIER								
Education								
Students	5,282	5,397	115	2	6,032	6,163	131	2
Teachers	211	216	5	2	241	247	6	2
Health Facilities								
Hospital Beds	39	41	2	5	43	45	2	5
Doctors	11	11	0	0	12	12	0	0
Dentists	10	10	0	0	11	11	0	0
Nurses	39	41	2	5	43	45	2	5
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	4	0	0
EMTs ^d	28	28	0	0	30	31	1	3
Ambulances	4	4	0	0	4	4	0	0
Nursing Homes	78	79	1	1	78	80	2	3
Law Enforcement								
Police	40	41	1	3	43	45	2	5
Police Cars	40	41	1	3	43	45	2	5

cont Inued

TABLE 4-55 (concluded)

County	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a
<u>SANPETE</u>								
Education								
Students	6,315	6,588	273	4	6,501	6,830	329	5
Teachers	253	264	11	4	260	273	13	5
Health Facilities								
Hospital Beds	44	46	2	5	45	47	2	4
Doctors	12	13	1	8	12	13	1	8
Dentists	11	12	1	9	11	12	1	9
Nurses	44	46	2	5	45	47	2	4
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	5	1	25	4	5	1	25
EMTs ^d	31	32	1	3	31	33	2	6
Ambulances	4	4	0	0	4	5	1	23
Nursing Homes	78	80	2	3	70	71	1	1
Law Enforcement								
Police	44	46	2	5	45	47	2	4
Police Cars	44	46	2	5	45	47	2	4
<u>SEVIER</u>								
Education								
Students	7,203	7,771	568	8	7,619	8,312	693	8
Teachers	288	311	23	8	305	332	27	9
Health Facilities								
Hospital Beds	48	52	4	8	51	55	4	8
Doctors	13	14	1	8	14	15	1	7
Dentists	12	13	1	8	13	14	1	8
Nurses	48	53	5	10	51	55	4	8
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	5	5	0	0	5	6	1	20
EMTs ^d	34	37	3	9	36	39	3	8
Ambulances	5	5	0	0	5	6	1	20
Nursing Homes	77	81	4	5	71	75	4	6
Law Enforcement								
Police	48	52	4	8	51	55	4	8
Police Cars	48	52	4	8	51	55	4	8

^a Percent Change: Change from Projected Baseline Need to Total Need with Impact.

^b Clinical Psych: Clinical Psychologist.

^c MSW: A person with a Master's Degree in Social Work.

^d EMT: Emergency Medical Technician.

TABLE 4-56

CENTRAL UTAH
PROJECTED DEMAND FOR WATER CONNECTIONS BY COMMUNITY
ALTERNATIVE TWO
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
<u>Carbon</u>								
East Carbon	558	7	549	13	560	31	547	33
Helper	234	44	1,277	53	1,577	332	1,408	147
Hiawatha	82	0	81	0	78	0	79	0
Price	4,950	183	5,493	368	6,419	952	6,847	1,159
Scotfield	43	0	44	0	46	0	47	0
Sunnyside	175	2	173	4	176	10	173	11
Wellington	815	51	918	102	1,124	264	1,204	321
<u>Emery</u>								
Castle Dale	792	48	894	108	1,073	269	1,095	306
Cleveland	171	8	185	18	216	48	217	52
Elmo	106	6	114	12	134	31	136	35
Emery	146	21	173	43	239	107	149	18
Ferron	679	100	801	200	1,102	493	1,148	544
Huntington	844	34	890	77	996	192	1,007	218
Orangeville	562	34	619	77	738	192	754	218
<u>Sanpete</u>								
Centerfield	266	11	279	11	306	29	311	29
Ephraim	1,068	12	1,125	10	1,213	28	1,272	26
Fairview	417	27	486	24	534	64	538	67
Fountain Green	212	2	212	2	215	6	215	6
Gunnison	522	19	551	19	601	49	609	50
Manti	790	8	832	7	895	18	940	17
Moroni	371	5	390	5	404	13	407	14
Mt. Pleasant	911	24	980	22	1,037	58	1,041	60
Spring City	249	5	261	4	273	12	274	12
Wales	50	1	51	0	53	1	53	1
<u>Sevier</u>								
Aurora	352	22	373	24	429	62	443	63
Redmond	248	14	262	15	300	40	310	41
Richfield	2,499	97	2,702	123	3,140	339	3,210	353
Salina	812	60	859	63	1,003	166	1,038	171

TABLE 4-57

CENTRAL UTAH
PROJECTED CAPACITY FOR WASTEWATER TREATMENT FACILITIES
BY COMMUNITY (GALLONS PER DAY)
ALTERNATIVE TWO
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
<u>Carbon</u>								
East Carbon	175,700	3,300	174,400	4,100	181,800	11,000	177,200	12,700
Helper	386,000	13,600	406,500	17,400	448,900	46,800	457,200	53,800
Hiawatha	25,700	0	25,700	0	25,100	0	25,400	0
Price	1,548,700	56,500	1,750,100	120,200	2,104,000	338,100	2,244,400	424,200
Scotfield	13,500	0	14,000	0	14,800	0	15,000	0
Sunnyside	54,900	700	54,900	1,300	57,300	3,600	55,800	4,100
Wellington	254,900	15,700	292,700	33,300	371,300	93,600	400,200	117,500
<u>Emery</u>								
Castle Dale	282,500	14,700	322,800	33,200	392,900	95,400	401,600	111,900
Cleveland	61,000	2,500	67,100	6,000	78,500	16,400	79,700	19,200
Elmo	37,700	1,700	41,500	4,000	49,100	10,900	50,000	12,800
Emery	51,700	6,600	61,900	14,200	86,600	37,900	91,100	43,100
Ferron	239,200	30,700	285,400	65,400	400,100	174,900	420,500	199,000
Huntington	302,200	10,500	322,700	25,100	365,500	68,100	369,500	79,900
Orangeville	200,500	10,500	223,600	25,100	270,000	68,100	276,500	79,900
<u>Sanpete</u>								
Centerfield	91,300	3,400	97,100	3,500	110,000	10,200	112,600	10,800
Ephraim	366,200	3,700	392,600	3,200	436,900	9,700	459,200	9,500
Fairview	142,300	8,200	169,200	7,900	192,000	22,900	194,300	24,400
Fountain Green	72,800	600	73,600	600	77,000	1,800	77,400	1,900
Gunnison	179,100	5,800	191,900	6,100	216,600	17,500	220,200	18,500
Manti	270,900	2,500	290,400	2,200	322,700	6,500	339,300	6,400
Moroni	127,400	1,700	136,000	1,600	145,600	4,700	146,600	234,300
Mt. Pleasant	312,400	7,400	351,900	17,100	372,800	20,500	375,900	21,900
Spring City	85,300	1,500	91,000	1,400	98,100	4,100	98,800	4,400
Wales	17,000	200	18,100	200	19,300	600	19,500	600
<u>Sevier</u>								
Aurora	120,100	6,800	130,300	7,600	154,500	21,900	161,300	23,200
Redmond	84,600	4,400	91,900	5,000	108,200	14,300	112,900	15,100
Richfield	853,000	29,800	946,900	40,300	1,131,800	120,400	1,202,300	129,300
Salina	271,000	12,800	300,200	20,500	361,300	59,100	377,200	62,500

growth in demand for water connections would occur mostly in Ephraim, Fairview and Gunnison. The amount of sewage generated would also grow where communities such as Ephraim would need waste treatment capacity of 0.36 mgd in 1987 and 0.46 mgd by the year 2000. Likewise Gunnison would need sewage treatment facilities with capacity for 0.18 mgd of wastewater in 1987 and 0.22 mgd in the year 2000.

These communities would be under stress to provide these additional services. Failure to provide sufficient water and sewer capacity would result in substandard health and sanitary conditions reducing overall quality of life.

Public Safety

The level of impacts on law enforcement within the four-county area would be only slightly less than discussed for Alternative One. Through 1990, only Emery County would experience an increase in demand for law enforcement services that would be higher on average than the 2 percent per annum baseline forecasts. Emery County currently has 19 police officers, and under baseline forecasts would need a total of 29 police officers by the year 2000. Twenty-two additional police officers would be needed between the year 1982 and 2000 as a result of implementation of Alternative Two. This could raise the county's expenditure for law enforcement services by an additional \$60,000 each year (1982 dollars) through the year 2000.

Growth in Carbon County's law enforcement needs would be consistently 3 to 5 percent per annum over the baseline from 1990 to the year 2000. This growth as shown in Table 4-55 would result in the need for 90 police officers in the year 2000 of which 15 officers would be the result of Alternative Two.

Although Sevier and Sanpete Counties would experience a substantial increase in demand for law enforcement services over the next two decades, the majority of this growth would be accommodated by baseline growth forecasts. Less than a 2 percent higher per annum growth over baseline projections is forecast. However, this does not negate the fact that the communities within those counties would need to make substantial investments in both capital facilities, such as jails, police stations, equipment, police vehicles, etc., to maintain the current level of law enforcement.

Carbon and Emery Counties which currently receive medical services from the Castleview Hospital in Price would need 27 additional hospital beds to meet demand generated from Alternative Two by the year 2000. In addition, the two counties would need an additional 7 doctors, 7 dentists, and 26 nurses which would represent a 37-to 43-percent growth over the projected baseline of medical manpower demand.

Sevier County would need an additional four new hospital beds by the year 2000. Also, additional physicians and dentists would be needed to accommodate growth from medium leasing. Sanpete County would not require significant additional medical services to accommodate implementation of Alternative Two.

Although an undetermined amount of expansion would be necessary in the number of volunteer fire-fighting staff and perhaps even some additional equipment in

general, there would be only a limited effect on the fire protection abilities of all the communities in the four-county area with the exception of Price and Richfield. Price would require a full-time fire-fighting staff of 10 or 11 people by 1990 to meet anticipated demand. An additional three fire-fighters could be necessary by the end of the century. Additional equipment as well as water flow capability and distribution would also be necessary. Richfield would require a full-time fire-fighting staff of six by 1995.

If local fire protection efforts do not keep pace with population growth, the resultant short-fall would increase the risk of personal injury, death, and property destruction.

Additional fire fighting equipment, personnel and water would be necessary within most of the communities under the medium level scenario.

Solid Waste

Communities within Carbon, Emery, Sevier and Sanpete Counties should have adequate disposal areas for the additional solid waste generated under Alternative Two although additional landfill acreage may be necessary in Richfield, Fountain Green, Moroni and Mt. Pleasant. Failure to maintain adequate solid waste facilities would result in overuse of existing facilities and use of unauthorized areas resulting in possible degradation of surrounding land.

Social/Attitudes

The projected population increases in Carbon, Emery, Sanpete, and Sevier Counties represent both significant growth for the communities in those counties and the potential for changing both the social and political climates in those areas. However, the situations vary among the counties. The cultural diversity of Carbon County would be better equipped to handle the rapid growth. Emery County whose culture has been more homogeneous, is less equipped to absorb a diverse cultural mix that would accompany substantial growth in the coal industry. The communities of both Carbon and Emery Counties are aware of the problems that can accompany rapid growth and have incorporated some of the most strict planning and zoning ordinances within the State. County officials are utilizing all available growth management tools to ensure that they can handle the growth that is forecast for the area from additional coal leasing. However, during cycles of economic expansion, opposition to additional growth emerges; this occurred in Emery County which faced growth pressures during the late 1970's. As economic conditions change, so do the social and political attitudes toward growth. The current economic recession which contributed to the fall in demand for coal and to the unemployment of coal miners has resulted in a redirection of concern from problems of growth toward encouraging economic development. Thus it is difficult to adequately reflect a community's response to potential growth at some future date.

Sanpete and Sevier Counties would be able to withstand the growth within their communities with little disruption to their existing lifestyles. In fact, the

creation of new job opportunities would have a positive effect on the economic climate in the communities and would help to stimulate local economics which have been stagnant during their recent past.

Transportation

Table 4-58 shows predicted increases in traffic due to development of the 15 central Utah tracts. Vehicles per day would increase by about 11,660 by the year 2000. Increased traffic would require increased road maintenance throughout the area and there would be an increased but unquantified number of traffic accidents. If road improvements are implemented as needed (see Alternative Four), the accident rate should remain typically low. Traffic patterns and traffic increases would be as analyzed for Alternative One, with the exception of removal of some traffic from U-96 north of Clear Creek due to due to the deletion of the Mud Creek and North Trough Springs tracts. The largest increases in traffic would continue to occur on Highway U-10 from Price southward to Castle Dale and on U.S. 6 from Castle Gate to Price. The vicinity of Price would continue to gain the bulk of the traffic, with the effects as analyzed under Alternative One. There would be moderate increases in traffic due to mining, increases in traffic jams in Price due to increased railroad activity, and increases traffic accidents due to increased congestion.

Mine-related traffic in the central Utah area would add about 11,600 vpd to the highways, traveling about 2.6 billion miles, using 197 million gallons of fuel and wearing out about 2,000 vehicles over the lives of the mines. Traffic associated with additional proposed mining would not by itself overload any of the State highways in the area. However, this incremental traffic added to the presently overcrowded roads would exacerbate an already poor situation and require earlier upgrading and more frequent maintenance of the affected roads. A commuter bypass route around the west and southwest sides of Price would assist in removing some local commuter traffic from downtown Price, but major upgrading of U-10 would still be required.

Cultural Resources

As described for Alternative One, exploration and construction of surface facilities for underground mining could inadvertently disturb or destroy historic and prehistoric cultural resources. The majority of such effects could be avoided by proper placement of facilities and salvage excavation. The total number and significance of the affected sites is unknown.

Significant sites would be mitigated. Mitigating techniques are varied and include collection, mapping, testing, photography, and excavation.

The extent of cultural resource disturbance that would result from mine-related community expansion and recreational activity is unknown.

Both scientific and aesthetic site values would be lost as a result of these indirect impacts. This loss would occur to many on and off-tract significant cultural resources in Carbon, Emery, Sanpete, and Sevier Counties.

TABLE 4-58

CENTRAL UTAH
 MAXIMUM INCREASES IN TRAFFIC AND VEHICLE USE
 ALTERNATIVE TWO

Feature	Coal Trucks	Service Trucks	Commuters	Other Trucks	Other Cars	Totals
Max. Vehicles/day	2,262	463	5,510	356	3,072	11,663
Total Million Miles ^a	297	193	1,926	26	200	2,639
Total Mi. Gals. Fuel ^a	73	36	76	5	7	197
Total Vehicles Lives ^a	294	380	19,266	52	1,998	21,990

^a Within area of influence only. Travel outside this area is not included.

Recreation

By the year 2000, mining-related population growth would increase the local demand (users originating from within the four-county region) for both dispersed and developed recreation opportunities in the four-county region by approximately 24 percent from 1982 use figures and by approximately 17 percent over the use figures projected for year 2000.

Table 4-59 and Table 4-60 show the anticipated increases in demand for hunting, fishing, and ORV activity, respectively, during the life of the mining operation. Increased demand for dispersed activities, as well as increased use of developed recreation sites and urban facilities, would result in impacts similar to those identified for Alternative One. The extent and intensity of those impacts are not quantifiable but would be very similar in degree to impacts from Alternative One. In summary, the additional competition for fish and game would lead to less hunter and fisherman success or restricted harvests. Increased use would increase ORV conflicts with other recreational uses. Overuse of developed campgrounds, picnic areas, playfields, swimming pools, and golf courses would result in continued deterioration of existing facilities, user dissatisfaction, and additional recreation pressures on undeveloped areas including the presently overused San Rafael/Buckskin Draw area. These impacts would be greatest in Carbon and Emery Counties due to the lack of facilities and because the majority of the coal related population would live in these counties. Federal, State, and local governments would be under stress to provide recreation facilities to meet minimum standards recommended by the UORA (1978).

Development of the tracts and of homesites would displace dispersed recreational use from as much as 383 acres by 1987, 1427 acres by 1990, 1982 acres by 1995, and 2,169 acres by the year 2000. As in Alternative One, because surrounding areas offer comparable or better opportunities, loss of recreational opportunities from displacement would be minimal.

Although an unquantified amount of existing roads would be lost from use for recreational access, the 180 miles of road that would be improved or constructed for mining purposes would also improve accessibility for dispersed recreation if managing agencies allow for such use.

Impacts to recreational traffic on the Myton, Coal Creek, Eccles Canyon, Huntington Canyon, Straight Canyon, Cottonwood Canyon, and Ferron Canyon roads would be the same as were identified in Alternative One (i.e., increase in danger, stress, and visitor dissatisfaction). As in Alternative One, visual and audio impacts from development of the Trail Mountain and Gooseberry tracts could degrade the visitor experience to some using Utah Highway 29, the Cottonwood Canyon road, Utah Highway 31, the Skyline Drive, and various recreation attractions, while improving it for others.

As in Alternative One, upgrading of the Ferron Canyon road would likely result in destruction of the Ferron Canyon Picnic Area. Should this happen, the approximately 803 annual visitor days the site receives would be displaced to other developed sites as well as to dispersed areas. Because of the small number of visitor days involved, impacts resulting from displaced visitor use would probably not be noticeable.

TABLE 4-59

PROJECTED INCREASE IN LOCAL HUNTER AND FISHERMAN DEMAND WITHIN THE FOUR-COUNTY REGION
ALTERNATIVE TWO

Year	Coal-Related Population	Projected Annual Increase in Numbers					Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
		Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen	Increased Demand for Fish		
1987	2,860	515	57	257	1,286	38,580	4	3
1990	4,990	898	100	449	2,244	67,320	7	5
1995	14,200	2,556	284	1,278	6,385	191,550	20	15
2000	16,700	3,006	334	1,503	7,510	225,300	24	17

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the four-county area. Approximately 18 percent of Utah's population hunt deer, approximately two percent hunt elk, approximately nine percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under 12 and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UDWR, 1978).

TABLE 4-60

PROJECTED INCREASE IN LOCAL OFF-ROAD VEHICLE DEMAND WITHIN THE FOUR-COUNTY REGION
ALTERNATIVE TWO

Year	Projected Coal-Related Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
1987	2,860	715	200	4	3
1990	4,990	1,248	349	7	5
1995	14,200	3,550	994	20	15
2000	16,700	4,175	1,169	24	17

Note: Projections were made assuming that the percentage of the population in the four-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles, and approximately 25 percent of the population currently owns four-wheel drive vehicles or light pickups) (UORA, 1978).

As in Alternative One, the loss of visual range from scenic vistas in Canyonlands and Capitol Reef National Parks (see Air Quality) may at times be perceptible to some park visitors, thus reducing the quality of their recreational experience.

Visual Resources

Visual impacts identified in Alternative One as specifically occurring from development of North Trough Springs, Blue Trail Canyon, Walker Flat, Dugout Pace and Mud Creek tracts would not occur under this Alternative. Otherwise impacts identified both on a specific and regional basis would be the same as identified under Alternative One. A summary follows.

Structures and surface disturbance from development of the Gooseberry tract would degrade the natural appearing vistas seen from Utah Highway 31 and from several recreation attractions. Structures and surface disturbance from development of the Trail Mountain tract would dominate the landscape as viewed from the Cottonwood Canyon road and Utah Highway 29. Visual resource management objectives would not be met in either area during the life of the mining operation.

In development of Soldier Creek, Whitmore Park, Alkali Creek, Ferron Canyon, and Ivie Creek tracts, careful placement of exploration roads, drill pads and ventilation shafts to avoid unnecessary disturbance and high visibility from the Myton road, Ferron Canyon road, and I-70, respectively, may prevent what would otherwise be temporary degradation of visual quality and probable conflict with the visual resource management objectives for these tracts.

Realignment of the Ferron Canyon road would result in temporary conflict with the partial retention objectives during the construction period.

Overall, no unique or outstanding scenic qualities would be lost from development of the tracts and reclamation would be effective in reestablishing the present scenic quality and character of the Wasatch Plateau and Book Cliff tracts within 10 years of completion of the mining operations. This, together with the fact that most mining activities would occur away from major travel routes, would result in the average visitor noting little change in the region's overall scenic character from development and reclamation of the tracts.

Special Designation Areas

With the exception of RARE II "nonwilderness" areas as identified in Alternative One mining activities including new mines and transportation routes would not directly impact any special designation area. However, the increase in local recreational demand could result in increased ORV and other dispersed use of some of the 17 areas within the four-county region with special designation or potential for special designation. The more intensive use and resultant littering and vandalism would tend to degrade values for which the areas are being protected and/or reviewed. Although not quantifiable, the degree of impact would be similar in extent and intensity to Alternative One.

Agencies managing the lands may be under stress to protect special values. However, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely even in a worst case situation that possible degradation would affect the suitability of any area for special designation.

Unavoidable Adverse Impacts

Four areas near Price, Castle Dale, Mt. Pleasant, and Alton, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. Average annual TSP emissions would increase by about 31 percent over 1981 levels and 17 percent over the projected baseline in these areas by the year 2000. Secondary NAAQS would be exceeded in a 2,730 square mile area by the year 2000, of which 1,160 square miles would be attributed to implementation of Alternative Two. The greatest contribution to the predicted concentrations would be coal related vehicular travel on unpaved roads. Visual impacts would be noticeable from many roads and highways often used for recreation purposes; however, the most significant impact to visual range would result from increased populations in towns and cities.

The loss of soil and vegetation productivity on 5,031 acres would be unavoidable. Approximately 2,308 acres would be eventually reclaimed following mining operations. The remaining 2,723 acres lost to community development including irrigated croplands would not be reclaimed for agricultural purposes but would be stabilized and reclaimed as part of residential development. An unquantified amount of soil would be lost from disturbed areas prior to reclamation. The mining of coal in the region would result in 1,007.8 million tons of coal (60 percent) becoming unrecoverable by present technology. Changes in aquifers such as redistribution of ground water discharge and distribution of surface water due to subsidence could not be avoided. Community use of water in the region would increase by 6,964 acre-feet by the year 2000. An additional 446 acre-feet would be required for mine development.

Consumptive water loss from the Colorado River system of 3,497 acre-feet per year due to coal mining and community development directly related to Round Two leasing in Utah and Colorado would not likely result in adverse effects on threatened or endangered fish species in the river system. However, in combination with other proposed water consumptive developments, Round Two leasing may affect threatened and endangered fish in the Green and Colorado Rivers. Therefore, BLM has requested informal consultation with the U.S. Fish and Wildlife Service (USFWS) and has added a standard mitigating measure to the Final EIS requiring lessees to develop a plan for formal Section 7 Consultation with USFWS prior to on-the-ground development.

In affected drainage basins, tract development would result in a total sediment yield of approximately 80 acre-feet annually by the year 2000. About 48 acre-feet would come from the southern Utah tracts. Sediment from tracts in the Wasatch Plateau could end up in local reservoirs important as fisheries and community water sources. Approximately 72,192 acres would be susceptible to subsidence of up to 16 feet. Surface mining would alter topography on an additional 622 acres. The loss of wildlife due to occupation, disturbance of

habitat, and illegal killing would increase. Highway mortality, mostly in central Utah, would be in excess of 160 deer and elk annually and would be unavoidable; however, vitality of the various herds should not be significantly affected. An unquantified amount of big game habitat including winter range and calving ground would be lost. Regionwide, the loss would be insignificant; however, in some areas, big game populations would be reduced as a result.

Conversion of irrigated cropland to urban use and retirement of irrigated land to provide water for mining and community needs would result in a loss of less than 1 percent (approximately 1,957 acres) of agricultural land in the region; however, losses would be relatively larger within the vicinity of certain communities.

Portions of three tracts on the Wasatch Plateau lie within Carbon County's land use zone where coal mining is not allowed. Zoning variances or rezoning would be necessary before mining could proceed. A potential conflict would exist with the Kane County Master Plan in the areas of water development and protection of irrigated croplands.

Population in the region would increase by 22,272 persons or 20 percent over the projected baseline by the year 2000. Housing needs would increase by over 7,000 units. Employment in the region would increase by 10,577 jobs or 19 percent over the projected baseline by the year 2000. Capital and operating expenditure requirements of local counties, school districts, and municipalities would rise as a result of the need to expand public services and facilities. Unless communities plan needed improvements in advance and ensure adequate funding, there would be at least a temporary deterioration in the quality of services, causing inconvenience and dissatisfaction among those affected. These impacts would be most acute in central Utah.

Mine-related traffic would add over 18,000 vpd (19 percent) to highways in the region, about 11,600 of which would occur in the central Utah area. The largest increase in traffic would occur on Highway U-10 south of Price, Utah, and US-6 east of Price where travel limits would be exceeded. Traffic congestion in downtown Price would result from increased numbers of vehicles and increased numbers of coal trains going through the community. Unpaved secondary roads in the region would experience deterioration and safety problems due to increased coal related traffic.

Inadvertent destruction or disturbance of undetected cultural and paleontological resources and losses through illegal collection or vandalism could not be avoided. The increase in demand for recreational activities over the projected baseline resulting from population increases (71 percent in southern Utah, 17 percent in central Utah, and an undetermined but slight amount in west-central Colorado) could result in an undetermined amount of overutilization and crowding of existing recreation developments and reduced hunting and fishing success. The landscape modifications that would result from mining and associated development would degrade the visual quality of those areas, in some areas VRM standards would not be met.

During a major portion of the time, mining related noise and fugitive dust would be detected by visitors to Bryce Canyon National Park. Overall noise level in Bryce Canyon National Park would be increased and would be perceived as significant by a majority of the visitors to the pristine National Park environment.

The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The increased population associated with mining development would result in a long-term decrease in air quality in the region.

Implementation of Alternative Two would increase annual coal production in the region from 13 million tons in 1980 to almost 53 million tons by the year 2000. Average annual production from the tracts alone would be 19.01 million tons when full production is reached. This would represent a significant commitment to coal mining in the region.

The short-term use of the environment for coal production and associated housing development would result in a long-term loss of soil and vegetation productivity on 2,180 acres permanently occupied by housing and acres retired from irrigation to provide water for community needs.

The extraction of 659.7 million tons of coal (40 percent) would render the remaining unmined 1,007.8 million tons of coal (60 percent) unrecoverable over the long term. Changes in aquifers and points of surface discharge due to subsidence would result in a long-term local change in surface water distribution and ground water storage. The short-term community and mining use of 7,410 acre-feet of water per year would be reduced by 446 acre-feet when mining ceases. The use of 6,964 acre-feet per year for community use would continue in the long term. Over the long-term, salinity at Imperial Dam would actually be reduced as water normally used for irrigation and returned to the system would be used for community development. This would more than offset salinity produced by active mining operations. Overall, the cumulative effect would be less than 1 percent.

Disturbance or occupation of habitat up to 40 years by mining activity would result in a long-term redistribution of wildlife populations and migration routes. Permanent occupation of 2,180 acres by urban development would cause a long-term loss of wildlife habitat occupied by pheasants, cottontail rabbits, mourning doves, and other small game. The loss of crop production on 764 acres occupied by housing and 1,189 acres retired due to conversion of water use would be a long-term loss in productivity.

The growth in population of 22,272 people in the region (20 percent over the projected baseline) would increase the area's potential productivity by enlarging its labor force, but the 10,577 jobs (19 percent over the projected baseline) associated with Federal leases mining would not continue in the long-term. Infrastructure improvement such as water systems would also contribute to increased community capacity by providing facilities useful for

commerce and industry as well as the residential population. However, until these improvements are operational, deficiencies in community services could be anticipated.

Excavation and salvage of sites would expand knowledge of cultural resources in the region. The development of recreational facilities as a result of demand by the increased population would be a long-term increase in capacity of recreation developments in the region.

Irretrievable or Irreversible Commitment of Resources

Emissions attributable to coal related population growth and mining activity in the region would result in an irretrievable deterioration in air quality during the life of the mining operations. Soil and vegetation productivity on 5,031 acres would be irretrievably lost for the life of the mines or until reclamation would be successful. Productivity on 2,723 acres occupied by housing or retired from irrigation would be irreversibly lost. Soil lost to wind and water erosion prior to reclamation would be irretrievable.

The 659.7 million tons of coal mined would be irreversibly lost as a resource and the 1,007.8 million tons of coal left in the ground would be irreversibly unrecoverable by present technology. Increased water consumption for mining and community needs would be irretrievable. Any change in aquifers, ground water storage potential, or point of discharge due to subsidence would be irreversible. The increased consumptive use of water for community and mining use (7,410 acre-feet per year) would be irreversible.

Big game losses through displacement from habitat, traffic mortality, and illegal killing would be irretrievable. With these increased losses, some individual herds would be adversely affected but overall vitality of the deer population would be maintained. Habitat for pheasants, cottontail rabbits, mourning doves, and other small game occupied by community development would also be irretrievably lost. Overall population vitality would be maintained, but local populations, especially in Carbon County, would be significantly reduced.

The growth in population of 22,272 persons foreseen under this alternative would be irreversible except at considerable economic and human cost. Likewise, the commitment of capital, physical resources, and labor to build over 7,000 housing units and infrastructure that would be required to support the growth in population, commerce, and industry would be an irretrievable impact. The loss of smalltown atmosphere and community solidarity in some communities as a consequence of coal development would be irreversible.

Development of the coal mines as proposed would result in the irretrievable consumption of over 260 million gallons of petroleum fuels.

The loss of cultural and paleontological resources in context would be irretrievable and any loss of interpretive values would be irreversible. The adverse impacts to visual resources would be irretrievable for the life of the mines, but in most cases would be reversible following reclamation. Noise

produced by coal development in southern Utah could result in an irretrievable degradation of a recreation experience to some visitors to Bryce Canyon National Park.

Significant Cumulative Impacts

The cumulative impact assessment was developed by adding the impacts of Alternative Two to those of the baseline (Alternative Four) for the year 2000. Only the most significant in central Utah are summarized below. The cumulative impacts in southern Utah and west-central Colorado would be identical to those described for Alternative One and are not repeated here.

By the year 2000, in central Utah there could be a 110 percent increase in TSP emissions over the 1981 emission levels. Three areas near Price, Castle Dale, and Mt. Pleasant would exceed primary NAAQS for TSP and there could be approximately a 2,355 square mile or 1,350 percent increase in area where the secondary NAAQS for TSP would be exceeded. About 42 percent of the increase would be attributable to Alternative Two.

Visual range from selected points in Canyonlands and Capitol Reef National Parks would be reduced by 6 to about 64 percent during 1 percent of the time. Such reductions could be perceptible to park visitors. Also, during 1 percent of the time a plume may be visible looking from Cathedral Valley in Capitol Reef National Park to the San Rafael Swell. About 21 to 24 percent of the reduction would result from Alternative Two.

Community development resulting from mining would result in a permanent loss of soil productivity for about 2,668 acres by the year 2000. Approximately 968 acres or 36 percent of the loss would be attributable to Alternative Two. Up to 114,488 additional areas of surface would be subject to subsidence of which 39 percent would be affected by Alternative Two. A maximum subsidence of 16 feet with surface fractures could result.

An estimated additional 12,413 acre-feet of water would be required by the year 2000 for coal development and selected population growth of which 37 percent would be required by Alternative Two. About 6,361 acre-feet of water would be consumptively used. This is about 0.43 percent of Utah's share of Colorado River water.

Projected mining activities would disrupt local aquifers, alter local ground water flow systems and cause redistribution of natural ground water flow systems. These impacts are not quantifiable but about 179 additional square miles would be subject to mining.

The four-county population would increase from an estimated 69,598 in 1982 to 116,900 in 2000, an 68 percent increase. Alternative Two would contribute about 16,700 people or 35 percent of the increase. Corresponding increases in hunters, fishermen, and ORV can be expected. The presence of a larger human population would exert greater pressures on wildlife populations through legal and illegal harvest, harassment, and displacement from habitat.

Cumulative loss of pheasant habitat would be insignificant on a regional basis but locally a 13 percent reduction in cock harvest could result in Carbon County.

Irrigated cropland lost as a result of community expansion and retired due to use of water for community purposes would be about 3,336 acres or 1.5 percent of the four-county agricultural land base. About 1,211 acres or 36 percent of the affected acreage would result from Alternative Two. The retired lands would be among the most favorable for agricultural use in the four-county region.

By the year 2000 the four-county population would increase approximately 68 percent over the 1982 level which would lead to similar increases in the demand for housing, water connections, and other community infrastructural services. Front-end financing of these services would be a major problem and the quality of community could deteriorate.

Traffic congestion would occur on U-10 between Price and Castle Dale, and on US-6 across Soldier Summit. Severe traffic congestion would occur in downtown Price as increased numbers of vehicles would be blocked by increased numbers of coal trains. Alternative Two would contribute to an already poor situation. Nearly all highways affected by proposed coal development are approaching or have already exceeded the 20-year design traffic volume and the need for maintenance would increase.

By the year 2000 total population growth would increase the local recreational demand by approximately 68 percent over 1982 levels. By itself, Alternative Two would increase the demand by only 17 percent. Such increases would result in overcrowding, user dissatisfaction, and deterioration of the environment at many sites in the four county region.

Because of large increases in population, overcrowded conditions, and user dissatisfaction at recreational facilities in towns and cities would also accelerate.

Alternative Three: Medium Level

(1.316 Billion Tons)

The following analysis addresses the projected impacts of Alternative Three in central Utah. The impacts of Alternative Three on west-central Colorado would be identical to those described for Alternative One and are not repeated here. Under this alternative, no coal would be offered for lease in southern Utah.

Central Utah

Climate, Air Quality

The models discussed under Alternative One were used to develop the Alternative Three analyses.

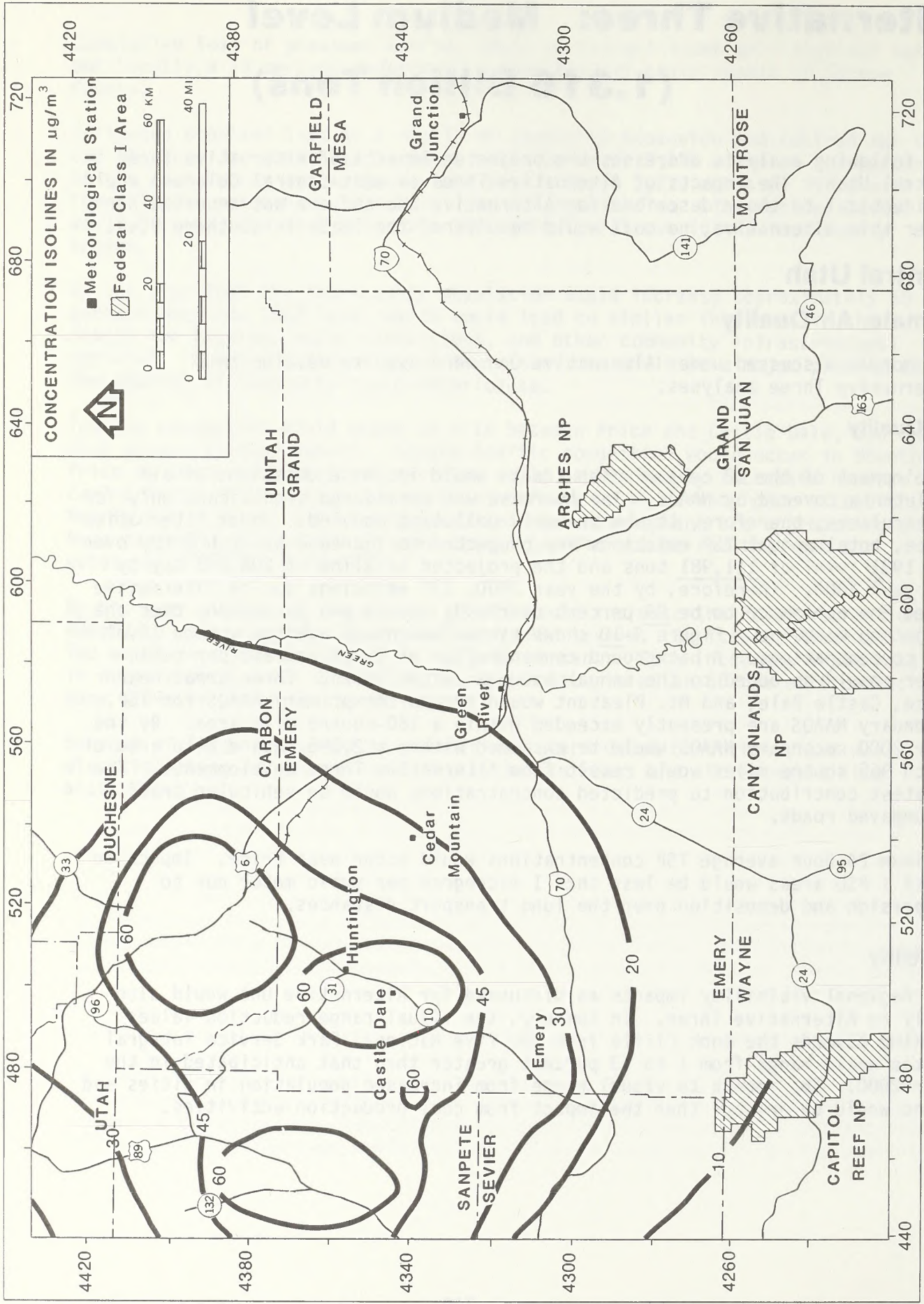
Air Quality

Development of the 18 central Utah tracts would increase emissions of all pollutants covered by NAAQS. The increase was considered significant only for particulates, therefore, it was the only pollutant modeled. Under Alternative Three, total annual TSP emissions are projected to increase by 32,609 tpy over the 1981 level of 111,981 tons and the projected baseline of 204,273 tpy by the year 2000. Therefore, by the year 2000, TSP emissions due to Alternative Three are estimated to be 29 percent over 1981 levels and 16 percent over the projected baseline. Figure 4-10 shows estimated annual average ground level TSP concentrations. A background concentration of 15 micrograms per cubic meter should be added to the annual average values shown. Three areas near Price, Castle Dale, and Mt. Pleasant would exceed the primary NAAQS for TSP. Secondary NAAQS are presently exceeded within a 160-square mile area. By the year 2000 secondary NAAQS would be exceeded within a 2,395 square mile area of which 965 square miles would result from Alternative Three developments. The greatest contribution to predicted concentrations would be vehicular traffic on unpaved roads.

Maximum 24-hour average TSP concentrations would occur near Price. Impact to Class I PSD areas would be less than 1 microgram per cubic meter due to dispersion and deposition over the long transport distances.

Visibility

The regional visibility impacts as discussed for Alternative One would also apply to Alternative Three. In summary, the visual range reduction values looking towards the Book Cliffs from the five National Park Service integral vistas would range from 1 to 13 percent greater than that anticipated in the year 2000. The impact to visual range from increased population in cities and towns would be greater than the impact from coal production activities.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-10
 ANNUAL AVERAGE TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 2000
 ALTERNATIVE THREE

Soils

Refer to the Alternative One Central Utah Soils section for general discussions on causes of soil disturbances, impacts to soils located on coal tracts and on off-tract support sites, and erosion control.

The cumulatively disturbed acres resulting from exploration, mining, and community development for Alternative Three are displayed in Table 4-61. The loss on community development areas would be permanent.

Table 4-62 presents estimated soil losses on critical soil erosion areas. The losses depicted are considered as averages over the potentially disturbed tract areas. As shown, the upper range of percent increases could be large, but would occur on a relatively small portion of the total tract acreage (from 1 to 3 percent). Revegetation and erosion control measures would reduce soil erosion to acceptable levels within a 2 to 10 year period on most tracts.

In the following discussion, soil impacts on total acres of disturbance are discussed for exploration activities. For production activities, only soil impacts on cut and fill slopes are analyzed (see Central Utah Alternative One for rationale and methodologies). The impacts under Alternative Three would be as analyzed under Alternative One, but would occur on fewer acres.

Exploration activities would be temporary (1 to 2 years) on approximately 255 acres.

Approximately 341 acres would be disturbed by production activities on steep slopes within critical soil erosion areas. In the Book Cliff tracts, 52 acres of steep slopes would be disturbed mainly on the Alkali Creek, Coal Creek, and Dugout-Pace tracts. Disturbances on steep slopes could result in soil losses of 50 tons or more per acre per year from combined water and wind erosion (BLM, 1982). In the Wasatch Plateau area, soil losses on exposed soils of cut and fill slope acres could range from 20 to 50 tons per acre per year on 94 acres in the North Trough Springs, and Castle Valley Ridge tracts and from 50 to 100 tons per acre per year on 195 acres in the Trail Mountain, Ferron Canyon, The Pines, and Quitchupah tracts. Due to the high erosion potential, low soil fertility, and high salt and clay content, revegetation problems would exist on the disturbed acres of these tracts.

Subsidence, as evidenced on coal lease operations within the Wasatch Plateau could increase the potential for mass soil movement on the unstable soils of the Trail Mountain and Ferron Canyon tracts (see Topography section). This could accelerate soil erosion and cause increased sediment transport into intermittent and perennial stream courses within or adjacent to these tracts.

Mineral Resources

Approximately 132.9 million tons or 36 percent of the coal in the Book Cliffs tracts, and 307.1 million tons or 42.2 percent of the coal in the Wasatch Plateau tracts, would be recovered using current mining techniques. Approximately 25.0 million tons of coal (34 percent of the total resource) would be recovered from the Walker Flat tract.

TABLE 4-61

CENTRAL UTAH
ACRES OF SOIL DISTURBANCE ON COAL TRACT
AND COMMUNITY DEVELOPMENT AREAS

ALTERNATIVE THREE

Activity	Acres Disturbed				
	1987	1990	1995	2000	
Exploration ^a	255.1	255.1	255.1	255.1	The exploration and mining acres represent 2.5 percent of the total surface acres within the coal tracts.
Mining ^b	0	977.9	1015.0	1038.1	
Community Development ^c	164.3	297.8	828.0	970.0	
Totals	419.4	1530.8	2098.1	2263.2	

Source: Round Two Tract Profiles. Round Two Leasing and socioeconomic data from the State of Utah Planning Coordinator's Office, 1982.

- ^a Although included in cumulative total of disturbed acres, these exploration acres would be rehabilitated within a 3-year period after completion of exploration work.
- ^b Includes 100 acres of off-tract loadout facilities.
- ^c Soil productivity loss considered permanent on these acres.

TABLE 4-62

CENTRAL UTAH
ESTIMATED SOIL LOSSES^a ON CRITICAL SOIL EROSION AREAS

ALTERNATIVE THREE

Coal Tract	EXPLORATION ACTIVITIES			PRODUCTION ACTIVITIES			
	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments	Estimated Soil Loss Without Tract Developments ^b	Estimated Soil Loss With Tract Developments ^c	Differences Attributed to Tract Developments	Percent Increases Over Present
Book Cliffs Tracts	0.5 to 3.0	5.0 to 50.0 (Moderately steep areas)	4.5 to 47.0	Same as shown for exploration ^d	Same as shown for exploration ^d	4.5 to 47.0	900 to 1600
		50.0 to 100.0 (steep escarpment areas)	49.5 to 97.0	0.5 to 3.0	5.0 to 50.0	4.5 to 47.0	900 to 1600
Wasatch Plateau Tracts							
Gooseberry, North Trough Springs, and Castle Valley Ridge	0.2 to 22.0	20.0 to 50.0	19.8 to 28.0	Same as shown for exploration.	Same as shown for exploration.		
Trail Mountain, Ferron Canyon, The Pines, & Quitcupah	20.0+	50.0 to 100.0	30.0 to 80.0	150 to 400	Same as shown for exploration.		
Walker Flat	Water Erosion 0.5 to 1.0	0.5 to 1.0	0	0	--e	--	--
	Wind Erosion 20.0+	50.0+	30.0+	150	--	--	--

^a Tons per acre per year. In water erosion rates on steep slopes unless otherwise indicated. Lack of site specific project and soil survey information prevents projection of cumulative total soil losses from construction activities on critical soil erosion areas as compared to total cumulative soil losses from natural erosion on these same areas.

^b Source: Table 3-4.

^c Site specific analyses for coal tracts to be included in the Uinta-Southwest Utah Coal Region Environmental Impact Statement: Round Two Leasing.

^d Soil loss for production activities on the Book Cliffs tracts would be the same as for exploration activities with the exception of utility line routes where soil loss with tract development would be 0.5 to 20.0 tons per acre per year.

^e The Walker Flat tract would be mined from an existing portal, therefore no soil losses are shown for production activities.

The mining of coal would result in total depletion of the coal resource as the 700.8 million tons of unrecoverable coal, though still in the ground, would no longer be available as a mineral resource given present mining technology.

Surface and subsurface mining activities and subsidence could hinder the subsequent exploration and location of facilities related to oil and gas development in the Book Cliff and Wasatch Plateau areas. The potential reduction in recoverable resources cannot be estimated at this time (see Land Uses).

Topography, Geology, Paleontology

Construction of surface facilities would cause permanent changes in topography on 1,193 acres in central Utah.

The subsidence impacts described for central Utah under Alternative One would also result under Alternative Three but topography would be altered only on portions of 51,766 total acres. Tension cracks, buckling, and troughs could be expected in these areas.

Moore and Nawrocki (1980) predict a maximum subsidence of 12 feet in the Book Cliffs, 16 feet in the Wasatch Plateau, and 6 feet on the Walker Flat tract. Because of shallow overburden, the effects of subsidence would be greatest on the Ivie and Walker Flat tracts. The lateral extent of surface effects of subsidence may be considerably less than the area above the extracted coal, but theoretically could range up to 168 to 170 percent of the mined area.

As discussed for Alternative One, significant plant fossils used for correlation and paleo-environmental guides could be destroyed by coal removal activities in the fossil-rich Blackhawk Formation of the Book Cliffs and Wasatch Plateau coal field. Significant disturbances to other scientifically important fossils would be avoided if mitigating measures are followed (Appendix 3). Surveys and mining activities could also expose new fossils and enhance paleontological studies.

Water Resources

Virtually all of the impacts on water resources as discussed for Alternative One would also occur under Alternative Three.

Surface Water

Annual sediment yields on the lands that would be disturbed by mining and associated development could increase to nearly 27 acre-feet by the year 2000 (Table 4-63). This is 0.07 percent of the estimated combined annual sediment yield in the Green and Dirty Devil River basins.

Table 4-64 shows by drainage subbasin the estimated increase in annual sediment yields from areas that would be disturbed by development of the central Utah tracts.

TABLE 4-63

CENTRAL UTAH
 IMPACTS ON WATER RESOURCES AND REGIONAL SIGNIFICANCE
 ALTERNATIVE THREE

Item	1987	1990	1995	2000
Water requirement (acre-ft/year)				
Mining and exploration	109.0	254.1	254.1	254.1
For public supply	746.1	1350.5	3755.6	4400.6
Total	855.1	1604.6	4009.7	4654.7
Consumptive water use				
Total (acre-ft/year) ^a	482.0	929.3	2131.9	2454.4
Percent of runoff ^b	.01	.02	.04	.05
Increased annual sediment yield				
Total (acre-ft)	4.9	17.9	24.6	26.5
Percent ^c	.01	.05	.06	.07
Increase in salinity (milligrams per liter) ^d				
	.04	.08	.18	.21

a Assumes 50 percent of withdrawal for public supply and 100 percent of withdrawal for exploration and mining.

b Percent of combined average annual runoff of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, Utah.

c Percent of estimated annual yield upstream from the stations cited in footnote b.

d As determined at Imperial Dam. Does not include reduction in salinity from reduced irrigation return flows.

TABLE 4-64

CENTRAL UTAH
SEDIMENT YIELD INCREASE
ALTERNATIVE THREE

River Basins	Estimated Increase in Sediment Yield (acre-feet per year)	Percent of estimated annual basin yield
Price River	9.2	0.79
Dirty Devil River	9.7	0.79
Sevier River	5.2	0.17
San Rafael River	2.4	0.05
Total	26.5	N/A

Development of the Gooseberry tract in the Upper Price River subbasin could increase annual sediment inflow to Scofield Reservoir by less than 0.06 acre-feet. This is less than 0.1 percent of the average annual inflow from 1943 to 1979. The effect on the life and utility of the reservoir would be small. The effect of increased sediment production due to development of the Ferron Canyon tract would have a slightly larger impact on the life and utility of Millsite Reservoir. Annual sediment yields for acres disturbed by development of the Ferron Canyon tract could increase by an estimated 1.2 acre feet, or about 1.0 percent of the estimated annual sediment inflow to Millsite Reservoir.

Development of the tracts would have a minor impact on surface-water quality in the general area of the tracts, access roads, loadouts, and affected communities. The regional impact on water quality would be negligible. However, there could be serious local impacts due to local increases in sediment yields or accidental spills of contaminants.

Water discharged from mines would generally increase the salinity in the receiving streams by up to 2 to 3 milligrams per liter. Localized changes in small intermittent streams would be larger. Except in the case of transbasin diversion of water by mines and possible contamination of the mine water, the salt load of the receiving streams would not be significantly increased. Any increase in salt loading from mine dewatering would be negligible compared to the salt loading from irrigated lands in the lower stream reaches, especially those in the Price, San Rafael, and Dirty Devil River basins.

Accidental pollution and pollution control system failures on the Gooseberry tract could add nutrients to streams that flow into Scofield Reservoir. This would contribute to eutrophication of the reservoir for a short period of time.

By the year 2000, 4,655 acre-feet per year more water would be diverted for mining and associated population growth. The annual consumption rate would be 2,454 acre feet (Table 4-63). Salt concentration resulting from withdrawal of

the water and salt loading resulting from return of the unconsumed water (chiefly from fluid-waste disposal systems) would have a minor effect on the salinity of the Colorado and Sevier Rivers. For example, the salinity of the Colorado at Imperial Dam would be increased by an estimated 0.21 milligrams per liter which is negligible compared to the salt loading of irrigation and natural runoff from the salt-bearing Mancos Shale.

Rock fracturing associated with the subsidence tends to divert more snowmelt and rainfall underground increasing ground water recharge at the expense of overland runoff. Fracturing could divert ground water and either reduce or increase the flow of springs that provide baseflow to headwater streams. Subsidence-caused fracturing could also divert streamflow directly underground if the fracture intersects a stream channel and remains open. Springflow and streamflow diverted underground by subsidence-caused fracturing would not be lost from the hydrologic system and might not be lost from the drainage subbasin in which it originates. The water would move through newly formed fractures and would degrade in quality more rapidly than it would as overland runoff. The chance of a subsidence-caused fracture reaching the land surface and diverting the flow of even one spring (or headwater stream) is small.

Ground Water

Mining and mine dewatering would create pressure gradients in the local ground water systems causing ground water to move toward the mine workings. This could induce the movement of saline water (such as that found in the Mancos Shale) into freshwater aquifers such as the Star Point Sandstone, thus locally reducing the quality of the fresh water aquifers (Lines et al., 1982).

Underground mine workings would disrupt local ground water flow systems in the Blackhawk Formation and adjacent formations causing a redistribution of ground water discharge. New discharge points (in most cases mine discharge sites) would generally be in the same drainage subbasins as the former natural discharge points; however, several of the tracts straddle the divides between drainage subbasins and mine workings would divert from one drainage subbasin to another. Mining of the Book Cliffs tracts could divert some ground water from the Uinta Basin to the Price River Basin.

The volume of ground water that would be diverted from one drainage subbasin to another is probably very small compared to the total water yield of the individual subbasins affected. The fine grained, poorly permeable beds of the Book Cliffs probably transmit about 30 acre-feet of water per year from the tracts to the Uinta Basin. This is only about 0.02 percent of the estimated mean annual runoff from the southern Uinta Basin as estimated by Price and Miller (1975). Proportionately small amounts of water probably are transmitted through the rocks in the area of the other central Utah tracts, assuming mine workings on those tracts do not intersect as yet unmapped faults similar to those intersected in the Wilberg and Deer Creek mines.

Water Supply and Use

Alternative Three would require up to 4,655 acre-feet of water per year for mining and public water supply needs (Table 4-63). An estimated 2,454

acre-feet of water would be consumed annually. This represents about 0.05 percent of the combined average annual runoff of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, Utah, or about 0.17 percent of Utah's share of Colorado River water. Impacts on the available supply in individual drainage subbasins could be larger. Table 4-65 shows the estimated annual mine-and-population-related water requirement from affected drainage subbasins as related to average annual discharge at maximum flow gaging stations.

TABLE 4-65
CENTRAL UTAH WATER REQUIREMENTS COMPARED TO RIVER BASIN RUNOFF
ALTERNATIVE THREE

River Drainage Basin	Gaged site (Figure 3-4)	Combined average annual discharge at gaged site (acre-feet)	Approximate total Round Two Leasing water requirement	
			Acre-feet	Percent of average annual gaged discharge
Price River	18	103,600	2,150.8	2.1
San Rafael River	46, 47	96,940	1,116.4	1.1
Dirty Devil River	55	16,820	472.0	2.8
Sevier River	58	162,300	915.5	0.6
Total	N/A	N/A	4,654.7	N/A

Maximum annual water requirement from affected drainage subbasin would range from about 0.6 percent of the annual discharge in the Sevier River basin to about 2.1 percent of the discharge of the Price River.

Vegetation

Implementation of this alternative would directly disturb a total of 1,293 acres of vegetation by the year 2000. This disturbance would result from exploration activities, construction of surface facilities, access roads, powerlines, and loadout facilities. The majority of this disturbance would occur in the Pinyon-Juniper Woodland and Conifer-Aspen forest (Table 4-66).

An additional 1,768 acres of vegetation would be lost or altered as a result of community expansion and mine water use. By the year 2000, 970 acres of land would be required for community housing of which 485 acres would be agricultural lands. In addition, 798 acres of agricultural lands would be retired from irrigation to provide water for mining and community needs. Table 4-66 summarizes disturbances by year and vegetation type.

While cumulative vegetation disturbance would total 3,061 acres, actual activities resulting in vegetation loss would occur at different periods of time following lease issuance. As a result, portions of the acreage identified in Table 4-66 would be in various stages of reclamation by the year 2000. The following summarizes major vegetation disturbing activities and if or when vegetation reclamation would likely occur.

TABLE 4-66

CUMULATIVE VEGETATION DISTURBANCE BY
VEGETATION TYPE: CENTRAL UTAH

ALTERNATIVE THREE

Vegetation Type	Direct Mining Impacts ^a (Acres)				Indirect Impacts ^b (Acres)	Total ^c
	1987	1990	1995	2000	2000	2000
Agriculture	-	-	-	-	1,282.8 ^d	1,282.8
Desert Shrub	1.0	87.0	87.0	89.0	102.3	191.3
Sagebrush-Grass	44.3	121.1	128.9	131.9	10.5	142.4
Pinyon-Juniper Woodland	12.5	382.0	385.5	387.7	281.6	669.3
Mountain Brush	4.0	56.9	60.9	63.9	21.4	85.3
Ponderosa Pine	24.0	132.1	135.1	135.6	-	135.6
Aspen	9.5	38.9	40.9	43.9	-	43.9
Conifer-Aspen	96.0	306.6	320.6	323.6	-	323.6
Non-Productive	7.5	19.0	21.5	24.8	69.0	93.8
Other (Douglas fir, Mountain Meadow, Grassland, etc.)	54.3	89.7	89.7	92.8	-	92.8
TOTAL	255.1	1,233.3	1,270.1	1,293.2	1,767.6	3,060.8

a Includes surface facilities, portal access, mining operations, exploration activities, powerlines, ventilation construction, and loadout areas.

b Total lands lost to community expansion including agricultural lands retired from irrigation to provide water for community needs. This acreage was computed for the year 2000 only and does not include 90 acres of irrigated cropland that would be retired for exploration water requirements from 1987 through 1990.

c Total vegetation disturbance by the year 2000.

d Includes 485.2 acres lost to community development and 797.6 acres retired from irrigation to provide water for mining and community needs.

Strip mining and associated developments on the Blue Trail Canyon tract would result in total removal of vegetation from 65.0 acres by the year 2000. However, only about 4 acres would be disturbed annually by strip mining activities. Based on a projected reclamation plan it is anticipated that no more than 20 acres would be unreclaimed at any one time in the mining area.

Exploration activities involving construction of drill pads and access roads would disturb a total of 255 acres by the year 1990. By the year 2000 this acreage, while included in the cumulative total of acres disturbed, would be in advanced stages of reclamation.

Implementation of this alternative would result in the loss of 1,038 acres of vegetation for which no reclamation would begin until completion of mining activities. This would include areas used for surface facilities, portal access, powerlines, ventilation installation, and loadout facilities. Certain access roads may continue to be used for other purposes following completion of mining and would not be reclaimed. Agricultural and nonagricultural lands surrounding local communities which would be lost to community expansion or retired for irrigation to provide water for community expansion would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of residential developments.

Even though less than 50 acres of Douglas fir communities in the Book Cliffs would be removed, it would represent a permanent commitment of the resource as the stands are not reproducing themselves. The areas disturbed would eventually revert to a mountain brush community.

For areas that would be reclaimed, the duration of the impact of total vegetation loss would depend upon the success of reclamation. As discussed in Alternative One, reclamation attempts on the Wasatch Plateau and Book Cliffs tracts are expected to be 50 to 80 percent successful (Hagihara et al., 1972). On steep slopes and areas of poorly developed soils in this area, 30 percent of revegetation attempts are expected to be successful.

Reestablishment of native species is expected to occur through natural succession over the long term. On areas of Aspen-Conifer, Ponderosa Pine, and Pinyon-Juniper Woodland, restoration to the original type would take longer. Fifteen to 20 years or more would be required for a return to original conditions.

Implementation of this alternative would not directly impact any listed or candidate threatened or endangered plant species; however, inadvertent destruction of threatened or endangered species found in the region could occur through housing development, off-road vehicle activities, or unlawful collecting of these species.

Wildlife

Terrestrial

The surface disturbance from production activities of 938 acres by the year 2000 could decrease the deer populations in herd units 33, 34, 35, 36, 38, 43,

and 45 by 146 deer. Elk loss from habitat destruction including migration routes and calving grounds would be 31 animals per year or 0.3 percent of the potential Manti elk herd. The majority of the elk loss would be in critical winter range. No comparable losses of elk from the proposed mining activity would occur in the Avintaquin-White Rocks-Anthro-Argyle herd unit (Table 4-67).

Encroachment by mining activity on mountain lion and black bear home ranges, illegal killing, and loss of prey species such as deer and elk would reduce lion and bear populations by an unknown amount until reclamation was completed. The increased development and widespread human disturbance on this range would cause abandonment of some home areas and a reduction in size or use of others.

Acreage utilized in community development would be irreversibly lost as wildlife habitat. Half of the acreage would come from irrigated cropland adjacent to expanding communities. Many species inhabit these lands, notably pheasants, cottontail rabbits, doves, small birds, and mammals. With 1,283 acres of irrigated agricultural land committed to urban use by 2000 (subdivisions and water right purchases), the regional pheasant population could be reduced by 820 birds potentially reducing the cock harvest by 238. Regionally this would be insignificant, but in Carbon County where over one-half of the community development would occur, the potential cock harvest loss would be 4.5 percent of the average annual harvest.

Surface expression of subsidence such as cracks, bulges, and displacements are not expected to directly affect wildlife, but any reduction or elimination of surface water flows and associated vegetation communities could adversely affect some species. Loss of water sources would result in reduced utilization of habitat by mobile species such as deer, elk, beaver, and birds, and elimination of species such as small mammals, reptiles, and amphibians that are unable to relocate. Because of lack of data on wildlife populations and the unpredictability of subsidence and its effects, the number of animals that could be affected cannot be quantified. At the projected production level up to 51,766 acres would be susceptible to subsidence.

Construction of a minimum of 42 miles of new utility lines (estimated length of new utility and new portal access) in the area would provide additional perching and hunting sites for raptors. This would be a beneficial impact; however, use of these structures along roadsides or in areas open to human access would expose the birds to illegal shooting and disturbance (BLM, 1981a). The extent of losses from this activity cannot be tabulated but approximately 16 miles of the new utility lines would be adjacent to portal access roads.

With this proposed level of production, 64 miles of new and improved portal access roads would be needed for access and truck hauling of coal. Most of these roads would be in deer and elk summer and winter ranges and vehicle traffic on them would present an additional hazard to wildlife (BLM, 1981a). In the 1980-81 field year 292 deer were recorded as traffic mortalities in deer herd units 33, 34, 35, 36, 3, 43, and 45. By 2000 the 14 percent

TABLE 4-67

CENTRAL UTAH
BIG GAME HABITAT DISTURBANCE
ALTERNATIVE THREE

Tract	Acres Disturbed	Plant Community	Wildlife Use ^a	Species	Losses/ Year ^b
Alkali Creek	39.1	P-J/P. Pine ^c	HP Winter	Deer	5
Coal Creek	83.5	P-J/Sagebrush	HP Winter	Deer	6
Dugout Pace	2.5	Sagebrush	HP Winter	Deer	1
Graves	0	P-J	HP Winter	Deer	2
Hoffman Creek	0	-	-	-	-
Soldier Creek	11.8	Sagebrush	S Summer	Deer	1
Whitmore Park	0	-	-	-	-
Acord	0	Sagebrush	HP Summer C Winter	Deer Elk	0 0
Castle Valley Ridge	155.0	Conifer/ Grass	HP Summer HP Summer	Deer Elk	26 7
Ferron Canyon	129.9	P-J/ Sagebrush	HP Winter HP Winter	Deer Elk	10 7
Gooseberry	34.1	Aspen/Grass	HP Summer HP Summer	Deer Elk	13 2
Ivie	2.0	Mt. Shrub	S Winter C Winter	Deer Elk	0 0
North Trough Springs	58.1	Conifer/ Grass	HP Summer HP Summer	Deer Elk	28 3
Quitcupah	155.1	P-J/P.Pine	C Winter C Winter	Deer Elk	11 7
Skumpah	76.0	Mt. Shrub	HP Summer C Winter	Deer Elk	18 4
The Pines	114.1	P-J/Sagebrush	C Winter C Winter	Deer Elk	21 5
Trail Mountain	76.9	P-J/Sagebrush	HP Winter	Deer	4
Walker Flat	0	Desert Shrub	S Winter	Deer	0
Totals	938.1			Deer Elk	146 31

^a See Appendix 8. HP, High priority; S, Substantial; C, Critical.

^b Includes 0.1 mile influence zone. Based on optimum management level objectives Deer/acre/habitat type, UDWR, 1981a.

^c Pinyon-Juniper/Pinyon pine

increase in traffic from coal hauling and commuting could increase the deer traffic mortality on existing roads to 333 animals per year. An additional 200 deer could become traffic mortalities on new roads (Table 4-68). However, this could decrease after the initial years of use because of habituation and dispersal of deer by human activity. Total traffic mortality (556) when combined with habitat losses would result in the loss of 1 percent of the region's deer population. Elk loss resulting from increased traffic has not been estimated but is expected to be low.

Heavily traveled portal access roads could be a limiting factor to small, isolated animal populations and become an obstacle to small animal movement especially among forest dwelling species (BLM, 1981a).

The escarpments of the Wasatch Plateau and the Book Cliffs are favored nesting sites for raptors especially golden eagles. Nesting concentrations are located in the south Wasatch Plateau and around Alkali Creek in the Book Cliffs. Impacts to raptor nesting sites would be as analyzed in Alternative One.

The human population increase in 1987 is expected to be 4 percent above the projected baseline, peaking at 18 percent above by 2000. Similar increase in hunters, fishermen, and ORV use (Recreation Section) would result. The presence of a larger human population and pressures on the wildlife populations through harvest, harassment, and displacement from habitat would be as analyzed under Wildlife, Alternative One.

By 2000 an additional 4,440 2-wheel drive and 4-wheel drive trucks could be located in the four-county region. An increase in unregulated use of unimproved roads on the Wasatch Plateau and Book Cliffs would result and would adversely affect the elk habitat in the Manti herd unit (Lyon, 1979). This effect would also apply to other wildlife species inhabiting these areas.

Assuming a rate equal to the reported increase in population and issued citations discussed for Wildlife, Alternative One, the 18 percent human population increase projected by the year 2000 could result in a 66 percent increase in illegal taking of wildlife. Illegal killing of wildlife could significantly reduce big game populations.

Fisheries

Pollution of fisheries from coal wastes and coal mine drainage would not be anticipated with reasonable enforcement of applicable State and Federal laws. The impacts resulting from accidental mine related pollution, including fugitive dust from coal hauling trucks would be as analyzed in Alternative One.

Ferron Creek, Mud Creek, Muddy Creek, Quitchupah Creek, and some tributaries of Huntington Creek could suffer dewatering in short sections if subsidence occurred and altered the channels. Mitigation measures could repair the channel and restore the flow avoiding permanent damage and total loss of fisheries.

TABLE 4-68

CENTRAL UTAH
POTENTIAL DEER TRAFFIC MORTALITY FROM NEW ROADS
ALTERNATIVE THREE

Tract	New Roads (miles)	Deer Range ^a	Deer Loss/ Year ^b	Mine Life ^c
Alkali Creek	1.6	HP Winter	2	25
Coal Creek	4.8	HP Winter	6	40
Dugout Pace	0	HP Winter	0	45
Soldier Creek	0	S Summer	0	40
Acord	0	HP Summer	0	18
Castle Valley Ridge	14.1	HP Summer	69	40
Ferron Canyon	11.7	HP Winter	28	20
Gooseberry	1.5	HP Summer	10	40
Ivie	0	S Winter	0	40
North Trough Springs	5.0	HP Summer	24	40
Quitcupah	8.5	C Winter	13	40
Skumpah	4.05	HP Summer	16	40
The Pines	7.9	C Winter	19	40
Trail Mtn.	4.6	HP Winter	13	40
Totals	63.75		200	

^a See Appendix 8. HP, High priority; S, Substantial; C, Critical

^b 1,280 acre (1 mile each side of road) X road length/deer density X 0.076 = deer loss/year. Divided again by 2 because occupancy of summer or winter range for six months.

^c Deer losses at this rate only apply to initial years of road use.

Fishing pressure impacts on popular waters such as Electric Lake, Huntington Creek, Joe's Valley Reservoir, Scofield Reservoir, Johnson Valley Reservoir, and Fish Lake would be as analyzed in Alternative One.

Threatened or Endangered Species

No significant impacts to threatened or endangered species or known habitats would be expected. However informal consultation has been initiated with USFWS to confirm these findings and to determine the overall impact to threatened and endangered species in connection with other central Utah projects (e.g. tar sand development).

Land Use

Agriculture and Range

During the construction and production phases of coal resource development there would be changes principally from grazing to mining and support uses, from agricultural land to community use, and from irrigated cropland to retired cropland. Table 4-69 displays projected total acres of temporary and permanent land change by activity. Table 4-70 displays acreage converted permanently to community development, agricultural acreage converted to community development, and irrigated cropland retired to provide community water. Impacts to non-agricultural and irrigated croplands as well as the effects to existing uses on coal tract areas are discussed below.

Permanent land changes associated with community expansion would affect cropland agriculture and community development in Carbon, Emery, Sanpete, and Sevier Counties. By the year 2000, these counties would experience a permanent change of approximately 970 acres from grazing and agricultural uses to housing and community infrastructures. Of the 970 acres, 485 acres (50 percent) would be irrigated cropland (consisting mainly of alfalfa and small grains). The remaining 485 acres would be non-agricultural lands adjacent to existing communities. An additional 728 acres of irrigated croplands would be retired to provide community water requirements (Table 4-70). Permanent land changes would occur on 1,698 acres (Table 4-69) due to conversion of land for community expansion and the retirement of irrigated cropland to provide community water needs.

Water requirements for exploration and mining activities would also impact irrigated cropland. Water for approximately 96 acres of irrigated cropland would be diverted to exploration activities over a 3-year period. For mining activities, irrigation water sufficient for approximately 70 acres of cropland would be diverted annually during the life of the mines.

In summary, total agricultural lands affected by the year 2000 due to the conversion of irrigated croplands for community development, retirement of irrigated croplands for community water supply, and the diversion of water for exploration and mining activities would be 1,373 acres. Water for approximately 90 acres of cropland (retired by exploration activities) would be available for cropland use upon completion of exploration (1989). All of the affected irrigated cropland would be off the proposed coal tracts. These acres represent less than 1 percent of the total four-county cropland acreage,

TABLE 4-69

CENTRAL UTAH
ACRES OF LAND CHANGES DUE TO COAL TRACT DEVELOPMENTS
BY YEAR 2000
ALTERNATIVE THREE

Projected Maximum ^d Total Acres Changed From One Land Use to Another	Temporary Land Changes Acres of Land Change Due to Mining Operations, Including On-Tract and Offsite Support Facilities	Permanent Land Changes--Acres Changed ^c for Community Development and Acres Irrigated Cropland Retired to Provide Community Water Needs
	834 acres for access routes, ^b 359 acres for on-tract facilities 100 acres for off-site loadout facilities 70 acres of irrigated land retired for mine water	1,698
Totals	3,061	1,363
		1,698

Source: Utah State Office - Bureau of Land Management (BLM, 1982a).

- a Projected Maximum Total Acres Changed From One Land Use to Another are totals of Temporary Land Changes plus Permanent Land Changes.
- b Exploration drill pads counted as part of access acres.
- c Figures shown are totals taken from Table 4-70 (Total Acres Converted column plus Additional Irrigated Acreage Retired column for year 2000).

TABLE 4-70

CENTRAL UTAH
LANDS AFFECTED BY COMMUNITY DEVELOPMENT AND WATER REQUIREMENTS
ALTERNATIVE THREE

Location (Census County Div.)	1987			1990			1995			2000		
	Total Acres Community Development a	Irrigated Acres for Community Development b	Additional Irrigated Acreage Retired c	Total Irrigated Lands Affected d	Total Acres Community Development a	Irrigated Acres for Community Development b	Additional Irrigated Acreage Retired c	Total Acres Community Development a	Irrigated Acres for Community Development b	Additional Irrigated Acreage Retired c	Total Irrigated Lands Affected d	
Carbon	64.5	32.4	48.4	80.8	132.1	66.1	99.1	132.1	66.1	99.1	165.2	
Emery	44.2	22.1	33.2	55.3	100.6	50.3	75.5	100.6	50.3	75.5	125.8	
Sanpete	22.5	11.3	17.0	28.3	23.2	11.7	17.4	23.2	11.7	17.4	29.1	
Sevier	33.1	16.6	24.8	41.4	41.9	21.0	31.4	41.9	21.0	31.4	52.4	
Total	164.3	82.4	123.4	205.8	297.8	149.1	223.4	297.8	149.1	223.4	372.5	
Carbon	367.1	183.6	275.4	459.0	454.1	227.1	340.6	454.1	227.1	340.6	567.7	
Emery	271.2	135.7	203.4	339.1	314.1	157.1	235.6	314.1	157.1	235.6	392.7	
Sanpete	67.4	33.7	50.6	84.3	71.1	35.6	53.4	71.1	35.6	53.4	89.0	
Sevier	122.3	62.7	91.7	154.4	130.7	65.4	98.0	130.7	65.4	98.0	163.4	
Total	828.0	415.7	621.1	1,036.8	970.0	492.7	727.6	970.0	492.7	727.6	1,212.8	

Source: Utah State Office, Bureau of Land Management (BLM, 1982a).

a,b,c Figures based on Analysis Assumptions and Guidelines listed in Chapter Four.

d Total Irrigated Lands converted and/or retired = b+c.

but they include lands that are among the most favorable for agricultural use (Utah Department of Agriculture, 1982). Some prime farmland could be among that converted and retired, unless planning avoided such areas.

About 960 of the 1,373 acres of affected irrigated cropland would be in Carbon and Emery Counties. This would be 1.5 percent of the cropland in the two-county area (Utah Department of Agriculture, 1982). The remaining 413 acre irrigated cropland loss would occur in Sanpete and Sevier Counties, with no significant impacts to the two-county agricultural land base (0.2 percent).

Land changes from irrigated cropland to community use and from irrigated cropland to retired cropland would eliminate cattle, sheep, and horse grazing on such land. Due to variability of grazing numbers and season of use on the existing cropland acres, actual AUM losses could not be predicted. Due to the high grazing capacity on such areas, overall losses could be high, i.e., 1 AUM lost for every 5 acres converted. Such losses would significantly affect small operators.

There would be temporary land changes on 1,363 acres (Table 4-69). The following discussion presents the effects of these land changes on existing uses. Some of the effects would be long-term, extending beyond mine life.

Losses of livestock grazing numbers (AUMs) on BLM and FS allotments would be insignificant with a loss of less than 2 percent of the total AUM capacity of any Federal allotment and less than a 2 percent annual reduction on directly affected private surface.

As discussed for Alternative One grazing reductions on BLM and FS allotments and private surface could require corresponding reductions of animal numbers on private off-tract areas.

There would be increased difficulty in moving livestock to and from grazing areas served by Deadman, Coal, Soldier, Dugout, Pace, Rock, and Cottonwood Creek and Straight Canyons and in Ferron and Link Canyons. Congestion caused by new developments and increased traffic in these canyons would result in greater hazards of vehicle collisions with migrating livestock.

Subsidence and dewatering of aquifers due to mining operations could reduce or eliminate livestock water sources. The livestock water sources provided by Ivie and Saleratus Creeks could be lost due to subsidence on the Walker Flat tract. Loss of these water sources would necessitate large reductions in grazing numbers on the Saleratus Allotment where there are 1,843 Federal and 325 private AUMs. This loss would be of a temporary nature as the lessee would be required to replace water lost as a result of mining activity.

Energy and Minerals Development

Conflicts could result between the development of the coal tracts and the development and operation of existing leases if there were different lessees involved. These conflicts would mainly involve transportation and utility access.

Oil and gas development could be hampered by underground coal mining. In the Book Cliffs and Emery areas, quantification of the effects are unknown since the area of the tracts has not been sufficiently drilled to determine oil and gas potential. Coal development would be favored over oil and gas development (BLM, 1981a).

In the Wasatch Plateau area, coal exploration and development of coal resources on the North Trough Springs, Castle Valley Ridge, and Trail Mountain tracts could conflict with the oil and gas exploratory well drilling and the development of potential and known oil and gas fields located within the boundaries of the above coal tracts. Quantification of the effects are unknown since information on oil and gas reserves and production potential for the fields has not been published by the companies involved.

Subsidence and surface disturbing operations associated with coal exploration and development on the North Trough Springs tract could damage wellhead facilities and pipelines and curtail gas production.

Rights-of-Way, Special Uses, Other Land Uses

As discussed under Alternative One, adherence to EPA and State water discharge criteria and standards would protect the established beneficial uses of affected streams, including those streams classified as sources for domestic water systems. However, water contamination accidents or periodic system failures at mine locations (such as cited for Huntington Canyon - see Chapter 3 Land Uses) could require that the coal lessees or communities in Carbon and Emery Counties plan and fund new water treatment facilities and measures.

Subsidence within the tracts could degrade the quality and reduce the quantity of water from seven municipal watersheds in Carbon and Emery Counties. Communities deriving domestic water from affected springfed streams would have to upgrade existing treatment facilities and/or develop new water sources. Alternative water sources are generally not available to the affected communities.

Exploration and production activities on the Trail Mountain and Ferron Canyon tracts could disturb the mechanical watershed treatment areas located on portions of these tracts and nullify past erosion control investments.

Land Use Plans, Controls, and Constraints

Federal Plans

All tracts identified in central Utah have been addressed in Federal Land Use plans (see Chapter 1). The Secretary of the Interior would consult with the Secretary of Agriculture for consent to offer tracts located on National Forest Service System lands (43·CFR 3420.4-2). The Secretary of Agriculture's decision would be based on Land and Resource Management plans directed by the National Forest Management Act of 1976. The Manti-LaSal and Fishlake National Forests are scheduled to complete the plans by late 1985. For all other

tracts it has been determined that leasing would not conflict with any Federal land use plans if mitigating measures are applied as directed by the surface managing agency.

County Plans

All tracts and alternatives were evaluated in light of county plan direction and zoning ordinances. Although county plans and zoning restrictions are not applicable to Federal lands, plan and zoning direction has been considered in coal leasing proposals on Federal land as well as on State and private lands.

Most tract developments in Carbon County would be in the CE-1 zone where coal mining is not allowed. Zoning variances or rezoning to the CE-2 zone would have to be approved by Carbon County before mining could proceed. All coal mine developments on tracts in Emery, Sanpete, and Sevier Counties would be in zones where coal mining is allowed.

All coal mine developments would be required to implement county mitigation requirements for protection of other land resources as well as for social and economic concerns (see Chapter 3 for description of county plan concerns). If such measures are applied and met, potential conflicts could be resolved to the satisfaction of the counties.

Socioeconomics

The assumptions pertaining to economic activity described in Alternative One are also applicable to Alternative Three. It should be noted that for Alternative Three in Carbon, Emery, and Sevier Counties, the work force requirements are larger than for Alternative Two. Therefore, cumulative impacts would be greater.

Population, Income, and Employment

Population increases that would result from increased coal mining under Alternative Three would begin in 1987 with 3,010 additional people and reach 17,600 by the year 2000, an 18-percent increase over the baseline projection. The employment increase would range from 1,930 in 1987 to 7,260 by 2000. Population and employment projections for Alternative Three are provided in Table 4-71. Projections of total personal income and per capita income for the four counties are provided in Table 4-72. As in the previous alternatives, the total county projections are based on a weighted average of the baseline projections and the impact projections. Per capita incomes are projected to reach levels from 1 to 8 percent greater than the baseline projections.

Infrastructure

Housing

Carbon County would experience the largest increase in demand for housing under Alternative Three. By the year 2000 1,320 additional single family

TABLE 4-71

CENTRAL UTAH
POPULATION AND EMPLOYMENT
PROJECTIONS BY COUNTY
ALTERNATIVE THREE
1987, 1990, 1995, 2000

County	Population	Total Employment
Carbon		
1987	1,200	790
1990	2,400	1,000
1995	6,600	2,800
2000	8,200	3,200
Emery		
1987	800	180
1990	1,800	370
1995	4,900	1,000
2000	5,700	1,100
Sanpete		
1987	410	340
1990	420	250
1995	1,200	660
2000	1,300	660
Sevier		
1987	600	620
1990	750	890
1995	2,200	2,300
2000	2,400	2,300
Totals	17,600	7,260
year 2000		

TABLE 4-72

TOTAL PERSONAL INCOME PROJECTIONS BY COUNTY
ALTERNATIVE THREE
1987, 1990, 1995, 2000

County	1987	1990	1995	2000
<u>Carbon</u>				
Total Personal Income (\$1,000)	361,119	404,615	499,013	537,535
Total Population (Baseline + Impact)	34,100	37,600	43,800	45,900
Per Capita Personal Income	\$10,590	\$10,761	\$11,393	\$11,711
<u>Emery</u>				
Total Personal Income (\$1,000)	144,172	167,511	225,680	240,557
Total Population (Baseline + Impact)	14,900	16,600	20,000	20,400
Per Capita Personal Income	\$ 9,676	\$10,091	\$11,284	\$11,792
<u>Sanpete</u>				
Total Personal Income (\$1,000)	130,639	144,408	178,250	197,397
Total Population (Baseline + Impact)	19,510	20,820	23,000	23,700
Per Capita Personal Income	\$ 6,696	\$ 6,939	\$ 7,750	\$ 8,329
<u>Sevier</u>				
Total Personal Income (\$1,000)	170,581	214,784	285,434	323,481
Total Population (Baseline + Impact)	20,300	22,350	26,300	27,800
Per Capita Personal Income	\$ 8,403	\$ 9,610	\$10,853	\$11,636

Note: Figures in this table are in 1980 dollars.

units, 550 additional mobile homes and 330 additional multi-family units would be necessary to accommodate projected growth. By the year 2000, Emery County would require 960 additional single family units, Sevier County would require 390 additional single family units, and Sanpete County would need 210 additional single family units. Table 4-73 summarizes the projected increases for housing by type for each county. If required housing units are not available as needed, housing prices could increase to the point of causing personal hardships and the use of substandard housing would also increase.

Education

Projected education growth and needs are identified in Table 4-74. Emery County would experience the largest growth over baseline forecasts. In 1987, 140 additional students would require six new teachers over the baseline forecast. By the year 2000, 36-percent growth would occur representing a need for 64 additional teachers to serve the 1,600 additional school-age children in the district over the baseline needs.

By the year 2000 in the Carbon School District anticipated growth would be 24 percent over baseline forecasts. This would require 94 new teachers to teach the 2,370 additional students.

The Sanpete County School District, while projected to face a growth in the number of students under baseline forecasts, would receive a smaller percentage increase from Alternative Three than Carbon or Emery Counties. By 1987, implementation of this Alternative would add 79 additional students to the baseline forecast of 4,930. Another 317 students would be added by 2000 to the projected baseline of 6,315. Fifteen new teachers would be required beyond the baseline demand of 260 by the year 2000 to instruct a total of 6,884 students in Sanpete County.

In Sevier County the growth rate would increase by approximately 2 percent from the baseline growth forecasts by 1990. Between 1990 and 1995, however, growth over the baseline would increase to 8 percent and widen to 9 percent by the year 2000. At that time 27 additional teachers over the baseline demand for 305 teachers would be necessary to instruct the total 8,323 school-age children in the district.

The quality of education could deteriorate if proper planning and cooperation are not directed toward providing sufficient personnel, equipment, and facilities to keep up with the projected growth in student populations.

Water and Sewer

The Price River Water Improvement District provides water to much of Carbon County, particularly the Price area. The expansion of water rights, storage capacity and distribution lines would be necessary to absorb growth forecasts under Alternative Three. Water needs are found in Table 4-75 and sewer facility needs are identified in Table 4-76.

TABLE 4-73

CENTRAL UTAH
HOUSING DEMAND BY TYPE
ALTERNATIVE THREE
1987, 1990, 1995, 2000

County	Single Family		Multi-Family		Mobile Homes	
	Total	Impact	Total	Impact	Total	Impact
<u>Carbon</u>						
1987	6,528	228	1,632	57	2,720	95
1990	7,098	438	1,760	110	1,932	182
1995	8,040	1,140	2,010	285	3,350	475
2000	8,400	1,320	2,100	330	3,500	550
<u>Emery</u>						
1987	2,496	156	624	39	1,040	65
1990	2,760	360	690	90	1,150	150
1995	3,300	840	825	210	1,375	350
2000	3,360	960	840	240	1,400	400
<u>Sanpete</u>						
1987	3,378	78	845	20	1,407	32
1990	3,558	78	890	20	1,482	32
1995	3,864	204	966	51	1,610	85
2000	3,930	210	983	53	1,637	87
<u>Sevier</u>						
1987	3,594	114	899	29	1,497	47
1990	3,798	138	950	35	1,582	57
1995	4,392	372	1,098	93	1,830	155
2000	4,590	390	1,148	98	1,912	162
Total year 2000	20,280	2,880	5,071	721	8,449	1,199
Total addi- tional units (year 2000)	4,800					

TABLE 4-74

CENTRAL UTAH
 IMPACTS ON EDUCATION, HEALTH, AND LAW ENFORCEMENT BY COUNTY
 ALTERNATIVE THREE
 1987, 1990, 1995, 2000

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
CARBON								
Education								
Students	7,890	8,103	213	3	8,863	9,302	439	5
Teachers	316	324	8	3	355	372	17	5
Health Facilities								
Hospital Beds	66	68	2	3	70	75	5	7
Doctors	18	19	1	6	19	21	2	11
Dentists	16	17	1	6	18	19	1	6
Nurses	66	68	2	3	70	75	5	7
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	7	0	0	7	8	11	14
EMTs ^d	46	48	2	4	49	53	4	8
Ambulances	7	7	0	0	7	8	1	14
Nursing Homes	120	122	2	2	125	130	5	4
Law Enforcement								
Police	66	68	2	3	70	75	5	7
Police Cars	66	68	2	3	70	75	5	7
EMERY								
Education								
Students	3,987	4,127	140	4	4,390	4,720	330	8
Teachers	159	165	6	4	176	189	13	7
Health Facilities								
Hospital Beds	28	30	2	7	30	33	3	10
Doctors	8	8	0	0	8	9	1	13
Dentists	7	7	0	0	7	8	1	14
Nurses	28	30	2	7	30	33	3	10
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	3	3	0	0	3	3	0	0
EMTs ^d	20	21	1	5	21	23	2	10
Ambulances	3	3	0	0	3	3	0	0
Nursing Homes	35	37	2	6	36	40	4	11
Law Enforcement								
Police	28	30	2	7	30	33	3	10
Police	28	30	2	7	30	33	3	10

(continued)

TABLE 4-74 (cont'd.)

County	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
CARBON								
Education								
Students	9,889	11,538	1,649	17	9,692	12,062	2,370	24
Teachers	396	462	66	17	388	482	94	24
Health Facilities								
Hospital Beds	74	88	8	11	75	92	17	23
Doctors	20	24	4	20	21	25	4	19
Dentists	19	22	3	16	19	23	4	21
Nurses	75	88	13	17	75	92	17	23
Clinical Psych ^b	2	2	0	0	2	2	0	0
MSWs ^c	7	9	2	29	8	9	1	13
EMTs ^d	52	61	9	17	53	64	9	17
Ambulances	7	9	2	29	8	9	1	13
Nursing Homes	129	141	12	9	129	141	12	9
Law Enforcement								
Police	74	88	8	11	75	92	17	23
Police Cars	74	88	8	11	75	92	17	23
EMERY								
Education								
Students	4,716	5,916	<u>1,200</u>	<u>25</u>	4,459	<u>6,059</u>	<u>1,600</u>	<u>36</u>
Teachers	189	237	48	25	178	<u>242</u>	<u>64</u>	<u>36</u>
Health Facilities								
Hospital Beds	30	40	10	33	30	41	11	37
Doctors	8	11	3	38	8	11	3	38
Dentists	8	10	2	25	7	10	3	43
Nurses	30	40	10	33	30	41	11	37
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	3	4	1	33	3	5	2	67
EMTs ^d	21	28	7	33	21	28	7	33
Ambulances	3	4	1	33	3	5	2	67
Nursing Homes	36	44	8	22	35	43	8	23
Law Enforcement								
Police	30	40	10	33	29	41	12	41
Police Cars	30	40	10	33	29	41	12	41

(continued)

TABLE 4-74 (cont'd.)

County	1987				1990			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change a
<u>SANPETE</u>								
Education								
Students	4,930	5,009	79	2	5,508	5,583	75	1
Teachers	197	200	3	2	220	223	3	1
Health Facilities								
Hospital Beds	38	39	1	3	40	41	1	2
Doctors	10	11	1	10	11	11	0	0
Dentists	10	10	0	0	10	10	0	0
Nurses	38	39	1	3	41	42	1	2
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	4	0	0
EMTs ^d	27	27	0	0	29	29	0	0
Ambulances	4	4	0	0	4	4	0	0
Nursing Homes	83	84	1	1	82	83	1	1
Law Enforcement								
Police	38	39	1	3	41	42	1	2
Police Cars	38	39	1	3	41	42	1	2
<u>SEVIER</u>								
Education								
Students	5,282	5,398	116	2	6,032	6,167	135	2
Teachers	211	216	5	2	241	247	6	2
Health Facilities								
Hospital Beds	39	41	2	5	43	45	2	5
Doctors	11	11	0	0	12	12	0	0
Dentists	10	10	0	0	11	11	0	0
Nurses	39	41	2	5	43	45	2	5
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	4	4	0	0	4	5	1	25
EMTs ^d	28	28	0	0	30	31	1	3
Ambulances	4	4	0	0	4	4	0	0
Nursing Homes	78	80	2	3	78	80	2	3
Law Enforcement								
Police	40	41	1	3	43	45	2	5
Police Cars	40	41	1	3	43	45	2	5

(continued)

TABLE 4-74 (concluded)

	1995				2000			
	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a	Projected Baseline Need	Total Need w/ Impact	Impact	Percent Change ^a
SANPETE								
Education								
Students	6,315	6,632	317	5	6,501	6,884	383	6
Teachers	253	265	12	5	260	275	15	6
Health Facilities								
Hospital Beds	44	46	2	5	45	47	2	4
Doctors	12	13	1	8	12	13	1	8
Dentists	11	12	1	9	11	12	1	9
Nurses	44	46	2	5	45	47	2	4
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	5	5	0	0	5	5	0	0
EMTs ^d	31	32	1	2	31	33	2	6
Ambulances	4	5	1	25	4	5	1	25
Nursing Homes	78	80	2	3	70	71	1	1
Law Enforcement								
Police	44	46	2	5	45	47	2	4
Police Cars	44	46	2	5	45	47	2	4
SEVIER								
Education								
Students	7,203	7,778	575	8	7,619	8,323	704	9
Teachers	288	311	23	8	305	332	27	9
Health Facilities								
Hospital Beds	48	53	5	10	51	56	5	10
Doctors	13	14	1	8	14	15	1	7
Dentists	12	13	1	8	13	14	1	8
Nurses	48	53	5	10	51	56	5	10
Clinical Psych ^b	1	1	0	0	1	1	0	0
MSWs ^c	5	5	0	0	5	6	1	20
EMTs ^d	34	37	3	9	36	39	3	8
Ambulances	5	7	2	40	5	7	2	40
Nursing Homes	77	81	4	5	71	75	4	6
Law Enforcement								
Police	48	53	5	10	51	56	5	10
Police Cars	48	53	5	10	51	56	5	10

^a Percent Change: Change from Projected Baseline Need to Total Need with Impact.

^b Clinical Psych: Clinical Psychologist.

^c MSW: A person with a Master's Degree In Social Work.

^d EMT: Emergency Medical Technician.

TABLE 4-75

CENTRAL UTAH
PROJECTED DEMAND FOR WATER CONNECTIONS BY COMMUNITY
ALTERNATIVE THREE
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
Carbon								
East Carbon	558	7	551	15	567	38	557	43
Helper	1,236	46	1,283	59	1,390	145	1,422	161
Hiawatha	82	0	81	0	78	0	79	0
Price	4,786	19	5,523	398	6,492	1,025	6,934	1,246
Scofield	43	0	44	0	46	0	47	0
Sunnyside	176	3	174	5	178	12	176	14
Wellington	817	53	926	110	1,144	284	1,228	345
Emery								
Castle Dale	792	48	895	109	1,075	271	1,098	309
Cleveland	171	8	186	19	214	46	218	53
Elmo	106	6	114	12	134	31	136	35
Emery	147	22	174	44	240	108	250	119
Ferron	679	100	803	202	1,106	497	1,152	548
Huntington	844	34	891	78	998	194	1,010	221
Orangeville	562	34	620	78	740	194	756	220
Sanpete								
Centerfield	266	11	279	11	306	29	313	31
Ephraim	1,079	13	1,127	12	1,218	33	1,277	31
Fairview	420	30	492	30	550	80	554	83
Fountain Green	212	2	212	2	215	6	215	6
Gunnison	522	19	551	19	603	51	611	52
Manti	798	9	833	8	899	22	944	21
Moroni	372	6	391	6	407	16	410	17
Mt. Pleasant	914	27	985	27	1,051	72	1,056	75
Spring City	250	6	262	5	275	14	277	15
Wales	50	1	52	1	54	2	54	2
Sevier								
Aurora	352	22	373	24	430	63	445	65
Redmond	248	14	263	16	301	41	311	42
Richfield	2,500	98	2,706	127	3,148	347	3,219	362
Salina	812	60	860	64	1,008	171	1,042	175

Note: Numbers indicate total demand for water connections, baseline plus impact.

NA - Information not available.

TABLE 4-76

CENTRAL UTAH
PROJECTED CAPACITY FOR WASTEWATER TREATMENT FACILITIES BY COMMUNITY
(GALLONS PER DAY)
ALTERNATIVE THREE
1987, 1990, 1995, 2000

County	1987		1990		1995		2000	
	Total	Impact	Total	Impact	Total	Impact	Total	Impact
Carbon								
East Carbon	174,700	2,300	175,300	5,000	184,300	13,500	180,100	15,600
Helper	386,500	14,100	408,200	19,100	453,300	51,200	462,100	58,700
Hiawatha	25,700	0	25,700	0	25,100	0	25,400	0
Price	1,550,600	58,400	1,759,500	129,600	2,128,900	363,000	2,275,100	454,900
Schofield	13,500	0	14,000	0	14,800	0	15,000	0
Sunnyside	55,000	800	55,200	1,600	58,100	4,400	56,700	5,000
Wellington	255,400	16,200	295,300	35,900	378,200	100,500	408,700	126,000
Emery								
Castle Dale	282,500	14,700	323,000	35,400	393,400	95,900	402,400	112,700
Cleveland	61,000	2,500	67,200	6,100	78,500	16,400	79,800	19,300
Elmo	37,700	1,700	41,500	4,000	49,200	11,000	50,100	12,900
Emery	51,800	6,700	61,900	14,200	86,800	38,100	91,300	43,300
Ferron	239,300	30,800	285,800	65,800	400,900	175,700	421,700	200,200
Huntington	302,200	10,500	322,900	25,300	365,900	68,500	370,100	80,500
Orangeville	200,500	10,500	223,800	25,300	270,400	68,500	277,100	80,500
Sanpete								
Centerfield	91,300	3,400	97,200	3,600	110,100	10,300	112,800	11,000
Ephraim	366,600	4,100	393,200	3,800	438,700	56,500	461,000	11,300
Fairview	143,500	9,400	171,100	9,800	197,500	28,400	200,200	30,300
Fountain Green	72,900	700	73,800	800	77,400	2,200	77,800	2,300
Gunnison	179,100	5,800	192,000	6,200	216,800	17,700	220,600	18,900
Manti	271,100	2,700	290,800	2,600	323,800	7,600	340,500	7,600
Moroni	127,600	1,900	136,400	2,000	146,700	5,800	147,800	6,200
Mt. Pleasant	313,400	8,400	343,600	8,800	377,800	25,500	381,200	27,200
Spring City	85,500	1,700	91,400	1,800	99,100	5,100	99,800	5,400
Wales	17,000	200	18,200	300	19,400	700	19,700	800
Sevier								
Aurora	120,100	6,800	130,500	7,800	155,000	22,400	161,800	23,700
Redmond	84,600	4,400	92,000	5,100	108,500	14,600	113,300	15,500
Richfield	853,300	30,100	948,100	41,500	1,134,300	122,900	1,205,300	132,300
Salina	276,600	18,400	300,700	21,000	362,500	60,300	378,600	63,900

Total is baseline plus impact.

Sanpete County would experience increases in the demand for water connections in some of its communities. Ephraim would experience growth from a demand for 1,079 water connections in 1987 to 1,277 water connections by the year 2000. Fairview would grow from 420 water connections in 1987 to 554 water connections in the year 2000 while Mt. Pleasant would see demand rise from 914 water connections in 1987 to 1,056 water connections by the year 2000. Demand for sewer capacity would also increase significantly throughout the communities of Sanpete County, particularly in the communities of Gunnison, Ephraim, and Manti.

Water for culinary and industrial purposes in Sevier County would not pose any immediate constraint under Alternative Three. All of the potentially impacted cities have both adequate flow and adequate supply, however, Richfield is experiencing deficiencies in storage capacity. Richfield would see the growth in the total demand for water connections from the existing 1,902 connections to 4,303 by the year 2000. The water source for the city comes from one well and one underground spring. The water rights are more than adequate to meet present demand.

None of the potentially impacted communities with the exception of Richfield and Salina have wastewater treatment facilities. Salina is approaching the system's maximum capacity.

Public Safety

The impact on law enforcement services would be similar for Emery and Sanpete Counties to that discussed under Alternative Two. Carbon County, however, would experience a 23-percent increase for law enforcement services over baseline demand by the year 2000. Sevier County would also experience a slightly larger increase in demand for police services (10 percent) by the year 2000. Table 4-74 details the increases necessary to accommodate projected growth. Failure to provide adequate law enforcement capability could result in increases in the instances and severity of illegal activities in affected areas.

Health care needs are identified in Table 4-74. Carbon and Emery Counties are currently served by the 70-bed Castleview Hospital in Price. By 1987 the total of new bed demand would be 98 although only four beds would be a direct result of Alternative Three. By the year 2000, 28 additional beds would be required over a baseline demand of 105 beds.

By the year 2000, mental health staff would need to increase by three over the baseline demand of 14 in the Carbon/Emery areas. Three additional ambulances would also be required as a result of this alternative, one in Carbon County and two in Emery County.

Sanpete County would need only two additional hospital beds to handle the demand under Alternative Three through the year 2000, in addition to one more doctor, one dentist, and two nurses.

Sevier County would need a total of five additional hospital beds by the year 2000. In addition, one new doctor and one dentist would be necessary to meet

the demand created by Alternative Three by the year 2000. Two additional ambulances and three EMTs would also be required.

Although some expansion will be necessary in the number of volunteer fire-fighting staff and perhaps some additional equipment in general, there would be only a limited impact on the fire protection abilities of all the communities in the study area under Alternative Three with the exception of Price and Richfield. Price would need a full-time fire-fighting staff of ten by 1990. An additional two people could be necessary the the year 2000. Richfield would need a full-time fire-fighting staff of six or seven by the year 2000. Inadequate fire protection capability would result in increased risk of personal injury or death and property damage.

Solid Waste

All impacted communities in Carbon, Emery, Sevier, and Sanpete Counties should have adequate disposal space for the additional solid waste generated by Alternative Three.

Social/Attitudes

The projected population increases in Carbon, Emery, Sanpete, and Sevier Counties represent both significant growth for the communities in those counties and the potential for changing both the social and political climates in those areas. However, the situations vary among the counties. The cultural diversity of Carbon County would be better equipped to handle the rapid growth. Emery County whose culture has been more homogeneous, is less equipped to absorb a diverse cultural mix that would accompany substantial growth in the coal industry. The communities of both Carbon and Emery Counties are aware of the problems that can accompany rapid growth and have incorporated some of the most strict planning and zoning ordinances within the State. County officials are utilizing all available growth management tools to ensure that they can handle the growth that is forecast for the area from additional coal leasing. However, during cycles of economic expansion, opposition to additional growth emerges; this occurred in Emery County which faced growth pressures during the late 1970s. As economic conditions change, so do the social and political attitudes toward growth. The current economic recession which contributed to the fall in demand for coal and to the unemployment of coal miners has resulted in a redirection of concern from problems of growth toward encouraging economic development. Thus it is difficult to adequately reflect a community's response to potential growth at some future date.

Sanpete and Sevier Counties would be able to withstand the growth within their communities with little disruption to their existing lifestyles. In fact, the creation of new job opportunities would have a positive effect on the economic climate in the communities and would help to stimulate local economics which have been stagnant during their recent past.

TABLE 4-77

CENTRAL UTAH
MAXIMUM INCREASES IN TRAFFIC AND VEHICLE USE
ALTERNATIVE THREE

Feature	Coal Trucks	Service Trucks	Commuters	Other Trucks	Other Cars	Totals
Max. Vehicles/day	2,440	522	5,863	406	3,498	12,729
Total Million Miles ^a	322	220	2,070	32	248	2,892
Total Mi. Gals. Fuel ^a	80	41	81	6	9	217
Total Vehicles Lives ^a	322	439	20,706	64	2,486	24,012

^a Within area of influence only. Travel outside this area is not included.

Transportation

Table 4-77 shows predicted increases in traffic due to development of the 18 central Utah tracts. Vehicles per day would increase by over 12,700 by the year 2000. Increased traffic would require increased road maintenance throughout the area and there would be an increased but unquantified number of traffic accidents. If road improvements are implemented as needed (see Alternative Four), the accident rate should remain typically low. The traffic increases and patterns would be as discussed for Alternative One with the largest increases in traffic occurring on Highway U-10 from Price southward to Castle Dale and on US 6 from Castle Gate to Price. There would be moderate increases in traffic due to mining, increases in traffic jams in Price due to increased railroad activity, and increases in traffic accidents due to increased congestion.

Mine related service trucks, coal trucks, and commuter traffic would add over 12,700 vehicles per day to the roads of the area, travel over 2.8 billion miles over the lifetimes of the mines, consume nearly 217 million gallons of fuel, and wear out nearly 24,000 vehicles, mainly family-type vehicles. Traffic associated with additional proposed mining would not by itself overload any of the highways in the area. However, this incremental traffic added to the presently overcrowded roads would exacerbate an already poor situation and require earlier upgrading and more frequent maintenance of the affected roads. A commuter bypass route around the west and southwest sides of Price would assist in removing some local community traffic from downtown Price, but major upgrading of U-10 would still be required.

Cultural Resources

As described for Alternative One, exploration and construction of surface facilities for underground mining could inadvertently disturb or destroy historic and prehistoric cultural resources. The majority of such effects could be avoided by proper placement of facilities and by salvage excavation. The total number and significance of the affected sites is unknown. Significant sites would be mitigated. Mitigation techniques are varied and include collection, mapping, photography, and excavations.

The extent of cultural resource disturbance that would result from mine-related community expansion and recreational activity is unknown.

Both scientific and aesthetic site values would be lost as a result of these indirect impacts. This loss would occur to many on and off tract significant cultural resources in Carbon, Emery, Sanpete, and Sevier Counties.

Recreation

By the year 2000, mining-related population growth would increase the local demand (users originating from within the four-county region) for both dispersed and developed recreation opportunities in the four-county region by approximately 25 percent from 1982 use figures and by approximately 18 percent over the use figures projected for year 2000.

Table 4-78 and Table 4-79 show the anticipated increases in demand for hunting, fishing, and ORV activity, respectively, during the life of the mining operation. Increased demand for dispersed activities as well as increased use of developed recreation sites and urban facilities, would result in impacts similar in type, extent, and degree to those identified in Alternatives One and Two. In summary, the additional competition for fish and game would lead to less hunter and fisherman success or restricted harvests. Increased ORV use would increase ORV conflicts with other recreational uses. Overuse of developed campgrounds, picnic areas, playfields, swimming pools, and golf courses would result in continued deterioration of existing facilities, user dissatisfaction, and additional recreation pressures on undeveloped areas including the presently overused San Rafael/Buckskin Draw area. These impacts would be greatest in Carbon and Emery Counties due to the lack of facilities and because the majority of the coal related population would live in these counties. Federal, State, and local governments would be under stress to provide recreation facilities to meet minimum standards recommended by UORA (1978).

Development of the tracts and of homesites would displace dispersed recreational use from as much as 419 acres by 1987, 1531 acres by 1990, 2,098 acres by 1995, and 2,263 acres by the year 2000. As in Alternatives One and Two, because surrounding areas offer comparable or better opportunities, loss of recreational opportunities from displacement would be minimal.

Although an unquantified amount of existing roads would be lost from use for recreational access, the 196 miles of road that would be improved or constructed for mining purposes would also improve accessibility for dispersed recreation if managing agencies allow for such use.

TABLE 4-78

PROJECTED INCREASE IN LOCAL HUNTER AND FISHERMAN DEMAND WITHIN THE FOUR-COUNTY REGION
ALTERNATIVE THREE

Year	Coal-Related Population	Projected Annual Increase in Numbers				Increased Demand for Fish	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
		Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen			
1987	3,010	542	60	271	1,354	40,620	4	4
1990	5,370	967	107	483	2,415	72,450	8	6
1995	14,900	2,682	298	1,341	6,700	201,000	21	15
2000	17,600	3,168	352	1,584	7,915	237,450	25	18

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the four-county area. Approximately 18 percent of Utah's population hunt deer, approximately 2 percent hunt elk, approximately 9 percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under 12 and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UDWR, 1978).

TABLE 4-79

PROJECTED INCREASE IN LOCAL OFF-ROAD VEHICLE DEMAND WITHIN THE FOUR-COUNTY REGION
ALTERNATIVE THREE

Year	Projected Coal-Related Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982	Overall Percent Increase from Projected Baseline
1987	3,010	752	211	4	4
1990	5,370	1,343	376	8	6
1995	14,900	3,725	1,043	21	15
2000	17,600	4,400	1,232	25	18

Note: Projections were made assuming that the percentage of the population in the four-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles, and approximately 25 percent of the population currently owns four-wheel drive vehicles or light pickups) (UORA, 1978).

Impacts to recreational traffic on the Myton, Coal Creek, Dugout Creek, Eccles Canyon, Huntington Canyon, Straight Canyon, Cottonwood Canyon, and Ferron Canyon roads would be the same as were identified in Alternative One (i.e., increase in danger, stress, and visitor dissatisfaction). Visual and audio impacts from development of the Trail Mountain and Gooseberry tracts would be the same as Alternative One.

As in Alternative One, upgrading of the Ferron Canyon road would likely result in destruction of the Ferron Canyon Picnic Area. Should this happen, the approximately 803 annual visitor days the site receives would be displaced to other developed sites as well as to dispersed areas. Because of the small number of visitor days involved, impacts resulting from displaced visitor use would probably not be noticeable.

As in Alternative One, the loss in range of scenic vistas viewed from overlooks in Canyonlands and Capital Reef National Parks (identified in the Air Quality Section of this document) may at times be perceptible to some Park visitors, reducing the quality of their recreational experience.

Visual Resources

Visual impacts identified in Alternative One as specifically occurring from development of the Blue Trail Canyon and Mud Creek tracts would not occur under this Alternative. Otherwise, impacts identified both on a specific and regional basis would be the same as identified under Alternative One. A summary follows.

Structures and surface disturbance from development of the Gooseberry tract would degrade the natural appearing vistas seen from Utah Highway 31 and from several recreation attractions. Structures and surface disturbance from development of the Trail Mountain tract would dominate the landscape as viewed from the Cottonwood Canyon road and Utah Highway 29. Visual resource management objectives would not be met in either area during the life of the mining operation.

In development of Soldier Creek, Whitmore Park, Alkali Creek, Ferron Canyon, and Ivie Creek tracts, careful placement of exploration roads, drill pads, and ventilation shafts to avoid unnecessary disturbance and high visibility from the Myton road, Ferron Canyon road, and I-70, respectively, may prevent what would otherwise be temporary degradation of visual quality and probable conflict with the VRM objectives for these tracts. Realignment of the Ferron Canyon road would result in temporary conflict with the partial retention objectives during the construction period.

Overall, no unique or outstanding scenic qualities would be lost from development of the tracts and reclamation would be effective in reestablishing the present scenic quality and character of the Wasatch Plateau and Book Cliff tracts within 10 years of completion of the mining operations. This, together with the fact that most mining activities would occur away from major travel routes, would result in the average visitor noting little change in the region's overall scenic character from development and reclamation of the tracts.

Special Designation Areas

With the exception of RARE II "nonwilderness" areas as identified in Alternative One, mining activities including new mines and transportation routes would not directly impact any special designation area. However, the increase in local recreational demand could result in increased ORV and other dispersed use of some of the 17 areas within the four-county region with special designation or potential for special designation. The more intensive use and resultant littering and vandalism would tend to degrade values for which the areas are being protected and/or reviewed. Although not quantifiable, the degree of impact would be similar in extent and intensity to Alternative One. Agencies managing the lands may be under stress to protect special values. However, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely even in a worst case situation that possible degradation would affect the suitability of any area for special designation.

Unavoidable Adverse Impacts

Three areas near Price, Castle Dale, and Mt. Pleasant, Utah, and two areas near Delta and Cedaredge, Colorado, would exceed the primary NAAQS for TSP. An average increase in annual TSP emissions of 16 percent over 1981 levels and 14 percent over the projected baseline would be expected in these areas by the year 2000. Secondary NAAQS would be exceeded in a 2,605 square mile area by the year 2000, of which 1,035 square miles would be attributed to implementation of Alternative Three. The greatest contribution to the predicted concentrations would be coal related vehicular travel on unpaved roads. No significant visibility impacts as viewed from National Parks would be anticipated. Visual impacts would be noticeable from many roads and highways often used for recreation purposes; however, the most significant impact to visual range would result from increased populations in towns and cities.

The loss of soil and vegetation productivity on 3,283 acres would be unavoidable. Approximately 1,373 acres would be eventually reclaimed following mining operations. The remaining 1,910 acres lost to community development would not be reclaimed for agricultural purposes but would be reclaimed and stabilized as part of residential development. An unquantified amount of soil would be lost from disturbed areas prior to reclamation. The mining of coal in the region would result in 1,787.5 million tons of coal (60 percent) becoming unrecoverable by present technology. Changes in aquifers such as redistribution of ground water discharge and distribution of surface water due to subsidence could not be avoided. Community use of water in the region would increase by 4,855 acre-feet by the year 2000. An additional 363 acre-feet would be required annually for mine development.

Consumptive water loss from the Colorado River system of 2,329 acre-feet per year due to coal mining and community development directly related to Round Two leasing in Utah and Colorado would not likely result in adverse effects on threatened or endangered fish species in the river system. However, in combination with other proposed water consumptive developments, Round Two Leasing may affect threatened and endangered fish in the Green and Colorado Rivers. Therefore, BLM has requested informal consultation with the U.S. Fish

and Wildlife Service (USFWS) and has added a standard mitigating measure to the Final EIS requiring lessees to develop a plan for formal Section 7 Consultation with USFWS prior to on-the-ground development.

In affected drainage basins, tract development would result in a total sediment yield of approximately 32 acre-feet annually by the year 2000. Sediment from tracts in the Wasatch Plateau could end up in local reservoirs important as fisheries and community water sources. Over 58,611 acres would be susceptible to subsidence of up to 16 feet. The loss of wildlife due to occupation, disturbance of habitat, and illegal killing would increase. Highway mortality, mostly in central Utah, would be in excess of 170 deer and elk annually and would be unavoidable; however, herd vitality should not be affected. An unquantified amount of big game habitat including winter range and calving grounds would be lost. Regionwide the loss would be insignificant although in some specific areas, big game populations would be reduced as a result.

Conversion of irrigated cropland to urban use and retirement of irrigated land to provide water for mining and community needs would result in a loss of less than 1 percent (approximately 1,375 acres) of agricultural land in the region; however, losses would be relatively larger within the vicinity of certain communities.

Portions of two tracts on the Wasatch Plateau lie within Carbon County's land use zone where coal mining is not allowed. Zoning variances or rezoning would be necessary before mining could proceed.

Population in the region would increase by 19,765 persons or 14 percent over the projected baseline by the year 2000. Housing needs would increase by over 4,500 units. Employment in the region would increase by 7,842 jobs or 14 percent over the projected baseline by the year 2000. Capital and operating expenditure requirements of local counties, school districts, and municipalities would rise as a result of the need to expand public services and facilities. Unless communities plan needed improvements in advance and ensure adequate funding, there would be at least a temporary deterioration in the quality of services, causing inconvenience and dissatisfaction among those affected. These impacts would be most acute in central Utah.

Mine-related traffic would add over 13,500 vpd (15 percent increase) to highways in the region, over 12,700 of which would occur in the central Utah area. The largest increase in traffic would occur on Highway U-10 south of Price, Utah, and US-6 east of Price where travel limits would be exceeded. Traffic congestion in downtown Price would result from increased numbers of vehicles and increased numbers of coal trains going through the community. Unpaved secondary roads in the region would experience deterioration and safety problems due to increased coal related traffic.

Inadvertent destruction or disturbance of undetected cultural and paleontological resources and losses through illegal collection or vandalism could not be avoided. The increase in demand for recreational activities over the projected baseline resulting from population increases (18 percent in central Utah and an undetermined but slight amount in west-central Colorado) could

result in an undetermined amount of overutilization and crowding of existing recreation developments and reduced hunting and fishing success. The landscape modifications that would result from mining and associated development would degrade the visual quality of those areas, in some areas, VRM standards would not be met.

The Relationship Between Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The increased population associated with mining development would result in a long-term decrease in air quality in the region.

Implementation of Alternative Three would significantly increase coal production in the region from 13 million tons in 1980 to about 48 million tons by the year 2000. Average annual production from the tracts alone would be 15.16 million tons when full production is reached. This would represent a significant commitment to coal mining in the region.

The short-term use of the environment for coal production and associated housing development would result in a long-term loss of soil and vegetation productivity on 1,910 acres permanently occupied by housing and retired from irrigation to provide water for community needs.

The extraction of 528.7 million tons of coal (40 percent) would render the remaining unmined 787.5 million tons of coal (60 percent) unrecoverable over the long term. Changes in aquifers and points of surface discharge due to subsidence would result in a long-term local change in surface water distribution and ground water storage. The short-term community and mining use of 5,218 acre-feet of water per year would be reduced by 363 acre-feet when mining ceases. The use of 4,855 acre-feet per year for community use would continue in the long term. Over the long-term, salinity at Imperial Dam would actually be reduced as water normally used for irrigation and returned to the system would be used for community development. This would more than offset salinity produced by active mining operations. Overall, the cumulative effect would be less than 1 percent.

Disturbance or occupation of habitat up to 40 years by mining activity would result in a long-term redistribution of wildlife populations and migration routes. Permanent occupation of 1,375 acres by urban development would cause a long-term loss of wildlife habitat occupied by pheasants, cottontail rabbits, mourning doves, and other small game. The loss of crop production on 535 acres occupied by housing and 840 acres retired due to conversion of water use would be a long-term loss in productivity.

The growth in population of 19,765 people in the region (14 percent over the projected baseline) would increase the area's potential productivity by enlarging its labor force, but the 7,842 jobs (14 percent over the projected baseline) associated with Federal lease mining would not continue in the long-term. Infrastructure improvement such as water systems would also contribute to increased community capacity by providing facilities useful for

commerce and industry as well as the residential population. However, until these improvements are operational, deficiencies in community services could be expected.

Excavation and salvage of sites would expand knowledge of cultural resources in the region. The development of recreational facilities as a result of demand by the increased population would be a long-term increase in capacity of recreation developments in the region.

Irretrievable or Irreversible Commitment of Resources

Emissions attributable to coal related population growth and mining activity in the region would result in an irretrievable deterioration in air quality during the life of the mining operations. Soil and vegetation productivity on 3,283 acres would be irretrievably lost for the life of the mines. Productivity on 1,910 acres occupied by housing or retired from irrigation would be irreversibly lost. Soil lost to wind and water erosion prior to reclamation would be irretrievable.

The 528.7 million tons of coal mined would be irreversibly lost as a resource and the 787.5 million tons of coal left in the ground would be irreversibly unrecoverable by present technology. Increased water consumption for mining and community needs would be irretrievable. Any change in aquifers, ground water storage potential, or point of discharge due to subsidence would be irreversible. The increased consumptive use of water for community and mining use (4,991 acre-feet per year) would be irreversible.

Big game losses through displacement from habitat, traffic mortality, and illegal killing would be irretrievable. With these increased losses, some individual herds would be adversely affected but overall vitality of the deer population would be maintained. Habitat for pheasants, cottontail rabbits, mourning doves, and other small game occupied by community development would also be irretrievably lost. Overall population vitality would be maintained but local populations, especially in Carbon County, would be significantly reduced.

The growth in population of 19,765 persons foreseen under this alternative would be irreversible except at considerable economic and human cost. Likewise, the commitment of capital, physical resources, and labor to build over 5,000 housing units and infrastructure that would be required to support the growth in population, commerce, and industry would be an irretrievable impact. The loss of smalltown atmosphere and community solidarity in some communities as a consequence of coal development would be irreversible.

Development of the coal mines as proposed would result in the irretrievable consumption of over 217 million gallons of petroleum fuels.

The loss of cultural and paleontological resources in context would be irretrievable and any loss of interpretive values would be irreversible. The adverse impacts to visual resources would be irretrievable for the life of the mines, but in most cases would be reversible following reclamation.

Significant Cumulative Impacts

The cumulative impact assessment was developed by adding the impacts of Alternative Three to those of the baseline (Alternative Four) for the year 2000. Only the most significant in central Utah are summarized below. On a Uinta-Southwestern Utah Coal Region basis, this alternative would have less impact than Alternatives One and Two because no mining would take place in southern Utah. However, in central Utah the impacts would be similar to those described for Alternatives One and Two.

Central Utah

By the year 2000, in central Utah there could be a 110 percent increase in TSP emissions over the 1981 emission levels. There could be approximately 2,235-square mile or 1,396-percent increase in area where the secondary NAAQS for TSP would be exceeded. About 43 percent of the increase would be attributable to Alternative Three.

Visual range from selected points in Canyonlands and Capitol Reef National Parks would be reduced by six to about 64 percent during 1 percent of the time. Such reductions could be perceptible to park visitors. Also, during 1 percent of the time a plume may be visible looking from Cathedral Valley in Capitol Reef National Park to the San Rafael Swell. About 21 to 24 percent of the reduction would result from Alternative Three.

Community development resulting from mining would result in a permanent loss of soil productivity on about 2,670 acres by the year 2000. Approximately 970 acres or 36 percent of the loss would be attributable to Alternative Three.

Up to 122,354 additional acres of surface would be subject to subsidence of which 42 percent would be affected by Alternative Three. A maximum subsidence of 16 feet with surface fractures could result.

An estimated 12,453 acre-feet of water would be required by the year 2000 for coal development and selected population growth of which 37 percent would be required by Alternative Three. About 6,396 acre-feet of water would be consumptively used. This is about 0.44 percent of Utah's share of Colorado River water.

Projected mining activities would disrupt local aquifers, alter local ground water flow systems and cause redistribution of natural ground water flow systems. These impacts are not quantifiable but about 191 additional square miles would be subject to mining.

The four-county population would increase from 69,598 in 1982 to 117,800 in 2000, an 69 percent increase. Alternative Three would contribute about 17,600 people or 37 percent of the increase. Corresponding increases in hunters, fishermen, and ORV use can be expected. The presence of a larger human population would exert greater pressures on wildlife populations through legal and illegal harvest, harassment, and displacement from habitat.

Cumulative loss of pheasant habitat would be insignificant on a regional basis but locally a 12 percent reduction in cock harvest could result in Carbon County.

Irrigated cropland lost as a result of community expansion and retired due to use of water for community purposes would be about 3,338 acres or 1.4 percent of the four-county agricultural land base. About 1,213 acres or 36 percent of the affected acreage would result from Alternative Three. The retired lands would be among the most favorable for agricultural use in the four-county region.

By the year 2000 the four-county population would increase approximately 69 percent over the 1982 level which would lead to similar increases in the demand for housing, water connections, and other community infrastructural services. Front-end financing of these services would be a major problem and the quality of community could deteriorate.

Traffic congestion would occur on U-10 between Price and Castle Dale, and on US-6 across Soldier Summit. Severe traffic congestion would occur in downtown Price as increased numbers of vehicles would be blocked by increased numbers of coal trains. Alternative Three would contribute to an already poor situation. Nearly all highways affected by proposed coal development are approaching or have already exceeded the 20-year design traffic volume and the need for maintenance would increase.

By the year 2000 total population growth would increase the local recreational demand by approximately 69 percent over 1982 levels. By itself, Alternative Three would increase the demand by only 18 percent. Such increases would result in overcrowding, user dissatisfaction, and deterioration of the environment at many sites in the four-county region.

Because of large increases in population, overcrowded conditions and user dissatisfaction at recreational facilities in towns and cities would also accelerate.

Alternative Four: No Action (No Competitive Federal Leasing)

Introduction

Alternative Four, the No Action Alternative, would consist of no leasing or production of coal from any of the 27 tracts discussed in this EIS. However, as discussed in Chapter 2, the Uinta-Southwestern Utah Region would continue to be an active coal producing area. Present and projected coal production would continue from existing Federal and State leases and private lands. The State of Utah projects an annual production rate of 21.6 million tons by 1990 and through the year 2000. This coal would come from central Utah with no production anticipated from southern Utah coal fields. An annual production rate of 24 million tons by 1990 analyzed in the Final Environmental Statement, Development of Coal Resources in Central Utah (GS, 1979), is applicable for this baseline analysis and provides the majority of the analysis for this Alternative. For certain resources, additional data have been obtained and included in this analysis. BLM projects a 17.0 million ton coal production rate for west-central Colorado by 1990 increasing only slightly to 17.3 million tons by the year 2000. This projection is detailed in an environmental assessment prepared in support of this EIS by BLM's Uncompahgre Area Office in Montrose, Colorado. These analyses are used as the baseline for the projection of further impacts from additional coal leasing proposed in the other alternatives. The following is a summary of the analyses as contained in the previously mentioned ES and environmental assessment. For a more detailed discussion of impacts, the reader is referred to those documents.

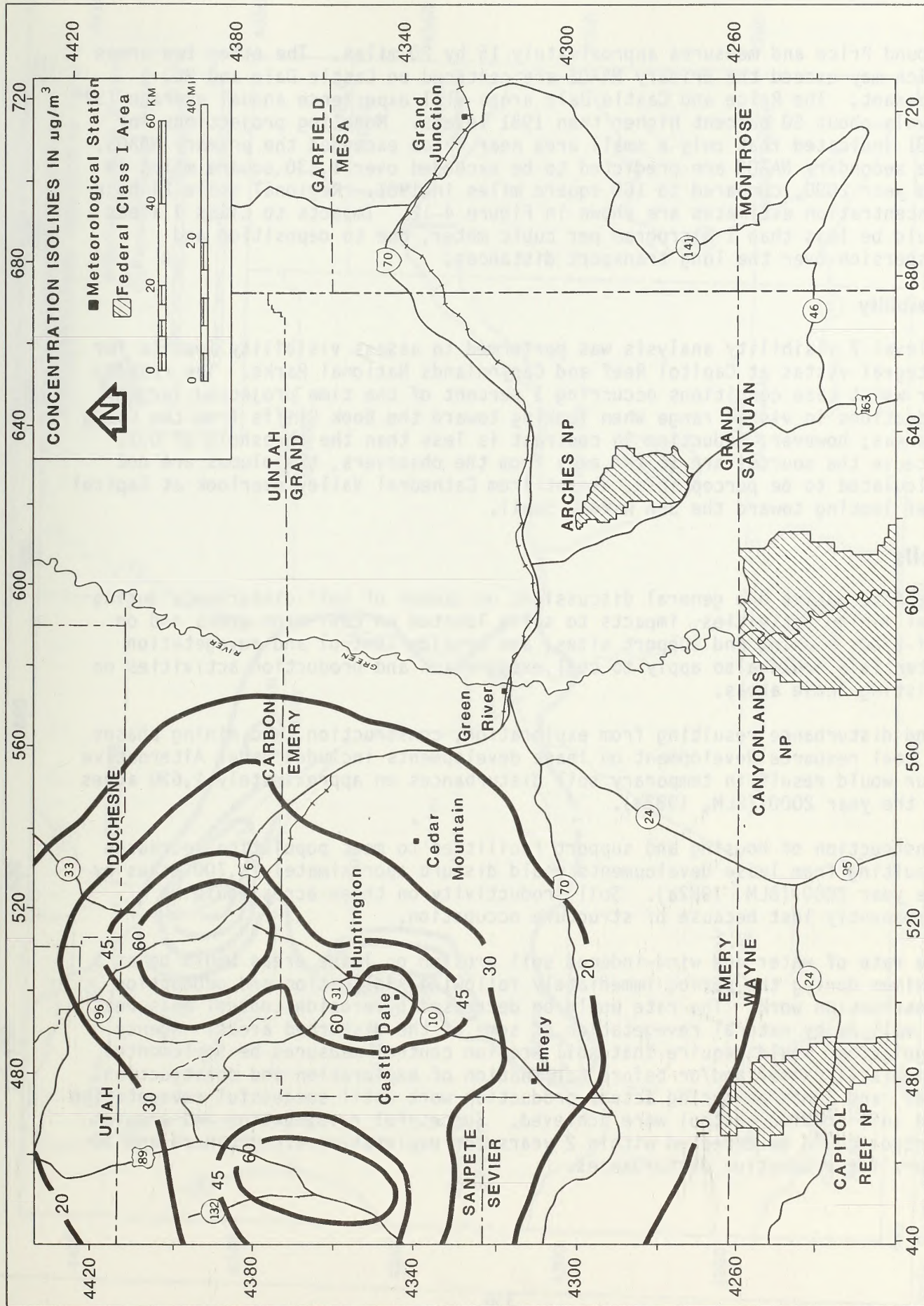
Central Utah

Climate, Air Quality

Air Quality

Pollutant emissions for the year 2000 were calculated for all NAAQS criteria pollutants. Particulate, sulfur dioxide, and nitrogen oxides emission will increase with time due to population growth and new industrial sources. Carbon monoxide and hydrocarbon emissions are calculated to decrease slightly between now and the year 2000 due to more stringent vehicle emission controls. Overall, by the year 2000, TSP emissions are estimated to increase from 111,981 tpy in 1982 to 204,273 tpy by the year 2000, an increase of 92,292 tpy (82 percent).

Annual average concentration estimates are shown in Figure 4-11. A background of 15 micrograms per cubic meter should be added to the annual average concentrations shown. As a result of growth in population and industrial activity, TSP concentrations are expected to increase significantly. Three areas may potentially exceed the primary NAAQS. The largest is centered



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-11
 ANNUAL AVERAGE TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 2000

around Price and measures approximately 15 by 20 miles. The other two areas which may exceed the primary NAAQS are centered on Castle Dale and Mt. Pleasant. The Price and Castle Dale areas will experience annual average TSP levels about 50 percent higher than 1981 levels. Modeling projections for 1981 indicated that only a small area near Price exceeded the primary NAAQS. The secondary NAAQS are predicted to be exceeded over 1,430 square miles in the year 2000, compared to 160 square miles in 1981. Regional scale 24-hour concentration estimates are shown in Figure 4-12. Impacts to Class I areas would be less than 1 microgram per cubic meter, due to deposition and dispersion over the long transport distances.

Visibility

A level-2 visibility analysis was performed to assess visibility impacts for integral vistas at Capitol Reef and Canyonlands National Parks. The results for worst case conditions occurring 1 percent of the time projected large reductions in visual range when looking toward the Book Cliffs from the Class I areas; however, reduction in contrast is less than the threshold of 0.1. Because the sources are so far away from the observers, the plumes are not calculated to be perceptible, except from Cathedral Valley overlook at Capitol Reef looking toward the San Rafael Swell.

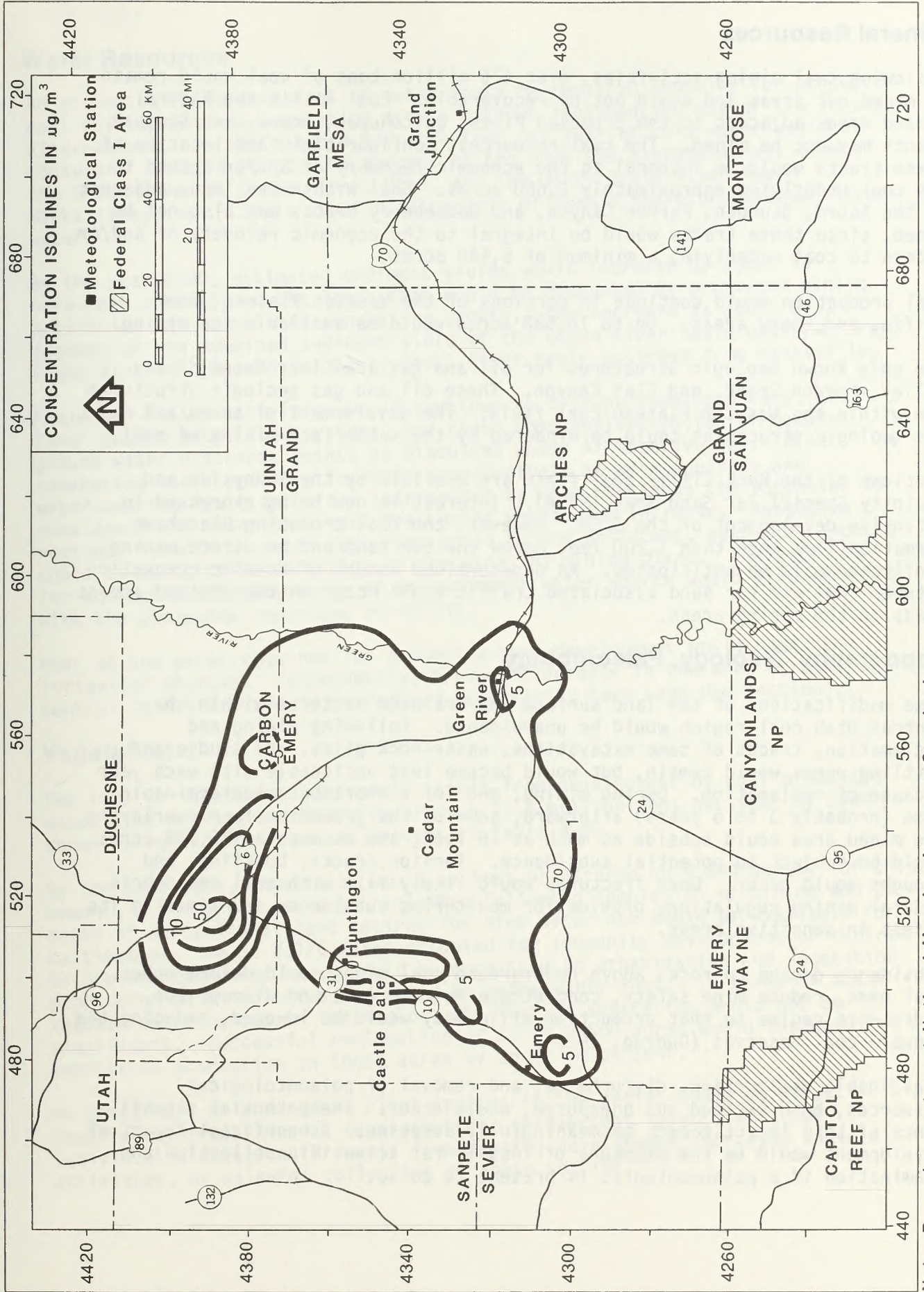
Soils

The Alternative One general discussions on causes of soil disturbance during coal mining activities, impacts to soils located on coal mine areas and on off-tract housing and support sites, and erosion control and revegetation potentials would also apply to coal exploration and production activities on existing lease areas.

Land disturbance resulting from exploration, construction, and mining phases of coal resource development on lease developments included under Alternative Four would result in temporary soil disturbances on approximately 1,620 acres by the year 2000 (BLM, 1982a).

Construction of housing and support facilities to meet population increases resulting from lease developments would disturb approximately 1,700 acres by the year 2000 (BLM, 1982a). Soil productivity on these acres would be permanently lost because of structure occupation.

The rate of water and wind-induced soil erosion on lease areas would be at a maximum during the period immediately following exploration and production construction work. The rate would be decreased by erosion control measures, as well as by natural revegetation of some of the disturbed areas. Agency regulations would require that soil erosion control measures be implemented immediately after and/or before termination of exploration and construction work, and continue during actual production work until successful revegetation and soil erosion control were achieved. Successful revegetation and erosion control could be expected within 2 years for exploration disturbances and 10 years for production disturbances.



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-12
24-HOUR TSP CONCENTRATIONS IN CENTRAL UTAH - YEAR 2000 (BASELINE)

Mineral Resources

Following coal mining activities, over 475 million tons of coal would remain in mined out areas and would not be recoverable. Coal within the Federal leased areas adjacent to the proposed Pines, Quitchupah, Acord, and Skumpah tracts may not be mined. The coal resources, configuration, and location of these tracts would be integral to the economic recovery of and/or access to the coal underlying approximately 2,660 acres. Coal within fee land, adjacent to the Acord, Skumpah, Ferron Canyon, and Gooseberry tracts may also not be mined, since these tracts would be integral to the economic recovery of and/or access to coal underlying a minimum of 5,540 acres.

Coal production would continue in portions of the Wasatch Plateau, Book Cliffs, and Emery areas. Up to 70,588 acres would be available for mining.

The only Known Geologic Structures for oil and gas are Clear Creek, Joe's Valley, Gordon Creek, and Flat Canyon. These oil and gas geologic structures are within the Wasatch Plateau coal field. The development of these oil and gas geologic structures could be hindered by the subsurface mining of coal.

Portions of the Book Cliffs coal field are overlain by the Sunnyside and Vicinity Special Tar Sand Area (STSA). Interest is now being expressed in extensive development of the STSA. However, the coal producing Blackhawk Formation lies more than 1,200 feet below the tar sand and no direct mining conflicts would be anticipated. An undetermined amount of traffic congestion between coal and tar sand associated traffic would occur on the limited access roads in the mining areas.

Topography, Geology, Paleontology

Some modifications of the land surface and drainage patterns within the central Utah coal region would be unavoidable. Following mining and reclamation, traces of some excavations, waste-rock piles, and sludge and settling ponds would remain, but would become less noticeable with each year because of reclamation. During mining, and for a short but undeterminable time (probably 3 to 5 years) afterward, some of the ground surface overlaying the mined area could subside as much as 16 feet, and as much as 70,588 acres could be subject to potential subsidence. Tension cracks, buckling, and troughs would occur. Open fractures would likely fill with soil and debris. Federal mining regulations provide for monitoring subsidence and limiting its effect in sensitive areas.

Subsidence damage to rocks above underground coal mines would deform other coal beds, reduce mine safety, concentrate methane gas, and disrupt the hydrologic regime so that production efficiency would be lowered, reducing the minable coal reserves (Dunrud, 1976).

Unavoidable destruction, disturbance, and removal of paleontological resources, both exposed and unexposed, would occur. The potential significance of this impact cannot be meaningfully assessed. A beneficial impact of development would be the exposure of fossils for scientific collection and examination if a paleontologist is present to do so.

Water Resources

An estimated 7,798 acre-feet of water would be required annually for projected coal development and population growth without implementing any of the leasing alternatives. An estimated 3,942 acre-feet per year of this water would be consumed. This is about 0.08 percent of the combined average annual flow of the Green River at Green River, Utah, and the Dirty Devil River near Hanksville, Utah. It is about 0.27 percent of Utah's share of Colorado River water.

By the year 2000, estimated sediment yields would increase by about 39 acre-feet annually on the lands that would be disturbed by projected mining activities and associated population growth. The increase is about 0.11 percent of the combined sediment yield of the Green River basin upstream from Green River, Utah, and the Dirty Devil River basin upstream from Hanksville.

Projected mining activities would continue to disrupt local aquifers, alter local ground water flow systems, and cause some redistribution of natural ground water discharge points as discussed under Alternative One. Mine dewatering would probably increase progressively as more aquifers and water-bearing fault zones are intersected by mine workings; the potential for subsidence and associated rock fracturing would also increase. Resulting regional impacts on water resources would be insignificant, but local impacts could be substantial depending on the mine and mining plans. The potential for accidental contamination of an important water source would also increase with the projected increases in mining.

Most of the water required for projected coal development would come from irrigation sources. Consequently, irrigated acreage in the area of the central Utah tracts would be reduced accordingly (see Land Use section).

Vegetation

The loss of vegetation that would result from development of coal mines and associated housing necessary to produce 21.6 million tons per year by 1990 is shown by vegetation type and percent in Table 4-80.

By the year 2000, vegetation would be lost or altered on 4,600 acres. Of this amount, 1,600 acres would be reclaimed following completion of mining and 25 acres of agricultural land retired for mine water use would be available for cultivation. About 2,975 acres occupied for community development or retired to provide community water would be committed to urbanization and vegetation production on these acres and would be permanently lost. In terms of total vegetation resources in the region, the loss of vegetation would not be significant. Successful reclamation of about 1,600 acres would increase vegetation production on those acres by about 40 percent.

No threatened or endangered plant species in the region would be directly impacted by proposed coal developments. Inadvertent impacts (loss of individual plants) could result from housing development, off-road vehicle activities, or unlawful collecting of these species.

TABLE 4-80
TOTAL IMPACTS ON VEGETATION
ALTERNATIVE FOUR

Vegetation Types	Direct Disturbance ^a	Indirect Impacts ^b	Total by the year 2000
Agricultural	850	1,300	2,150
Desert Shrub	850	-	850
Riparian	13	-	13
Grassland	153	-	153
Sagebrush-Grass	801	-	801
Pinyon-Juniper Woodland	470	-	470
Mountain Meadow	20	-	20
Aspen	58	-	58
Conifer Aspen	85	-	85
Total	3,300	1,300	4,600

^a Includes acreage used for mining and community development.

^b Includes irrigated croplands retired for community and mine water use.

Wildlife

The temporary loss of 1,600 acres of wildlife habitat resulting from construction and operation of proposed coal mines and ancillary facilities would occur. Permanent loss of about 1,700 acres of wildlife habitat by the year 2000 that would be occupied by houses and community facilities would be unavoidable. Many species inhabit these croplands, notably pheasants, cottontail rabbits, doves, small birds, and mammals. The resulting regional pheasant loss of nearly 1,560 birds, while insignificant on a regional basis, may be significant in certain local communities with sparse irrigated croplands.

Loss of wildlife would result from loss of habitat and increased human disturbance. Elk habitat on 353 acres of land occupied by surface facilities would be lost, and elk use on about 9,400 acres would be reduced due to human disturbance. Deer habitat on 1,404 acres would be lost due to construction of surface facilities and deer use on 7,256 acres would be reduced because of human disturbance. Carrying capacity for 260 deer would be lost annually. Any loss of the endangered bald eagle or peregrine falcon or other birds of national interest is not quantifiable but would be significant. Direct impacts on wildlife would include deaths resulting from construction and operation of the proposed mines, highway mortality, illegal killing, and deaths from wire strikes. Deer highway mortalities would increase by 95 deer annually because of increased traffic in the region. Long-term alteration of migration routes and use patterns would be unavoidable. Impacts to fisheries would be slight under reasonable enforcement of existing laws and regulations. However, accidental releases of materials toxic to fish and other aquatic organisms might occur.

The population increase in 1987 of 23 percent above 1982 levels and 44 percent by 2000 portends a similar increase in hunters, fishermen, and ORV use (Recreation section). The presence of a larger human population could exert greater pressures on the wildlife populations through harvest, harassment, and displacement from habitat. The legal harvest can be controlled by instituting more stringent regulations and harassment partially controlled by enforcement regulations, but the presence of humans in wildlife habitat could not be eliminated.

Land Use

A total of 4,600 acres would be changed from the existing uses to mining and support uses for existing and potential lease development by the year 2000. Approximately 2,975 of the 4,600 acres would be permanently changed from existing uses to that of new community development acreage; the remaining 1,625 acres would be temporary land changes resulting from mining operations (BLM, 1982a).

Approximately 50 percent (850 acres) of the 1,700 acres needed for new community developments would come from the four-county agricultural land base. An additional 1,300 acres of irrigated cropland would be retired from productivity to supply community water needs (BLM, 1982a). Thus, by the year 2000,

2,150 acres of agricultural lands would be affected. These acres represent about 0.9 percent of the four-county total of cropland area (Utah Department of Agriculture, 1982).

The loss of grazing capacity would be about 4,170 AUMs over the life of the existing and potential lease developments. Land changes from agricultural land to community use and from irrigated cropland to retired cropland would eliminate cattle, sheep, and horse grazing presently occurring on such land. Actual AUM losses cannot be predicted due to the variability of grazing numbers and seasons of use on the now-existing cropland acres. Due to the high grazing capacity of such acres, overall losses could be high, i.e., 1 AUM lost for every 5 acres converted. Such losses could significantly affect small operators.

Land Use Plans, Controls, and Constraints

The Alternative One discussion pertaining to Federal and County plans would apply to existing and potential coal lease development under Alternative Four.

Existing leases are presently located in both Carbon and Emery Counties (C-1 and CE-2 land use zones). In Carbon County, rezoning requests (from CE-1 to the CE-2 zone) would require approval by the county, and actual mine developments in the CE-2 zone would be required to implement the county's socioeconomic and land resource mitigation measures for potential or existing resource conflicts. In Emery County, existing and potential lease developments would be required to follow and meet established measures for both land use zones; no land use rezoning would be required.

No significant conflicts would exist between lease developments and the regulations of Emery County's M&G-1 land use zone, Sanpete County's FW-10 zone, and Sevier County's GRF-1 zone.

Socioeconomics

The baseline projections reflect the future based on the existing economic structure of the areas and the changing demographic characteristics of the population and are an attempt to depict the direction current trends are likely to take in the area without the additional coal leasing. The Utah Process Economic and Demographic Impact Projection Model and the Spatial Allocation Model were applied in making the baseline projections presented here.

It should be noted that the baseline projections assumed growth in Utah's coal industry to begin in 1982 and move toward the target of 21.6 million tons per year by the year 2000. Consequently, the short-term baseline projections presented here, which show substantial growth in Carbon and Emery Counties in 1982 and 1983, may be somewhat overstated due to the current recession.

Population, Income, and Employment

The baseline projection for the four counties shows the population increasing from 69,598 in 1982 to 100,200 by the year 2000, or a total increase of about

30,602. This represents a 44 percent change between the years 1982 and 2000. Over this same period, total employment in the area would increase by 6,400 jobs which is about an 18 percent increase; total employment in the year 2000 is projected at 41,200. Table 4-81 shows projected baseline figures by county for selected years through 2000.

These baseline projections have incorporated assumptions regarding coal projection, manufacturing, power plant construction, and commuting patterns which are important to understand in the analysis of the potential impacts of additional coal development. Additional information on these assumptions and detailed projections are presented in a technical report on file at the BLM Utah State Office.

The relationship between the State's per capita income and the per capita incomes of the counties was utilized in projecting baseline county personal income figures. The baseline income projections for the State assume an annual growth rate of 1.7 percent; by the year 2000 the State per capita income would be \$11,568. Carbon County achieved high average per capita income levels relative to the State in the last half of the 1970s. It is assumed that this will be reversed during the next two decades and that by the year 2000, Carbon County per capita personal income would equal that of the State. Emery County per capita personal income is presumed to stabilize at 100 percent of the State figures for the entire projection period. Sanpete County's personal income figures have been consistently below the State average, and it has been assumed that the county would maintain per capita income that would be 70 percent of the State average over the projection period. Sevier County personal income has risen steadily in the past; it is assumed that this trend will continue and that by 1995 the county per capita income level will equal that of the State. The county per capita personal income and total personal income projections are provided in Table 4-82.

Infrastructure

Housing

The type of housing mix in a community is reflective of a number of variables including community preference, existing planning and zoning ordinances, land availability and personal income. The Department of Community and Economic Development, upon review of the existing conditions and elected officials' preferences of 25 rural communities, has determined that an appropriate guideline for housing mix percentages is 60 percent single family units, 15 percent multi-family units, and 25 percent mobile home units.

In the year 2000, under the baseline forecast, Carbon County would need 7,080 single family homes, 1,770 multi-family homes and 2,950 mobile homes. The largest demand for housing would be in the Price area. At the same time Emery County would require 960 single family units, 240 multi-family units and 400 mobile homes. In Sanpete county the demand for multi-family housing could reach 930 dwelling units by the year 2000, and single family homes could reach 3,720 units. Sevier County will need 4,200 single family units, 1,050 multi-family units and 1,750 mobile homes in the year 2000 under baseline growth forecasts (Table 4-83).

TABLE 4-81
 CENTRAL UTAH
 ALTERNATIVE FOUR
 SUMMARY OF POPULATION AND EMPLOYMENT PROJECTIONS
 BY COUNTY
 1987, 1990, 1995, 2000

County	Total Population	Total Households	Total School-age Population	Total Employment
Carbon				
1987	32,900	10,500	7,900	13,400
1990	35,200	11,000	8,900	14,300
1995	37,200	11,500	9,900	15,200
2000	37,700	11,800	9,700	15,800
Emery				
1987	14,100	3,900	4,000	6,500
1990	14,800	4,000	4,400	6,700
1995	15,100	4,100	4,700	6,800
2000	14,700	4,000	4,500	6,800
Sanpete				
1987	19,100	5,500	4,900	6,900
1990	20,400	5,800	5,500	7,200
1995	21,800	6,100	6,300	7,800
2000	22,400	6,200	6,500	8,200
Sevier				
1987	19,700	5,800	5,300	8,000
1990	21,600	6,100	6,000	8,700
1995	24,100	6,700	7,200	9,700
2000	25,400	7,000	7,600	10,400
Year 2000 Totals	100,200	29,000	28,300	41,200

TABLE 4-82

BASELINE PERSONAL INCOME PROJECTIONS
BY COUNTY
1985, 1987, 1990, 2000

Year	PCPI ^a State of Utah	Carbon County		Emery County		Sanpete County		Sevier County	
		PCPI	Total Personal Income (\$1,000)	PCPI	Total Personal Income (\$1,000)	PCPI	Total Personal Income (\$1,000)	PCPI	Total Personal Income (\$1,000)
1985	\$ 8,932	\$10,182	304,869	\$ 8,932	125,736	6,252	113,911	\$ 7,592	140,460
1987	9,243	10,352	340,265	9,243	130,271	6,470	123,344	8,134	160,622
1990	9,736	10,612	373,107	9,736	143,879	6,815	139,040	9,493	205,191
1995	10,631	10,525	391,720	10,631	160,124	7,442	162,504	10,631	256,111
2000	11,568	11,568	435,605	11,568	170,073	8,098	181,533	11,568	293,989

Note: In 1980 dollars.
^a Per Capita Personal Income.

TABLE 4-83

HOUSING DEMAND BY TYPE
 ALTERNATIVE: BASELINE
 1987, 1990, 1995, 2000

County	Single Family	Multi-Family	Mobile
<u>Carbon</u>			
1987	6,300	1,575	2,625
1990	6,660	1,650	2,750
1995	6,900	1,725	2,875
2000	7,080	1,770	2,950
<u>Emery</u>			
1987	2,340	585	975
1990	2,400	600	1,000
1995	2,460	615	1,025
2000	2,400	600	1,000
<u>Sanpete</u>			
1987	3,300	825	1,375
1990	3,480	870	1,450
1995	3,660	915	1,525
2000	3,720	930	1,550
<u>Sevier</u>			
1987	3,480	870	1,450
1990	3,660	915	1,525
1995	4,020	1,005	1,675
2000	4,200	1,050	1,750
Year 2000 Totals	17,400	4,350	7,250

Education

Baseline growth projections for 1987 anticipate a 76 percent increase in the number of students in the Carbon School District over the existing student population. By the year 1995, baseline growth of school-age children is expected to peak at 9,889 before dropping off to 9,692 school-age children in the year 2000. This growth will continue the demand for additional classrooms and teachers that the Carbon County School District has faced since the coal boom of the 1970s.

Emery County, which has experienced rapid growth for educational services due to large construction projects within the county, is forecast to have an increase of 685 students between 1982 and 1987. This represents a 21 percent growth or just over 4 percent a year. This growth rate is significantly slower than the years of peak construction employment. The growth rate for school-age children is forecast to continue to slow to under a 2.5 percent growth per year by 1995. The years following 1995 could see an actual decline in the number of students in the Emery County School District. This growth pattern of Emery County's school-age population will require creative planning by School District officials to ensure adequate educational facilities and personnel without over-building. The School District, having experienced boom/bust cycles in the past, has developed a growth plan that utilizes temporary classrooms to avoid over-building in boom times and to allow the tax base to be in place before incurring new debt for additional school construction.

Baseline growth forecasts for school-age children in Sanpete County show 1,274 additional students in 1987. This is a 7 percent annual increase in students and will require a similar increase in teachers and school facilities. Between 1987 and 1990 growth should moderate to a 4 percent increase in school-age children per annum. Between 1990-1995 this should further moderate to a 3 percent annual increase in the number of school-age children. After 1995 the baseline growth in the number of school-age children will decrease to less than 1 percent growth per year.

The 1984 baseline forecasts for the Sevier School District project an increase of 1,233 new students or approximately 6 percent per annum growth rate of the school-age population. The growth rate for school-age populations will then begin a gradual slowdown through the year 2000 when the baseline school-age population is forecast to increase at less than 1 percent (.0058) per annum.

Water and Sewer

Price City in Carbon County has annexed over 600 acres since 1974. This new area has adequate water and sewer lines although the system is old and undersized. Expansion and upgrading of these sewer lines, as well as a new water storage tank would be required to absorb baseline growth forecasts. These two projects are estimated to cost over \$1.5 million. Baseline demand for water connection is forecast to grow from 4,767 connections in 1987 to 5,125 in 1990, 5,467 connections in 1995, and reach 5,688 connections in the year 2000. The Price River Water Improvement District will also need to

expand its sewer system to be capable of handling baseline growth forecasts. The plant currently is working at one-third over the designed capacity and to meet National Pollution Discharge Elimination System standards would require several improvements costing an estimated 3.8 to 4 million dollars.

Wellington, which is served by the Price River Water Improvement District, needs to upgrade its water and sewer, distribution, storage, and collection systems to handle baseline growth. Preliminary analysis estimates the cost of upgrading the water system to reach almost \$730,000 to handle the 883 water connections forecast for the year 2000. The sewer system in the East Carbon/Sunnyside area, which was constructed in 1979, appears to handle baseline growth forecasts through the year 2000 that could reach 216,200 gallons per day of waste. A recently passed bond election (1982) for a new water system calls for construction to commence in the spring of 1983 on a new water plant and distribution system that will be more than capable of handling baseline growth forecasts of 676 water connections required by the year 2000.

Most communities in Emery County are served by the Castle Valley Special Service District for culinary water services. Additional water rights, treatment, and storage facilities will be necessary to handle the baseline demand sited in Table 4-84. Adequate sewage capacity appears available to handle baseline growth forecasts in all Emery County communities as shown in Table 4-85 although infiltration problems are common.

Sanpete County communities have ample water rights and storage capacity for all communities with the exception of Moroni to handle baseline growth forecasts. Moroni has plans to add a 600,000 gallon storage tank and to construct a new distribution system to handle baseline growth forecasts. The majority of communities in Sanpete County sewage needs are served by septic tanks with the exception of Mt. Pleasant and Moroni. Moroni's sewer treatment facility is adequate to handle baseline growth forecasts that project waste to reach 141,600 gpd by the year 2000. Mt. Pleasant, on the other hand, will need to expand its sewer system to absorb the 305,000 gallons per day of waste forecast by 1987.

Richfield in Sevier County will need to expand and upgrade its water system to accommodate baseline growth forecasts. In fact, inadequate flow and storage already exists and this condition currently needs to be corrected. The trickling filter sewer system appears capable of handling baseline growth forecasts into the 1990s although expansion will then be necessary. Salina will need to expand its sewer system later in this decade to handle the baseline demand generated by 302,200 gallons of sewage generated per day by 1995. The remaining Sevier County communities outside of Richfield appear to have adequate water to handle culinary and industrial growth forecast under the baseline scenario.

Public Safety

Law enforcement needs of Carbon County are projected to increase by one additional officer per year from 1987 to 1995. Peak need would level off by 1995, and by the year 2000, only one more office would be required. The need

TABLE 4-84
CENTRAL UTAH
PROJECTED DEMAND FOR WATER CONNECTIONS
ALTERNATIVE FOUR

Year	1987	1990	1995	2000
<u>Carbon County</u>				
East Carbon	551	536	529	514
Helper	1,190	1,224	1,245	1,261
Hiawatha	82	81	78	79
Price	4,767	5,125	5,467	5,688
Scotfield	43	44	46	47
Sunnyside	173	169	166	162
Wellington	764	816	860	883
<u>Total</u>	<u>7,570</u>	<u>7,995</u>	<u>8,391</u>	<u>8,634</u>
<u>Emery County</u>				
Castle Dale	744	786	804	789
Cleveland	163	167	168	165
Elmo	100	102	103	101
Emery	125	130	132	131
Ferron	579	601	609	604
Huntington	810	813	804	789
Orangeville	528	542	546	536
<u>Total</u>	<u>3,049</u>	<u>3,141</u>	<u>3,166</u>	<u>3,115</u>
<u>Sanpete County</u>				
Centerfield	255	268	277	282
Ephraim	1,056	1,115	1,185	1,246
Fairview	390	462	470	471
Fountain Green	210	210	209	209
Gunnison	503	532	552	559
Manti	782	825	877	923
Moroni	366	385	391	393
Mt. Pleasant	887	958	979	981
Spring City	244	257	261	262
Wales	49	51	52	52
<u>Total</u>	<u>4,742</u>	<u>5,063</u>	<u>5,253</u>	<u>5,378</u>
<u>Sevier County</u>				
Aurora	330	349	367	380
Redmond	234	247	260	269
Richfield	2,402	2,579	2,801	2,857
Salina	752	796	837	867
<u>Total</u>	<u>3,718</u>	<u>3,971</u>	<u>4,265</u>	<u>4,373</u>
<u>Grand Total</u>	<u>19,079</u>	<u>20,170</u>	<u>21,075</u>	<u>21,500</u>

TABLE 4-85
CENTRAL UTAH
PROJECTED DEMAND FOR WASTE WATER CONNECTIONS
ALTERNATIVE FOUR

Year	1987	1990	1995	2000
<u>Carbon County</u>				
East Carbon	172,400	170,300	170,800	164,500
Helper	372,400	389,100	402,100	403,400
Hiawatha	25,700	25,700	25,100	25,400
Price	1,492,200	1,629,900	1,765,900	1,820,200
Scofield	13,500	14,000	14,800	15,000
Sunnyside	54,200	53,600	53,700	51,700
Wellington	239,200	259,400	277,700	282,700
<u>Emery County</u>				
Castle Dale	267,800	287,600	297,500	289,700
Cleveland	58,500	61,100	62,100	60,500
Elmo	36,000	37,500	38,200	37,200
Emery	45,100	47,700	48,700	48,000
Ferron	208,500	220,000	225,200	221,500
Huntington	291,700	297,600	297,400	289,600
Orangeville	190,000	198,500	201,900	196,600
<u>Sanpete County</u>				
Centerfield	87,900	93,600	99,800	101,800
Ephraim	362,500	389,400	427,200	449,700
Fairview	134,100	161,300	169,100	169,900
Fountain Green	72,200	73,000	75,200	75,500
Gunnison	173,300	185,800	199,100	201,700
Manti	268,400	288,200	316,200	332,900
Moroni	125,700	134,400	140,900	141,600
Mt. Pleasant	305,000	334,800	352,300	354,000
Spring City	83,800	89,600	94,000	94,400
Wales	16,800	17,900	18,700	18,900
<u>Sevier County</u>				
Aurora	113,300	122,700	132,600	138,100
Redmond	80,200	86,900	93,900	97,800
Richfield	823,200	906,600	1,011,400	1,073,000
Salina	258,200	279,700	302,200	324,700

by 2000 would be 75 officers. Emery County would require one additional officer by 2000, bringing the total to 29. Sanpete County would need one additional officer a year through 1990. By 1995, another three policemen would be needed. Peak needs would be reached by 1995 when 44 officers and patrol cars would be required. Sevier County would be the most affected county under baseline conditions. The need would rise from 40 in 1987 to 51 officers by the year 2000. The years from 1990 to 1995 would experience the largest growth with five additional officers needed during this time.

Carbons County's need for health services shows continued growth under baseline conditions, with the most rapid growth taking place by 1990. EMTs, hospital beds, and nurses are the categories that show the greatest need by the year 2000. Nine hospital beds and nurses along with seven new EMTs would be required by 2000. Sanpete County would require seven more hospital beds, with four of the beds coming between 1990 and 1995. Seven additional nurses would be needed by 2000 as well. The need for nurses follows a steady growth rate under baseline conditions. Sevier County would require 12 new hospital beds and an additional 12 nurses under baseline growth. EMTs would need to be increased by eight with six of the additional EMTs added by 1995 or almost one per year.

Transportation

Baseline traffic projections with no new Federal coal leasing includes existing and projected traffic resulting from present and projected coal mining development. This EIS takes advantage of a computer model which accounts for background or baseline traffic resulting from earlier and projected coal mining, the general population and projected population increases, and present and projected through traffic, such as long distance trucks, vacationers, and general travel. Results of this computer model are on file at the BLM Utah State Office.

In the central Utah area, secondary roads are generally adequate to accommodate anticipated traffic. Those secondary roads which are projected to carry mining traffic proposed at earlier dates are also projected to be upgraded in conjunction with mining development.

The Round One Final Environmental Impact Statement, BLM (1981a), pointed out the potential for overcrowding on U-10 southward from Price to Castle Dale. The computer analysis emphasizes this possibility and, in addition, points out that US-6 across Soldier Summit, from Castle Gate to Spanish Fork will also become severely overcrowded. The high traffic segment from Castle Gate into Price, is a four-lane highway which is presently being extended to bypass Price.

There is a potential for severe traffic congestion in downtown Price, both from sheer volume of traffic and from interruptions to traffic on U-10 less than a block south of the US-6/U-10 intersection, where the D&RGW railroad crosses U-10 at grade. Assuming that only half the coal mined and projected to be mined in the area passes across this intersection, and assuming that one 100-car coal train 1 mile long would require 5 minutes to pass, the crossing

would be locked on the average half an hour per day, backing traffic into the US-6/U-10 intersection. Although the analysis was made for the year 2000 projected production, some traffic congestion should be expected almost immediately.

Highway construction and maintenance is primarily funded from taxes on motor fuel. Present funding formulas are not expected to meet the needs of maintenance required through increased traffic flows and are inadequate to accommodate any additional road construction. Nearly all of the highways impacted by already proposed coal development are approaching or have already exceeded the 20-year design traffic volume. This need for increased maintenance would continue.

Cultural Resources

Known significant sites would be mitigated. Mitigation techniques are varied and include collection, mapping, testing, photography, and excavation.

Salvage excavation of threatened archaeological or historic sites may be required. Data would be preserved, but an undetermined number of sites or portions of sites would be lost. Some loss would occur for buried sites encountered during dirt-moving operations even if they were recognized early. Changes in setting of sites, either by the introduction of project activities and facilities or by moving certain things to avoid impacts, would degrade archaeological and historic values. Vandalism would occur due to an increased population and easier accessibility.

Positive impacts would also result from coal development. Valuable information has been gathered and other surveys could be necessary prior to any disturbance. The additional surveys would result in the accumulation of data that would otherwise not have been available until the future, or which may have been lost. Any salvage excavation that is required will result in the preservation of data and material (including some that might otherwise be lost to vandalism), although in situ value is lost.

Recreation

By the year 2000, projected population growth without additional leasing would increase the local demand for both dispersed and developed recreation opportunities in the four-county region by approximately 41 percent from 1982 use figures.

Table 4-86 and Table 4-87 show the anticipated increases in demand for hunting, fishing, and ORV activity, respectively, in the years 1987, 1990, 1995, and 2000. Increased demand for dispersed activities as well as increased use of developed recreation sites and urban facilities, would result in impacts similar in type to those identified in Alternatives One, Two, and Three. The extent and intensity of those impacts is not quantifiable but would be greater in degree than impacts resulting from Alternative One, Two, or Three if these impacts are considered alone because by the year 2000 the increase in population above 1982 levels would be as much as 20 percent

TABLE 4-86
 PROJECTED INCREASE IN LOCAL HUNTER AND FISHERMAN DEMAND
 WITHIN THE FOUR-COUNTY REGION
 ALTERNATIVE FOUR (NO ACTION)

Projected Annual Increase in Numbers							
Year	Projected Population Increase	Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen	Increased Demand for Fish	Overall Percent Increase 1982
1987	16,202	2,916	324	1,458	7,286	218,580	23
1990	22,402	4,032	448	2,016	10,075	302,250	32
1995	28,602	5,148	572	2,574	12,862	385,860	41
2000	30,602	5,508	612	2,754	13,757	412,860	44

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the four-county area. Approximately 18 percent of Utah's population hunt deer, approximately 2 percent hunt elk, approximately 9 percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under 12 and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UWDR, 1978).

TABLE 4-87
 PROJECTED INCREASE IN LOCAL OFF-ROAD VEHICLE DEMAND
 WITHIN THE FOUR-COUNTY REGION
 ALTERNATIVE FOUR (NO ACTION)

Year	Projected Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982
1987	16,202	4,051	1,134	23
1990	22,402	5,601	1,568	32
1995	28,602	7,151	2,002	41
2000	30,602	7,651	2,142	44

Note: Projections were made assuming that the percentage of the population in the four-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles, and approximately 25 percent of the population currently owns four-wheel drive vehicles or light pickups) (UORA, 1978).

greater than the projected coal based populations for the leasing alternatives. The additional competition for fish and game would lead to less hunter and fisherman success or restricted harvests. Increased ORV use would increase conflicts with other recreational uses. Overuse of developed campgrounds, picnic areas, playfields, swimming pools, and golf courses would result in continued deterioration of existing facilities, user dissatisfaction, and additional recreation pressures on undeveloped areas including the presently overused San Rafael/Buckskin Draw area. Federal, State, and local governments would be under stress to provide recreation facilities to meet minimum standards recommended by the UORA (1978).

Development of homesites for the projected population would displace dispersed recreational use (particularly upland game hunting) from as much as 1,200 acres by the year 2000. Because surrounding areas offer comparable or better opportunities, loss of recreational opportunities from displacement would be minimal.

The reduction in range of scenic vistas viewed from overlooks in Canyonlands and Capitol Reef National Parks (identified in the Air Quality section) would be perceptible to some Park visitors, reducing the quality of their recreational experience.

Visual Resources

Disturbance from development of existing lease areas would continue to modify the landscape character of isolated portions of the region both on and off lease. In most cases, mining activities would continue to be located away from major travel routes and would seldom be seen by individuals traveling through the region. Visual resource management objectives would probably not be met for the life of the mining operations in many instances, although in most cases reclamation would be effective in reestablishing the area's scenic quality. Because development would be localized, the average visitor would probably note little change in the area's overall scenic character.

Special Designation Areas

The increase in local recreational demand that is projected to occur, may result in increased ORV and other dispersed use of some of the 17 areas within the four-county region with special designation or potential for special designation. More intensive use would degrade values for which areas are being protected and/or reviewed. The extent and intensity of impact is not quantifiable but would be greater than that resulting from Alternatives One, Two, or Three if these alternatives are considered alone because by the year 2000 the increase from 1982 population levels would be as much as 20 percent greater than that projected for the coal based populations in Alternatives One, Two, and Three. Agencies managing the lands may be under stress to protect special values. However, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely, even in a worst case situation, that possible degradation would affect the suitability of any area for special designation.

Southern Utah

As explained in Chapter 2, the regional baseline projected through the year 2000 shows no coal development in southern Utah. However, even in light of this lack of development, some community growth in Kane and Garfield Counties is expected. As a result of this growth some associated environmental impacts would result and are summarized below.

The estimated 1.0 billion tons of in-place coal resource in the Alton coal field located outside of the proposed tracts would not be mined. Beneficial as well as adverse environmental and socioeconomic impacts associated with coal mining activities would not occur.

By the year 2000, TSP emission levels are estimated to be about 250 percent greater than 1981 levels. Estimated annual TSP concentrations for the year 2000 are shown in Figure 4-13. Concentrations are higher than 1981 levels due to increased population in the area. Concentrations in the Kanab area (including a background of 15 micrograms per cubic meter) are predicted to be about equal to the secondary annual NAAQS of 60 micrograms per cubic meter, which is about 15 micrograms per cubic meter above the 1981 levels. Secondary NAAQS is not presently exceeded in Kane and Garfield Counties but by the year 2000 the standard would be exceeded over about 20 square miles. Reduction in visual range at Bryce Canyon National Park due to the expected population growth would not be perceptible.

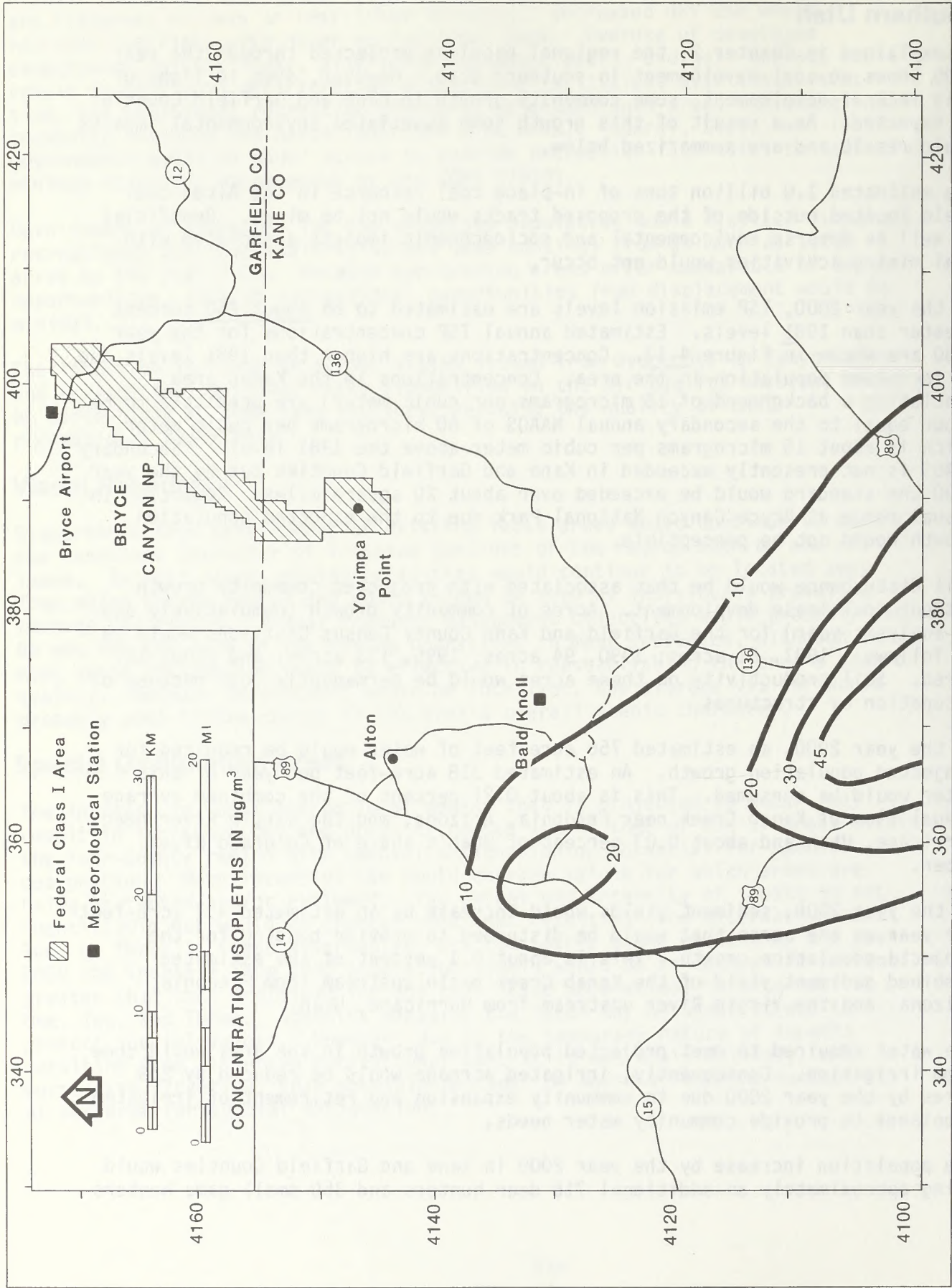
Soil disturbance would be that associated with projected community growth without coal lease development. Acres of community growth (cumulatively and by analysis year) for the Garfield and Kane County Census Divisions would be as follows: 1987, 61 acres; 1990, 94 acres; 1995, 133 acres; and 2000, 167 acres. Soil productivity on these acres would be permanently lost because of occupation by structures.

By the year 2000, an estimated 756 acre-feet of water would be required for projected population growth. An estimated 318 acre-feet per year of this water would be consumed. This is about 0.21 percent of the combined average annual flow of Kanab Creek near Fredonia, Arizona, and the Virgin River near Hurricane, Utah and about 0.03 percent of Utah's share of Colorado River water.

By the year 2000, sediment yields would increase by an estimated 4.7 acre-feet per year on the acres that would be disturbed to provide housing for the projected population growth. This is about 0.1 percent of the estimated combined sediment yield of the Kanab Creek basin upstream from Fredonia, Arizona, and the Virgin River upstream from Hurricane, Utah.

The water required to meet projected population growth in the area would come from irrigation. Consequently, irrigated acreage would be reduced by 209 acres by the year 2000 due to community expansion and retirement of irrigated croplands to provide community water needs.

The population increase by the year 2000 in Kane and Garfield Counties would bring approximately an additional 716 deer hunters and 350 small game hunters



Note: Base does not meet National Mapping Accuracy Standards

FIGURE 4-13
ANNUAL AVERAGE TSP CONCENTRATIONS IN SOUTHERN UTAH - YEAR 2000 (BASELINE, NO DEVELOPMENT)

to hunt in the area. The additional hunting pressure and travel on unimproved roads would tend to reduce game populations by an unknown amount and depreciate the value to wildlife of roadside habitat.

Community development and water requirements in these two counties would consume 285 acres of irrigated agricultural lands. This is 0.6 percent of the total acreage available as habitat for pheasants, doves, quail, cottontail rabbits, and numerous small birds and mammals. In addition to the 285 acres of agricultural lands lost to community growth, an additional 114 acres of Pinyon-Juniper Woodland and Desert Shrub vegetation communities would also be used for community development.

There would be increases in traffic on the highways in the area, along with some increases of negligible traffic on the secondary roads of the area. In addition to local traffic, there is a large amount of through traffic, as US-89 and US-89A connect Arizona with Utah and the Wasatch Front cities. Further, the beauties in and surrounding the area, including several National Parks, draw a large amount of vacation traffic. Despite the variety of traffic, the highways of the area would be adequate to accommodate projected traffic through the study period. Existing secondary roads can accommodate only light traffic at best; however, traffic on these roads is projected to be light to negligible in the absence of additional Federal leasing.

The baseline projection for Garfield and Kane Counties shows the population increasing from 8,800 in 1982 to 11,800 by the year 2000, or a total increase of 3,000, representing a 34 percent change. Between 1987 and the year 2000, employment in the area would increase by 700 jobs which is about a 19 percent increase; total employment in the year 2000 is projected at 4,300. Table 4-88 summarizes population and employment projections.

The demand for single family units in Garfield County could increase from 900 in 1987 to 960 by the year 2000. Kane County could experience a demand increase for single family units from 1,080 in 1987 to 1,260 by the year 2000.

The analysis of income and wages was carried out at the county levels, and the data are provided in 1980 dollars (Table 4-89). The relationship between the State's per capita income and the per capita incomes of the counties was utilized in projecting baseline county personal income figures. The baseline income projections for the State assume an annual growth rate of 1.7 percent; by the year 2000 the State per capita income would be \$11,568. Garfield and Kane Counties' personal income figures have been consistently below the State average; it has been assumed that these counties would maintain per capita income levels that would both be 85 percent of the State average over the projection period.

Kanab City has a new lagoon type sewage system that is adequate to handle baseline growth forecasts for sewer. The Long Valley Sewer System which serves the Orderville, Glendale, Mt. Carmel area will be adequate to handle baseline growth forecasts for 760 sewer connections through the year 2000 under the baseline alternative. Glendale will require an additional 65 acre-feet of water to handle baseline growth forecasts. The remaining

TABLE 4-88

SOUTHERN UTAH
ALTERNATIVE FOUR
SUMMARY OF POPULATION AND EMPLOYMENT PROJECTIONS
BY COUNTY
1987, 1990, 1995, 2000

County	Total Population	Total Households	Total School-age Population	Total Employment
<u>Garfield</u>				
1987	4,400	1,500	1,100	1,800
1990	4,600	1,500	1,200	1,900
1995	4,800	1,500	1,300	2,000
2000	5,000	1,600	1,400	2,100
<u>Kane</u>				
1987	5,500	1,800	1,500	1,800
1990	5,900	1,800	1,700	1,900
1995	6,400	1,900	1,900	2,000
2000	6,800	2,100	2,100	2,200
Year 2000 Totals	11,800	3,700	3,500	4,300

TABLE 4-89

SOUTHERN UTAH
ALTERNATIVE FOUR
BASELINE PERSONAL INCOME PROJECTIONS BY COUNTY
1985, 1987, 1990, 1995, 2000

Year	PCPI State of Utah	<u>Garfield County</u>		<u>Kane County</u>	
		PCPI	Total Personal Income (\$1,000)	PCPI	Total Personal Income (\$1,000)
1985	\$ 8,932	\$ 7,592	32,623	\$ 7,592	39,820
1987	9,243	7,857	34,924	7,857	43,308
1990	9,736	8,276	38,012	8,276	48,564
1995	10,631	9,036	43,671	9,036	57,623
2000	11,568	9,833	49,096	9,833	66,648

Note: In 1980 Dollars

communities have adequate water rights for baseline growth forecasts although Mt. Carmel will require an additional 100,000 gallon storage tank by the late 1980s. This should handle baseline projected growth through the turn-of-the century.

Septic tanks handle the sewage needs in Hatch and Panguitch in Garfield County. This appears adequate to handle the baseline growth forecasts although Panguitch may need to consider another method for handling sewage later in the 1990s. The water system in these communities appear adequate to handle baseline growth which could require 639 connections in Panguitch by the year 2000.

Garfield School District is forecast to have only limited growth under the baseline forecast. By the year 2000 the school-age population is projected to reach 1,350 which would require only four additional teachers over the existing 50 teachers.

Kane County should experience a steady growth in demand for teachers growing from the existing 47 to 83 by the year 2000 to accommodate a projected student population that would increase from the existing 1,002 to 2,066 by the year 2000.

Garfield County will need to add one police officer to its roster by the year 2000. Kane County anticipates a slow but steady need for policemen under baseline conditions. They will require one additional officer every 2 years.

Projected population growth by the year 2000 would increase the local demand for both dispersed and developed recreation opportunities in the region by approximately 34 percent from 1982 use figures.

Table 4-90 and Table 4-91 show the anticipated increase in demand for hunting, fishing, and ORV activity, respectively, in the years 1987, 1990, 1995, and 2000. Increased demand for dispersed activities as well as increased use of developed recreation sites and urban facilities would result in impacts similar in type to those identified in Alternative One. The extent and intensity of those impacts is not quantifiable but would be less in degree than impacts resulting from Alternatives One or Two if these alternatives are considered alone because by the year 2000 the increase from 1982 levels projected for populations in Alternatives One and Two is 62 percent greater than that projected for the baseline population. The additional competition for fish and game would lead to less hunter and fisherman success or restricted harvests. Increased ORV use would conflict with other recreational uses. Overuse of developed campgrounds, picnic areas, playfields, swimming pools, and golf courses would result in continued deterioration of existing facilities, user dissatisfaction, and additional recreational pressures on undeveloped areas. Federal, State, and local governments would be under stress to provide recreation facilities to meet minimum standards recommended by the State Outdoor Recreation Agency (SCORP, 1978).

The increase in local recreational demand (users originating from within the two-county area) that is projected to occur even without leasing and development of the proposed tracts (34 percent increase above 1982 use figures by the

TABLE 4-90
 PROJECTED INCREASE IN LOCAL HUNTER AND FISHERMAN DEMAND
 WITHIN GARFIELD AND KANE COUNTIES
 ALTERNATIVE FOUR (NO ACTION)

Year	Projected Annual Increase in Numbers						Overall Percent Increase 1982
	Projected Population Increase	Deer Hunters	Elk Hunters	Upland Game/ Waterfowl Hunters	Fishermen	Increased Demand for Fish	
1987	1,100	208	23	104	520	15,600	13
1990	1,700	299	33	150	747	22,418	19
1995	2,400	434	48	217	1,084	32,520	27
2000	3,000	535	59	267	1,336	40,080	34

Note: Projections were made assuming that the percentage of Utah's population that currently hunts or fishes would remain the same, and that the Utah percentage can be applied to the four-county area. Approximately 18 percent of Utah's population hunt deer, approximately 2 percent hunt elk, approximately 9 percent hunt upland game or waterfowl. Approximately 53 percent of Utah's population under the age of 12 and 42 percent of the population over the age of 12 fish. Approximately 27 percent of Utah's population is under 12 and 73 percent is over 12 in age (Thayne and Hudson, 1978). An average of 30 fish per person per year were caught in 1977 (UDWR, 1978).

TABLE 4-91
 PROJECTED LOCAL INCREASE IN OFF-ROAD VEHICLE DEMAND
 WITHIN GARFIELD AND KANE COUNTIES
 ALTERNATIVE FOUR (NO ACTION)

Year	Projected Population Increase	Projected Increase in Pickup and Four-Wheel Drive Numbers	Projected Increase in Motorcycle Numbers	Overall Percent Increase from 1982
1987	1,100	385	77	13
1990	1,700	599	119	19
1995	2,400	840	168	27
2000	3,000	1,050	210	34

Note: Projections were made assuming that the percentage of the population in the two-county region that owns off-road vehicles would remain the same (approximately 7 percent of the population currently owns motorcycles and approximately 35 percent of the population currently owns four-drive vehicles or light pickups) (UDRA, 1978).

year 2000), may result in increased ORV and other dispersed use of some of the 40 acres within the two-county region with special designation or potential for special designation. The more intensive use would tend to degrade values for which areas are being protected and/or reviewed. The probability for and the extent and intensity of impact is not quantifiable but would be less than that resulting from Alternatives One or Two if these alternatives are considered alone because by the year 2000 the increase from 1982 levels that is projected for the baseline population is 62 percent less than the coal-based population projected in Alternative One and Two. Agencies managing the lands may be under stress to protect the special values associated with potential special designation areas, however, due to the temporary nature of impacts resulting from dispersed recreational use, it is extremely unlikely, even in a worst case situation, that possible degradation would affect the suitability for special designation of any area.

West-Central Colorado

Even without additional Federal leasing, a small amount of coal production is expected to continue in Delta County. Delta County mines are projected to produce a total of 1.53 million tons in 1987 lowering to 1.35 million tons per year in 1990 through the year 2000. The lower figure is approximately the production obtained during 1982. The drop in production would result from closure of the Orchard Valley mine when coal resources on that tract are exhausted in the late 1980s.

Given the situation described above, Delta County is expected to experience a 16 percent population increase, a 14 percent growth in employment, and a 2 percent fall in per capita income between the years 1982 and 2000. Employment in North Fork coal mines may be expected to decline from a 1982 figure of 975 to 885 employees in 2000 having reached a high of 1,145 in 1986.

This population growth rate, which would average less than 1 percent annually, would present no significant problems to Delta County infrastructural facilities. Delta County communities could be expected to expand these facilities to reduce deficiencies created during the 1974-1981 period of rapid growth.

Under this Alternative, Delta County residents would experience slower population growth and, as a consequence, reduced levels of environmental degradation, and employment opportunities than experienced in the period between 1974-1981.

By the year 2000, TSP emission levels are estimated to be 20 percent greater than 1982 levels. The secondary NAAQS would be exceeded within 120 square miles compared to 85 square miles in 1981. An undetermined amount of subsidence could occur over areas that have been and would be mined from existing holdings in Delta County. Some unquantifiable impacts to the water resources, roads, pipelines, and ditches could result from overburden fracturing and subsidence.

By the year 2000, the average daily traffic volume would increase an undetermined but expected low amount on all State and county roads in the

area. The daily traffic volume on State Highway 65 at the intersection of State Highway 92 would increase to some 5,390 with approximately four accidents per year.

Urban area expansion would permanently remove from agricultural production a cumulative total of 57 acres of irrigated cropland by 1987, 71 acres by 1990, 84 acres by 1995, and 100 acres by the year 2000. Up to half of this acreage removed from agricultural production would be prime and unique farmland which would represent an over-all loss in the county of about 0.1 percent of irrigated croplands. An additional 100 acres of native vegetation would also be lost in urban development.

Although it cannot be quantified, human population increases would cause increased poaching incidence, more hunting and fishing pressure, more wildlife disturbance, and increased wildlife highway mortalities.

In the year 2000, the annual consumptive use of water would increase 521 acre-feet. The salinity reaching the area's stream channels would decrease by 2,086 tons/year. This would result primarily from the loss of irrigated acreage.

The expansion of present mines in the area could change the quantity, quality, and distribution of surface and groundwater. Due to the lack of specific information on future coal development, these impacts are not quantifiable.

CHAPTER 5

COORDINATION AND CONSULTATION

A notice of intent to prepare the Uinta-Southwestern Utah Coal Region EIS and hold scoping meetings for the EIS was published in the Federal Register Monday, April 5, 1982. In addition to the Federal Register notice, public notices were placed in local newspapers and aired on local radio stations. The formal public comment period extended to May 14, 1982. Public meetings were held in Delta, Colorado (April 26, 1982), Castle Dale, Utah (April 27, 1982), Price, Utah (April 28, 1982), Kanab, Utah (April 29, 1982), and Salt Lake City, Utah (April 30, 1982).

On April 16, 1982, an interagency prescoping meeting was held at BLM Utah State Office. Representatives of Bureau of Land Management, Forest Service, and Minerals Management Service attended and developed a list of potential issues relative to the coal leasing program.

Several written and oral comments were received discussing both potential alternatives and issues to be analyzed in the EIS. Transcripts from the public meetings and written comments are available for review at the BLM Utah State Office. These comments were presented to the Regional Coal Team meeting on July 22, 1982, for their consideration in ranking tracts and formulating alternatives. Briefly summarized, suggestions for alternatives included:

1. Lease coal in dispersed geographic locations to reduce social and economic impacts on any one community or county.
2. Lease areas for surface mining only after all potential underground mining operations are exhausted.
3. Tracts nearest to National Parks should be leased only after more distant tracts have been leased and developed.
4. Several comments were received specific to the Paonia tract in Colorado and dealt with consideration of single seam leasing, altering tract boundaries and comparing impacts of new portal development to coal removal through nearby existing facilities.

The following issues, mostly general in nature, were also identified:

1. Purpose and Need for Leasing. Is there a need for additional leasing at the present time when the coal market is depressed and large areas in the region (e.g., the Kaiparowits Plateau) currently under lease are not being developed? Is additional leasing in the Alton Coal Field needed when development of the Allen/Warner Valley Project is questionable? There is a potential for loss of economic return to the Federal Government that would result from leasing at current low market values during the depressed coal market. The regional and national long-term demand for high Btu, low sulfur coal should be analyzed and balanced against current market conditions in assessing the need for coal leasing.

What contribution would increased coal leasing have toward national energy independence and the related reduction in the Nation's negative balance of payments in foreign trade? What are the cost benefits to industry of high quality and extensive quantity of coal available from a fairly centralized geographical area? Would local coal help meet the demand for coal in the Pacific Rim Market? Many of these issues are beyond the scope of this EIS.

2. Wildlife. The impacts of coal leasing on summer and winter critical habitat for game and non-game wildlife should be analyzed, and the possible disruption of migration routes and impacts to riparian habitats considered. What effect would leasing have on threatened and endangered species? Increased human populations would affect wildlife and wildlife habitat.

3. Vegetation. What would be the potential impacts on threatened or endangered plant species both listed and those not officially listed by the U.S. Fish and Wildlife Service but considered to be sensitive or endangered by the States of Utah or Colorado or by groups such as the Utah Native Plant Society?

4. Soil. The potential effects of accidental spills of toxic wastes on soil or water resources should be considered, and the ability to successfully rehabilitate disturbed areas analyzed.

5. Hydrology. Possible impacts to aquifers, surface water, and water quality should be analyzed, particularly impacts that could result from coal mining on municipal watersheds and loss of water resulting from mining beneath lakes or streams. How much water is available for coal mining, transportation activities, and associated population growth in relation to existing water rights and the Colorado River Compact?

6. Land Use. What are the impacts of leasing coal on multiple use management and development of other resources on lease areas, and what would be the effects of leasing, mining, coal transportation, and related human population increases on livestock grazing and grazing privileges? Conversion of agricultural land to urban land due to increased housing needs would result in loss of agricultural production. Leasing, mine development, and coal transportation could conflict with local zoning and permitting regulations.

7. Recreation. The increased population would affect dispersed and community recreation and recreational facilities. There are potential recreation-related secondary impacts of increased human populations on surface and ground water and fragile desert soils and vegetation.

8. Socioeconomics. Analyze the cumulative impacts on local community infrastructure from populations attributable to Federal coal leasing and mining, including demand for housing and impacts on the quality and availability of housing. Consider the distribution of resultant populations and effects on the relationship of incorporated and unincorporated areas. Social impacts including effects on health care, mental health services, jail facilities, crime prevention, and public safety should be analyzed.

Point out the beneficial aspects for employment and the general economy of the affected region such as the revenue contributions generated by Federal bonuses and royalties, half of which returns directly to the affected States. The favorable climate for socioeconomic mitigation which allows for prepayment of certain taxes to fund mitigation efforts should also be included.

9. Transportation. The impacts of coal transportation on roads, highways, and highway and community safety should include a cost analysis for improvement and maintenance of affected roads. Analysis of traffic congestion on roads, highways, and in communities should be cumulative and consider future oil shale, tar sand, and nuclear waste disposal projects.

Contacts and informal consultation were initiated with several State and Federal agencies including Office of Surface Mining, Fish and Wildlife Service, Geological Survey, National Park Service, Forest Service, Utah Division of Wildlife Resources, and Utah State Planning Coordinator's Office regarding impact analysis and other data contained in this EIS. The input received was incorporated into the document as appropriate.

The draft EIS was made available to EPA and the public on May 5, 1983. In addition to the Federal Register notice, public notices were placed in local newspaper and aired on local radio and television stations.

Comments on the Draft EIS were requested from the following agencies, interest groups, and individuals (an asterisk denotes comments were received).

Federal Agencies

- Department of Agriculture
 - *Forest Service
- Department of the Interior
 - Bureau of Land Management
 - *National Park Service
 - *Office of Surface Mining
 - *U.S. Fish and Wildlife Service
 - *Water and Power Resources Service
- Federal Highway Administration
- Small Business Administration
- Office of Technological Assessment
- *Environmental Protection Agency

State Agencies

- State of Colorado
 - Governor
 - *Clearinghouse
 - *Department of Natural Resources
- State of Utah
 - *Governor
 - *Clearinghouse
 - *Division of Transportation

Local Agencies

Five County Association of Governments
Six County Association of Governments
Utah Association of Governments
*Southeastern Utah Association of
Governments
Kane County Commission
Garfield County Commission
Carbon County Commission
*Emery County Commission
Sevier County Commission
Sanpete County Commission
*Delta County Commission, Colorado
*Town of Paonia, Colorado

Other Organizations and Individuals

Numerous organizations and individuals expressing interest in the coal leasing program for the region have been sent copies of the DEIS, including Utah and Colorado's congressional delegation, coal and other energy companies, universities and colleges, publications, and local and statewide organizations.

Public hearings on the Draft EIS were held at Delta, Colorado (June 6, 1983), Castle Dale, Utah (June 7, 1983), Kanab, Utah (June 8, 1983), and Salt Lake City, Utah (June 9, 1983), and 55 letters concerning the Draft EIS were received during the public comment period which extended to July 6, 1983. The comments made at the public hearings and in the comment letters are responded to in the comment and response section of the Final EIS following Chapter Six.

The majority of comments made by individuals from Colorado dealt with the analysis and mitigation of impacts of coal transportation and disruption of surface and ground water supplies. Commentors from Utah dealt with a wider variety of impacts but many addressed the purpose and need for the Federal coal leasing program, the level of detail in the Draft EIS which is regional in nature, and the analysis of impacts on the water resources of central Utah.

Major Special Interest Groups

*National Resources Defense Council
*Friends of the Earth
The Wilderness Society
Utah Mining Association
*Sierra Club
Utah Geological Association
Western Colorado Resources Council
*Utah Coal Operators Association
Utah Environment Center
Utah Geological and Mineralogical
Society
*Utah Wilderness Association
*The Humane Society of Utah
*Colorado Open Space Council
National Wildlife Federation

CHAPTER 6

INDIVIDUAL TRACT SUMMARY

Introduction

This chapter presents a summary of the probable development scenarios, application of the unsuitability criteria, and impact analysis of the individual tracts considered for leasing in this round. Many of the tracts could either be mined in association with or independent of adjacent coal properties. In such cases, for analysis purposes, independent operations are assumed because it would generally result in greater environmental impacts. The tracts are listed by coal field.

Central Utah: Book Cliffs Coal Field

Alkali Creek Tract

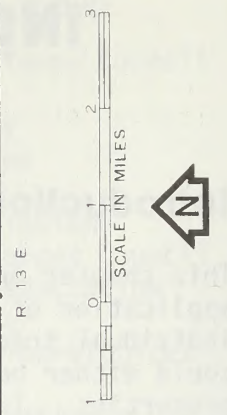
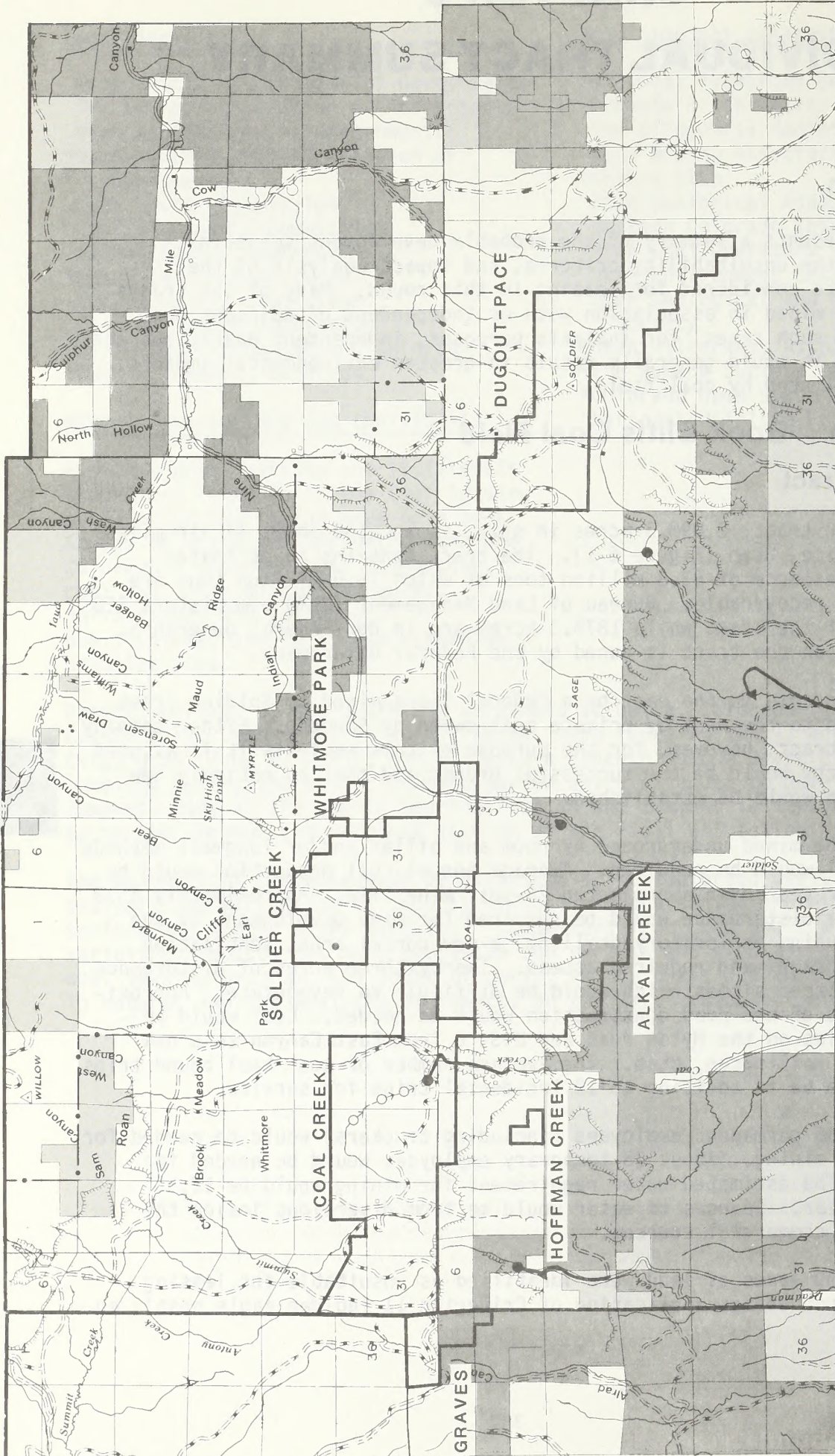
The Alkali Creek tract, 2,098.3 acres in size, is located about 11 air miles northeast of Price, Utah (Figure 6-1). The tract contains an estimated in-place coal resource of 33.8 million tons of which 15.0 million tons are estimated to be recoverable. Bureau of Land Management (BLM) administers 220 surface acres of the tract while 1878.3 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government.

The tract is bordered to the east by a Federal lease mined by Soldier Creek Coal Company and to the west by private coal owned by Sunedco. Either company may bid on the tract; however, for the purpose of this analysis it is assumed that a third party would be the successful bidder and that an entirely new mining operation would be established.

The coal would be mined underground by room and pillar and/or longwall methods and a new portal would be required. Average annual coal production would be 600,000 tons per year over a projected 25-year mine life. Approximately 45.8 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, a new portal area, ventilation shafts, coal storage, and required access. Twenty-three acres of disturbance would occur on steep slopes which would be difficult to revegetate. Approximately 7.6 miles of new road construction would be needed. Coal would be trucked 18.0 miles on the Myton road and U.S. 6 from East Canyon to a new loadout east of Wellington, Utah. The average number of coal haul round trips per day would be 63 in addition to 12 incidental trips for service.

Approximately 185 permanent employees (including truckers) would be needed for the 25 years of mining. About 28 temporary employees would be needed for construction. The estimated water requirement for mining would be 12.9 acre-feet per year. Sources of water would be from diversions inside the mine, wells, or commercial sources.

Approximately 570 acres of land were identified as unsuitable for leasing consideration upon strict application of Criterion 11 (golden eagle nest); an



- PUBLIC LANDS
- STATE LANDS
- TRACT BOUNDARY
- IMPROVED ACCESS
- PORTAL
- LOADOUT

FIGURE 6-1
 GRAVES, COAL CREEK, WHITMORE PARK, DUGOUT-PACE, ALKALI CREEK,
 SOLDIER CREEK AND HOFFMAN CREEK COAL TRACTS

additional 110 acres were identified as unsuitable upon strict application of Criterion 13 (prairie falcon nests). With application of the underground mining exemption, the above lands were found acceptable for leasing by application of specific stipulations covering scheduling of lease activities.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

About 18.8 million tons of coal (56 percent of the total estimated resource) would remain underground and unrecoverable. Carbon County would receive added revenues from coal development and a 3 to 5 percent population increase in the area which would accompany tract development.

Coal Creek Tract

The Coal Creek tract, 4,198.09 acres in size, is located about 10 air miles northeast of Price, Utah (Figure 6-1). The tract contains an in-place coal resource of 114.4 million tons of which 46 million tons are estimated to be recoverable. BLM administers 40 surface acres of the tract while 4,158.09 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government.

The Coal Creek tract is bordered on the south by Federal coal leases owned by Tower Resources and coal lands owned by Sunedco. Both companies' properties include coal outcrops from which they could proceed with mining into the tract. However, considering the size of the tract and the available reserve, the development scenario considered will be that of a third operator who does not own adjacent coal properties. This operator would require a complete set of surface facilities.

The coal would be mined underground by room and pillar and/or longwall methods. A new portal would be required possibly in conjunction with other coal properties. Average annual coal production would be 1.15 million tons per year over a 40-year mine life. Approximately 92.1 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 4.5 miles of existing access roads would be improved and 10.05 miles of new road construction would be needed. Coal would be trucked for about 19.4 miles on the Coal Creek road and U.S. 6 to a new loadout east of Wellington, Utah. The average number of coal haul truck round trips per day would be 120 in addition to 23 trips per day for incidental service.

Approximately 358 permanent employees (including truckers) would be needed for the 40 years of mining. About 73 temporary employees would be needed for construction. The estimated water requirement for mining would be 24.7 acre-feet per year. Sources of water would include the mine, wells, and commercial sources.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

About 46 million tons of coal would be mined with the remaining 68.4 million tons (59.7 percent of the estimated resource) remaining underground and unrecoverable. Carbon County would experience an increase in population and revenues as a result of tract development. A minor amount of wildlife habitat would be lost.

Dugout-Pace Tract

The Dugout-Pace Canyon tract, 3,149.62 acres in size, is located about 18 air miles northeast of Price, Utah (Figure 6-1). The tract contains an in-place coal resource of 106.7 million tons of which 25 million tons are estimated to be recoverable. The tract is comprised of non-Federal surface and Federal coal.

The tract is bordered by Federal coal leases held by Sunedco and Kaiser Steel. Both companies' properties include coal outcrops from which they could mine into the tract and are considered to be the only lease contenders. The principal surface facilities, such as, portal facilities and access roads, truck loadout, preparation plant, and rail loadout, would have been constructed regardless of the availability of the Dugout-Pace tract and are not addressed in this analysis.

The coal would be mined by underground methods. A room and pillar system would be employed with an average annual coal production of 555,000 tons per year over a 45-year mine life. Approximately 10.7 acres of surface disturbance would be required for exploratory drilling, ventilation shafts, and required access by the year 2000. Approximately 0.5 miles of existing access roads would be improved and 4 miles of new road construction would be needed.

Coal would be trucked for 12.3 miles along the Dugout Creek Road (county road 6508) to U.S. Highway 6 to an existing loadout in the vicinity of Sunnyside Junction. The average number of coal haul truck round trips per day would be 57 in addition to 11 trips per day for incidental service.

Approximately 86 permanent employees (including truckers) would be needed for the 45 years of mining. The estimated water requirement for mining would be 11.9 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

Visual resource protection is considered important within 65 percent of the tract area; land use plan direction stipulates that proposed surface facilities would be disallowed within this scenic area if such facilities were not in accordance with scenic management criteria. Only 25 million tons of coal (23.4 percent of the estimated coal resource) would be recovered. Some dust from vehicular traffic on unpaved roads would be noticeable.

Graves Tract

The Graves tract, 550.16 acres in size, is located about 8 air miles northeast of Price, Utah (Figure 6-1). The tract contains an in-place coal resource of 19.8 million tons of Federal coal of which 7 million tons are estimated to be recoverable underground by room and pillar and/or longwall mining methods. BLM administers 228.28 surface acres of the tract while 322.88 acres are in non-Federal ownership. Due to the lack of coal outcrop on the tract and the depth of overburden, the Graves tract could be economically developed only from adjacent coal lands to the east, west or south held by Tower Resources and Blackhawk Coal Company (Price River Coal). In either case, required surface facilities would be off-tract and would have been constructed regardless of the availability of the Graves tract. Therefore, these facilities will not be considered in this development scenario. Annual production from the tract would be 700,000 tons. Mining of the tract would not increase annual production or require increased employment or additional water sources for the overall development operation.

Approximately 0.2 acres of surface disturbance would be required for exploration drill pads. No new road construction would be needed. Coal would be trucked 19.4 miles on the Hayes Wash road through Price to the existing Wildcat siding loadout on Consumers Wash. The average number of coal haul truck round trips per day would be 72 in addition to 14 trips per day for incidental service. The trucking of coal would be extended over a longer period of time but the number of truck trips per day would not increase.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

About 12.8 million tons of coal (64.6 percent of the resource) would not be mined and would remain unrecoverable. Coal would be mined in the Blackhawk Formation which is potentially valuable for fossils.

Hoffman Creek Tract

The Hoffman Creek tract, 120 acres in size, is located about 9 air miles northeast of Price, Utah (Figure 6-1). The tract contains an estimated in-place coal resource of 2.0 million tons of which 1 million tons are estimated to be recoverable. BLM administers all 120 surface acres of the tract and owns all of the coal. Mining would be underground by room and pillar methods

from adjacent coal properties to the north or west held by Tower Resources or Sunedco. Required surface facilities would be off-tract and would have been constructed regardless of the availability of the Hoffman Creek tract. Therefore, the surface facilities will not be addressed in this report.

Average annual coal production from the tract itself would be 153,000 tons per year for about 6.5 years. One million tons (50 percent of the total coal resource) would not be recovered. Tract development would lengthen mine life of adjacent properties but would not increase annual production of the mining unit or require additional employment. No surface disturbance would be required for mine development. Coal would be trucked 19.4 miles on the Hayes Wash road through Price to the existing Wildcat siding loadout on Consumers Wash. The average number of coal haul truck round trips per day would be 15.9 in addition to 3.1 trips per day for incidental service. Use of the roads by miners, coal trucks, and service trucks would be extended 1 year but the number of truck trips per day would not be increased.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

The Hoffmann Creek tract was offered for sale as an emergency lease on August 12, 1983. The apparent high bidder was AMCA Coal Leasing, Inc.

Soldier Creek Tract

The Soldier Creek tract, 2,168.02 acres in size, is located about 13 air miles northeast of Price, Utah (Figure 6-1). The tract contains an in-place coal resource of 81.9 million tons of which 37 million tons are estimated to be recoverable. The tract is comprised of non-Federal surface underlain by Federally owned coal. Due to the lack of outcrop on the tract and the depth of overburden, the tract could be economically developed only from adjacent coal lands to the south, east, or west. Soldier Creek Coal Company's lease and mine lies immediately south of the subject tract. Lands to the east of the tract include Federal and State coal leases held by Sunedco which are expected to support a large coal operation within several years. The tract is adjacent to the Alkali Creek tract to the west and also a State lease held by Bow Valley Coal Resources. Any or all of the parties holding these adjacent coal lands may be interested in obtaining the Soldier Creek tract. Development would be from an existing or planned portal on one of these adjacent operations.

The coal would be mined underground by room and pillar and/or longwall mining methods and would extend the life of an adjacent mine. Average annual coal production from the tract would be 925,000 tons per year over a 40-year mine life. Approximately 20.9 acres of surface disturbance would be required for mine development by the year 2000 for exploratory drill holes, ventilation shafts, and required access. About 5.75 miles of new road construction would be needed for exploratory drilling and a ventilation shaft. Coal would be

trucked about 17.6 miles via the Soldier Creek road and U.S. Highway 6 to a new loadout east of Wellington, Utah. The average number of coal haul truck round trips per day would be 97 in addition to 19 trips per day for incidental service.

Approximately 163 permanent employees (including truckers) would be needed for the 40 years of mining. About 95 temporary employees would be needed for 1 year for construction of ventilation shaft facilities. The estimated water requirement for mining would be 19.9 acre-feet per year. Sources of water would be the mine, wells, and/or commercial sources.

By strict application of the unsuitability criteria, 50.65 acres associated with the location of County Road 381 were identified under Criterion 3. This area was found acceptable with the application of the underground mining exemption and a specific stipulation for road protection. Criterion 14 would need to be applied as discussed for the other Book Cliffs tracts.

Dust from unpaved roads would be visible from surrounding areas. Revegetation of disturbance on steep slopes would be difficult. Tract development may violate Visual Resource Management standards in some areas. About 57.7 million tons of coal (70.4 percent of the resource) would not be recovered. Development of the tract would result in a slight population increase and increased county revenues.

Whitmore Park Tract

The Whitmore Park tract, 160 acres in size, is located about 14 air miles northeast of Price, Utah (Figure 6-1). The tract contains an in-place coal resource of 6.3 million tons of which 1.9 million tons are estimated to be recoverable. All surface acres are in non-Federal ownership while all of the coal on the tract is owned by the Federal Government. The Whitmore Park tract is a nearly isolated parcel of Federal coal land and would be mined in conjunction with non-Federal coal to the south or west. Any of the parties holding adjacent coal leases could be interested in obtaining the tract. Surface facilities would be constructed on other lease holdings, whether or not this tract is leased, and are not considered in this analysis.

The coal would be mined underground by room and pillar and/or longwall methods. Annual production would be 380,000 tons which would contribute to the overall production of a mining unit having a life of 40 years. About 4.4 million tons of coal (69.8 percent of the total resource) would not be recovered. The tract would provide 25 percent of the total mining unit's annual production for 5 years. Overall mine life would be extended by 1.3 years. Mining of the tract would not cause increased annual production of the mining unit or require increased employment or additional water sources. Approximately 0.3 acres of surface disturbance would be required for exploration drill hole pads. No new road construction would be needed. Coal would be trucked about 17.6 miles down the Soldier Creek road and U.S. Highway 6 to a new loadout east of Wellington. The average number of coal haul truck round trips per day would be 40 in addition to 8 trips per day for incidental service. Trucking would be required over the extended mine life but the number of truck trips per day would not increase.

County road 6502 crosses the tract and results in 50 acres being identified as unsuitable upon strict application of Criterion 3. Through the underground mining exemption this area was found acceptable for leasing with a specific stipulation on road protection. Unsuitability Criterion 14 (migratory birds) has not been fully applied due to a lack of data; the appropriate land use plan calls for necessary inventories to be conducted in an actual mine plan.

Central Utah: Wasatch Plateau and Emery Coal Fields

Acord Tract

The Acord tract, 120 acres in size, is located about 12 air miles west of the town of Emery, Utah (Figure 6-2). The tract contains an in-place coal resource of 3.4 million tons of which 1.5 million tons are estimated to be recoverable. The tract is comprised of non-Federal surface underlain by Federal coal. Coal Search Corporation currently controls 2,500 acres of Federal coal leases and 4,020 acres of private coal land surrounding the Acord tract. A mine plan is currently being developed for Coal Search's existing property. The Acord tract will allow Coal Search Corporation to block up additional coal and allow it to be mined in conjunction with surrounding lands, avoiding a possible by-pass situation. An alternate owner for the Acord tract itself is not a viable option because the tract is too small to economically support a separate mine. The possibility does exist that a party other than Coal Search Corporation could obtain the lease and negotiate with Coal Search Corporation for control of their existing property.

The coal would be mined underground by room and pillar methods. Average annual coal production would be 83,000 tons per year and would be mined in conjunction with an approximately 1.0 million ton per year operation over a 40-year unit mine life. About 0.5 acres of additional surface disturbance would be required for exploratory drilling including 0.25 miles of new access roads. Coal would be trucked about 83.4 miles on the Spring Canyon road, I-70, U.S. Highway 89, and Utah Highway 28 to the Levan loadout. The average number of coal haul truck round trips per day would be 9 in addition to 2 trips per day for incidental service. The tract would supply 83,000 tons of the 1 million tons per unit mine for about 18 years.

Approximately 15 permanent employees (including truckers) would be needed for the 40 years of mining. No temporary employees would be needed for construction. The estimated water requirement for mining would be 1.8 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

No exemptions or exceptions to the unsuitability criteria were applied to the Acord tract. Development of this tract would result in 15 new jobs being available for local miners. Nearly 40 to 60 percent of the lease tract could subside 8 to 10 feet causing tension fractures at the surface. Both ground water aquifers and surface water runoff would be disrupted, resulting in adverse impacts to existing livestock and wildlife water sources. About 1.9 million tons of in-place coal resource (55.8 percent) would not be recovered.

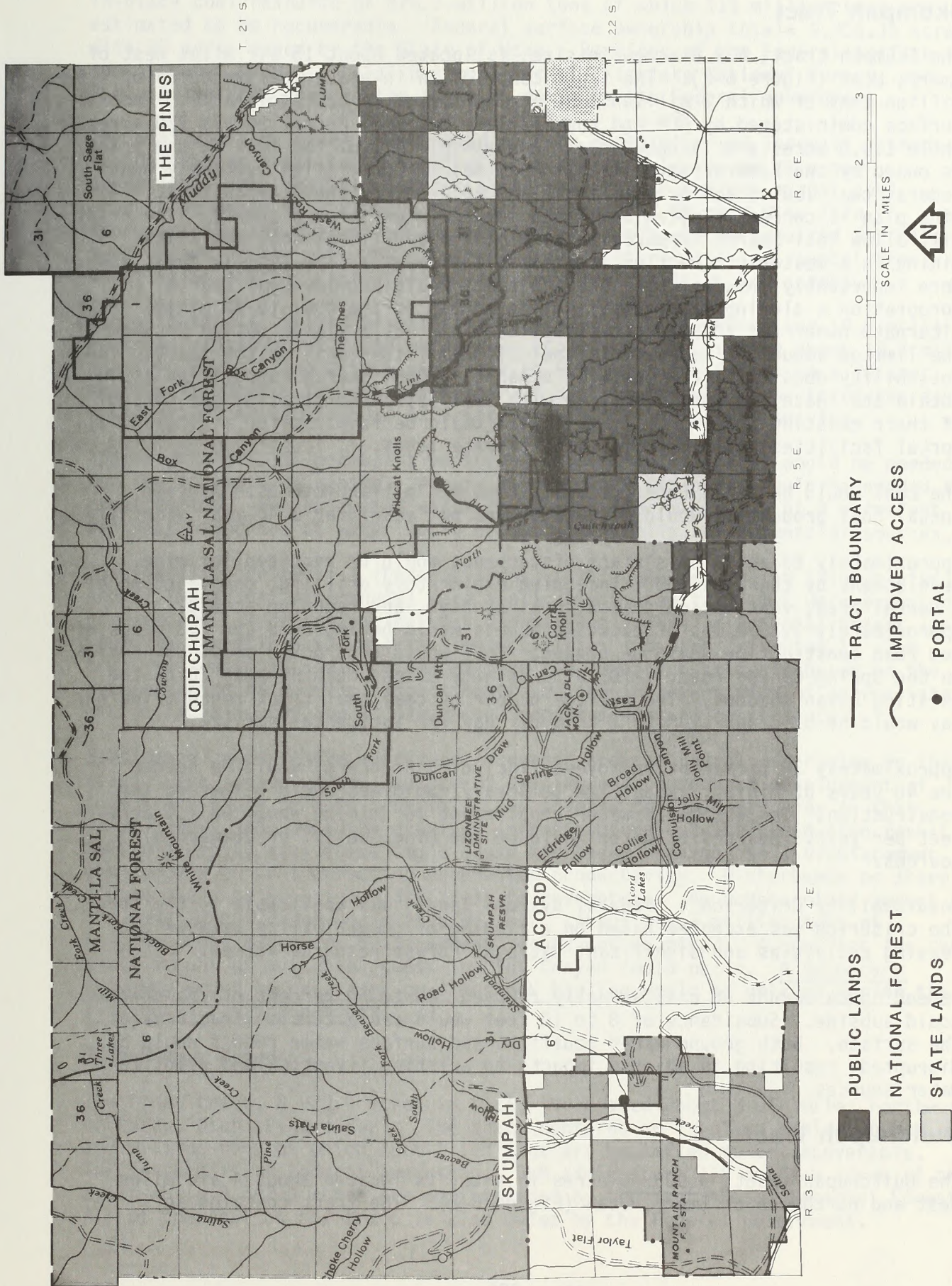


FIGURE 6-2
SKUMPAH, ACORD, QUITCHUPAH AND THE PINES COAL TRACTS

Skumpah Tract

The Skumpah tract, 639.8 acres in size, is located about 15 air miles west of Emery, Utah (Figure 6-2). The tract contains an in-place coal resource of 4.5 million tons of which 2 million tons are estimated to be recoverable. Federal surface administered by BLM and the Fishlake National Forest totals 520 acres while 119.8 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government. Coal Search Corporation currently owns Federal coal leases and private coal land adjacent to the Skumpah tract. A mine plan is currently being developed for their existing property. The tract will allow Coal Search Corporation to block up additional coal and allow mining in a westerly direction from existing leases to the Musinia fault zone. More importantly, however, the Skumpah tract would provide Coal Search Corporation a sloping 18 degrees incline access to the coal to be mined. An alternate owner for the Skumpah tract itself is not a viable option because of the limited amount of recoverable coal (2.02 million tons) on the tract. The possibility does exist that a party other than Coal Search Corporation could obtain the lease and then negotiate with Coal Search Corporation for control of their existing property. A new portal would be required for mining and all portal facilities would be located on private lands.

The coal would be mined underground by room and pillar methods. Average annual coal production would be 50,000 tons per year over a 40-year mine life.

Approximately 83 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, construction of a portal area, ventilation shafts, coal storage, and required access. Approximately 3.75 miles of existing access would be improved and 6.3 miles of new road construction would be needed. Coal would be trucked about 83.4 miles on the Spring Canyon road, I-70, U.S. Highway 89 and Utah Highway 28 to the existing Levan loadout. The average number of coal haul truck round trips per day would be 5 in addition to 1 trip per day for incidental service.

Approximately 30 permanent employees (including truckers) would be needed for the 40 years of mining. About 128 temporary employees would be needed for construction. The estimated water requirement for mining would be 1.1 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Unsuitability Criterion 1 (Federal systems lands) was applicable to the tract. The criterion was excepted based on a finding of compatibility between coal leasing activities and significant National Forest resource values.

Depending on amount of coal actually removed, 40 to 60 percent of the tract could subside. Subsidence of 8 to 10 feet would cause tension fractures at the surface. Both ground water aquifers and surface water runoff would be disrupted, resulting in adverse impacts to existing livestock and wildlife water sources.

Quitcupah Tract

The Quitcupah tract, 9,905.46 acres in size, is located about 4 air miles west and northwest of Emery, Utah (Figure 6-2). The tract contains an

in-place coal resource of 276.3 million tons of which 115 million tons are estimated to be recoverable. Federal surface ownership totals 9,906.35 acres with 80 acres owned by the State of Utah. Portions of the Federal surface are administered by Manti-LaSal National Forest, Fishlake National Forest, and BLM. All of the coal on the tract is owned by the Federal government.

The coal would be mined underground by room and pillar and longwall methods. The Quitchupah tract could be mined from adjacent leases or as a new operation. This analysis assumes a new operation. Average annual coal production would be 2,875,000 tons per year over a 40-year mine life. Approximately 183.8 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, portal area, ventilation shafts, coal storage, and required utilities and access.

Approximately 4.4 miles of existing access would be improved and 19.6 miles of new road construction would be needed. Coal would be trucked about 10.4 miles down Dry Fork, along Quitchupah Creek to Highway U-10, and on to a loadout near Emery, Utah. The average number of coal haul truck round trips per day would be 300 in addition to 52 trips per day for incidental service.

Approximately 1,125 permanent employees (including truckers) would be needed for the 40 years of mining. About 175 temporary employees would be needed for construction. The estimated water requirement for mining is 61.8 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Unsuitability Criteria 1 (Federal lands), 11 (eagle nests), 16 (floodplains), and 17 (municipal watersheds) were applicable to the tract but were excepted or exempted. A determination that significant values on National Forest lands would be compatible to coal leasing activities excepted Criterion 1. The tract was excepted and/or exempted from the remaining criteria based on the determination of no significant impacts or the implementation of appropriate mitigating measures and/or management requirements and constraints.

Subsidence could damage watershed resources and the hydrologic regime on the tract. The socioeconomic impacts of leasing and subsequent development of this tract would be both beneficial and adverse to the Emery area in that while needed jobs would be provided infrastructural stress could also result. Soil disturbing activities could cause increased erosion, soil displacement and compaction thus affecting vegetation productivity. Disturbance on steep slopes would be especially difficult to revegetate. An undetermined amount of big game winter range would also be lost. About 161.3 million tons of in-place coal resource (58.3 percent) would not be mined. A conflict for the small amount of suitable access in Link Canyon could occur. A secondary driveway would be necessary or livestock hauling would be delayed during the livestock trailing periods.

The Pines Tract

The Pines tract, 8,920.9 acres in size, is located about 3 air miles northwest of Emery, Utah (Figure 6-2). The tract contains an in-place coal resource of 167 million tons of which 70 million tons are estimated to be recoverable. The surface is in Federal ownership. BLM administers 178 surface acres of the tract while 8,742.9 acres are administered by the Manti-LaSal National Forest. All of the coal on the tract is also owned by the Federal Government.

The coal would be mined underground by room and pillar and longwall methods. A new portal would be required as development of this tract would be a new operation. Average annual coal production would be 1,750,000 tons per year over a 40-year mine life. Approximately 140.1 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 7.7 miles of existing access would be improved and 14.2 miles of new road construction would be needed. Coal would be trucked about 15.1 miles down Link Canyon to Highway U-10 to a new loadout near Emery, Utah. The average number of coal haul truck round trips per day would be 182 in addition to 35 trips per day for incidental service.

Approximately 637 permanent employees (including truckers) would be needed for the 40 years of mining. About 110 temporary employees would be needed for construction. The estimated water requirement for mining would be 37.6 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

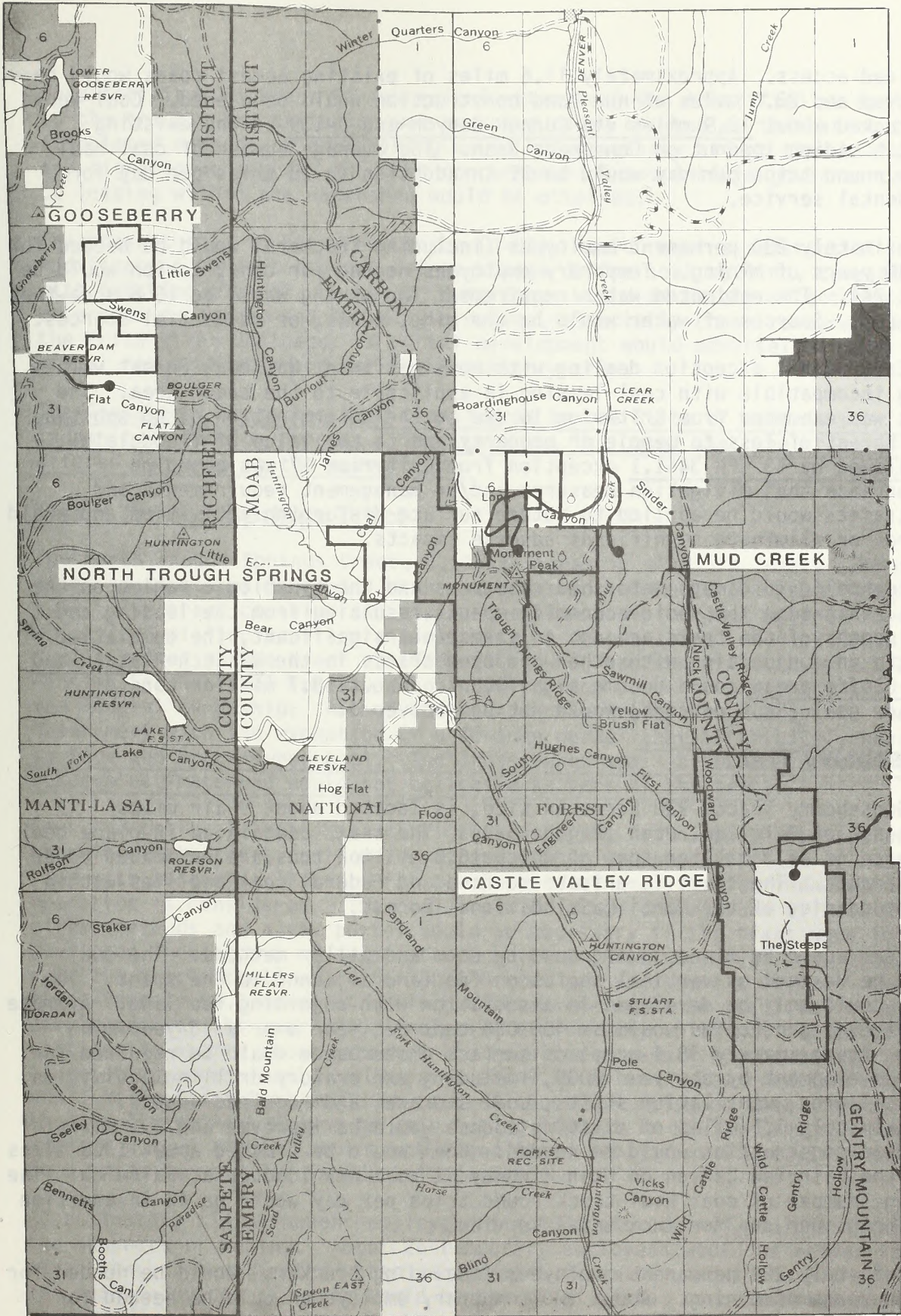
Unsuitability Criteria 1 (Federal lands), 11 (eagle nests), 16 (floodplains), and 17 (municipal watersheds) were applicable to the tract but were excepted or exempted. A determination that significant values on National Forest lands would be compatible to coal leasing activities excepted Criterion 1. The tract was excepted and/or exempted from the remaining criteria based on the determination of no significant impacts or the implementation of appropriate mitigating measures or management requirements and constraints.

Subsidence could damage watershed resources and the hydrologic regime on the tract. The socioeconomic impacts of leasing and subsequent development of this tract would be both beneficial and adverse to the Emery area in that while needed jobs would be available, infrastructural stress could also result. A conflict for the small amount of suitable access in Link Canyon could occur. Nearly 97 million tons of in-place coal (58 percent of the total resource) would not be mined. Where surface disturbance would occur on steep slopes, revegetation success would be difficult.

Castle Valley Ridge Tract

The Castle Valley Ridge tract, 3,442.16 acres in size, is located about 16 air miles west-southwest of Price, Utah (Figure 6-3). The tract contains an in-place coal resource of 73.7 million tons of which 35 million tons are estimated to be recoverable. The Forest Service administers all 3,442.16 surface acres of the tract. All of the coal on the tract is also owned by the Federal Government.

The coal would be mined underground by room and pillar or longwall methods probably by continuation of Plateau Mining's existing operation. However, because the possibility exists that the tract could be developed independent of adjoining operations, the analysis considers independent access, portal construction and other surface facility development. Average annual coal production would be 875,000 tons per year over a 40-year mine life. Assuming new portal development, approximately 188.9 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling activities, the portal area, ventilation shafts, coal storage, and.



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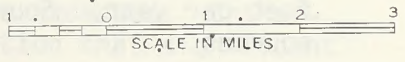
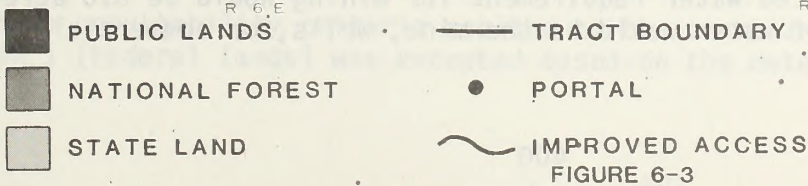


FIGURE 6-3

MUD CREEK, CASTLE VALLEY RIDGE, GOOSEBERRY AND NORTH TROUGH SPRINGS COAL TRACTS

required access. Approximately 11.6 miles of existing access roads would be improved and 23.0 miles of new road construction would be needed. Coal would be trucked about 13.9 miles via Corner Canyon and U-139 to the existing Wildcat siding loadout on Consumers Wash. The average number of coal haul truck round trips per day would be 91 in addition to 18 trips per day for incidental service.

Approximately 289 permanent employees (including truckers) would be needed for the 40 years of mining. Temporary employees needed for construction would be about 241. The estimated water requirement for mining would be 18.8 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

The Criterion 1 exception dealing with no significant National Forest values being incompatible with coal leasing is applicable to the track area. The tract was exempted from Criterion 16 due to the determination of no substantial threat of loss to people or property and to the value of floodplains. As allowed by 43 CFR 3461.1 exception from Criterion 17 was based on concurrence that mitigation measures and/or management requirements and constraints would be applied to future surface disturbing activities and would control or eliminate significant adverse impacts.

Subsidence could damage watershed resources and the hydrologic regime on the tract. Although the socio-economic impacts resulting from the leasing and development of the tract are not in themselves significant, the cumulative impacts in conjunction with other proposed tracts in the Wasatch Plateau and Book Cliffs areas could become significant. About 38.7 million tons of in-place coal (52.5 percent) would not be recovered.

Gooseberry Tract

The Gooseberry tract, 920 acres in size, is located about 9 air miles northeast of Fairview, Utah (Figure 6-3). The tract contain an in-place coal resource of 46.3 million tons of which 16.0 million tons are estimated to be recoverable. The tract is private surface and Federal coal and lies within the boundaries of the Manti-LaSal National Forest.

The coal would be mined underground by room and pillar methods. The coal would be reached by vertical shafts on fee land adjacent to the tract. The tract could only be developed in association with adjoining fee land. Average annual coal production would be 400,000 tons per year over a 40-year mine life. Approximately 38.4 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling activities, a portal area, ventilation shafts, coal storage, and required access. Approximately 1.5 miles of existing access would be improved and 2.5 miles of new road construction would be needed. Coal would be trucked about 13.6 miles down the Fairview Canyon on Utah Highway 31 to a new loadout at Fairview. The average number of coal haul truck round trips per day would be 42 in addition to 8 trips per day for incidental service.

Approximately 229 permanent employees (including truckers) would be needed for the 40 years of mining. About 120 temporary employees would be needed for construction. The estimated water requirement for mining would be 8.6 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Unsuitability Criterion 17 (municipal watershed) was identified as applicable to the tract. The criterion was excepted based on studies indicating that stipulated methods of coal mining would not adversely affect the watershed to any significant degree; and that concurrence of responsible governmental units to leasing within the watershed would be obtained.

The present road in Fairview Canyon (U-31), would require substantial modification to meet minimum safety standards for coal hauling, compatible with existing uses of the road. Subsidence would adversely affect the watershed resources and hydrologic regime, especially those resources within the Price River drainage. A portal development would adversely impact the visual resource standards of the Gooseberry area.

The Gooseberry tract has been transferred to the State of Utah as part of the indemnity selection process. The State has indicated that the tract will be offered for sale in the near future.

North Trough Springs Tract

The North Trough Springs tract, 3,195.61 acres in size, is located about 7 air miles southwest of Scofield, Utah, adjacent to the Mud Creek tract (Figure 6-3). The tract contains an in-place coal resource of 30.2 million tons of which 12.0 million tons are estimated to be recoverable. About 2,555.61 surface acres of the tract are Federally owned and administered by BLM and Manti-LaSal National Forest. About 640 surface acres of the tract are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government with the exception of a 40-acre parcel that is privately owned surface and State owned coal. The State owned coal is not included in the reserve estimate and would not be leased as part of the tract.

Four Federal coal leases are contiguous with the North Trough Springs tract; therefore, the tract could be developed either independent of or in association with adjoining leases. For the purpose of analysis, an independent operation is considered. The coal would be mined underground by room and pillar methods and a new portal would be necessary if the tract were to be developed independent of adjacent operations. Average annual coal production from the tract itself would be 300,000 tons per year over a 40-year mine life. Approximately 81.3 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 2 miles of existing access would be improved and 9.75 miles of new road construction would be needed. Coal would be trucked about 8.4 miles on Utah Highway 96 through Clear Creek Canyon to an existing loadout in Eccles Canyon. The average number of coal haul truck round trips per day would be 31 in addition to 6 trips per day for incidental service.

Approximately 114 permanent employees (including truckers) would be needed for the 40 years of mining. About 26 temporary employees would be needed for construction. The estimated water requirement for mining would be 6.4 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Three unsuitability criteria applied to the tract and were excepted. Criterion 1 (Federal lands) was excepted based on the determination that significant

values on National Forest lands would be compatible to coal leasing activities. Criterion 16 (floodplains) was exempted by the formulation of appropriate mitigation measures and the determination of no substantial threat of loss to people or property or to the value of floodplains. Stipulated methods of coal mining and concurrence of appropriate government units regarding coal development on the tract excepted Criterion 17 (municipal watersheds).

Subsidence could damage watershed resources and the hydrologic regime on the tract. Though the socioeconomic and water quality impacts resulting from leasing and development are not in themselves significant, the cumulative impacts of this tract in conjunction with other proposed tracts in the Scofield area could become significant. Substantial upgrading of nearby access roads would be required to accommodate the increased coal traffic. Nearly 18.8 million tons of coal (60.2 percent of the total in-place resource) would not be mined.

Mud Creek Tract

The Mud Creek tract, 1,206.8 acres in size, is located about 7 air miles south of Scofield, Utah (Figure 6-3). The tract contains an in-place coal resource of 27.9 million tons of which 10 million tons are estimated to be recoverable. The Manti-LaSal National Forest administers the surface of the tract and the coal on the tract is owned by the Federal Government.

The Mud Creek tract would likely be developed independent of any nearby coal operations. The coal would be mined underground by room and pillar methods and a new portal would be required. Average annual coal production would be 250,000 tons per year over a 40-year mine life. Approximately 36.4 acres of surface disturbance would be required for mine development by the year 2000, including the exploratory drilling, portal area, ventilation shafts, coal storage, and required access. Approximately 1.2 miles of existing access would be improved and 2.5 miles of new road construction would be needed. Coal would be trucked about 4.6 miles on Forest development roads and Utah Highway 96 through Clear Creek Canyon to an existing loadout in Eccles Canyon. The average number of coal haul truck round trips per day would be 26 in addition to 5 trips per day for incidental service.

Approximately 69 permanent employees (including truckers) would be needed for the 40 years of mining. About 19 temporary employees would be needed for construction. The estimated water requirement for mining would be 5.4 acre-feet per year. Sources of water would be from the mine, wells, or commercial sources.

Three unsuitability criteria applied to the tract and were excepted. Criterion 1 (Federal lands) was excepted based on the determination that significant values on National Forest lands would be compatible to coal leasing activities. Criterion 16 (floodplains) was exempted by the formulation of appropriate mitigation measures and the determination of no substantial threat of loss to people or property or to the value of floodplains. Stipulated methods of coal mining and concurrence of appropriate government units regarding coal development on the tract excepted Criterion 17 (municipal watersheds).

Subsidence could damage watershed resources and hydrologic regime on the tract. Though the socioeconomic and water quality impacts resulting from

leasing and development are not in themselves significant, the cumulative impacts of this tract in conjunction with other proposed tracts in the Scofield area could become significant. Nearly 17.9 million tons of coal (64.1 percent of the total resource) would not be recovered. Surface disturbance could result in minor losses of elk calving ground habitat.

Ferron Canyon Tract

The Ferron Canyon tract, 2,680.38 acres in size, is located about 11 air miles northwest of Ferron, Utah (Figure 6-4). The tract contains an in-place coal resource of 28.5 million tons of which 10 million tons are estimated to be recoverable. The tract is comprised of Federal coal and Federal surface. The Manti-LaSal National Forest administers the surface.

The coal would be mined underground by room and pillar methods and a new portal would be required. The tract would likely be developed in conjunction with adjoining fee land held by Sunedco Coal Company. Average annual coal production from the tract itself would be 500,000 tons per year over a 20-year mine life. Approximately 157.4 acres of surface disturbance would be required for mine development by the year 2000, including the portal area, ventilation shafts, coal storage, and required access. These surface facilities would also be used for development of the adjacent fee lands. Approximately 8.8 miles of existing access would be improved and 23.1 miles of new road construction would be needed. Coal would be trucked about 24.4 miles down the Ferron Canyon road and Utah Highway 10 to a new loadout near Castledale. The average number of coal haul truck round trips per day would be 52 in addition to 10 trips per day for incidental service.

Approximately 183 permanent employees (including truckers) would be needed for the 20 years of mining. About 147 temporary employees would be needed for construction. The estimated water requirement for mining would be 10.7 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Criteria 1 (Federal land system), 11 (eaglenest), 16 (floodplains), and 17 (municipal watershed), were identified as applicable to the tract area. The general underground mining exemption and the Criterion 1 exception on determination of compatibility between National Forest values and coal leasing activities were applied to the tract. The tract was excepted and/or exempted from the remaining criteria based on determination of no substantial impacts or the implementation of appropriate mitigation measures and/or management requirements and constraints as outlined in 43 CFR 3461.1

Subsidence could damage watershed resources and treatment structures and the hydrologic regime on the tract. Although the socioeconomic impacts resulting from leasing and development of the tract are not in themselves significant, the cumulative impacts in conjunction with other proposed tracts in the Emery area could become significant. There would be an undetermined loss of riparian habitat. The Ferron Canyon Picnicground may be destroyed and may need relocation. Nearly 18.8 million tons of in-place coal resource (64.9 percent) would not be mined.

Trail Mountain Tract

The Trail Mountain tract, 6,950.61 acres in size, is located about 11 air miles northwest of Castle Dale, Utah (Figure 6-4). The tract contains an in-place coal resource of 87.3 million tons of which 40 million tons are estimated to be recoverable. The surface is Federally owned with BLM administering 202.66 acres while 6,747.95 acres are administered by the Manti-LaSal National Forest. All of the coal on the tract is owned by the Federal Government.

The coal would be mined underground by room and pillar and longwall methods. The tract would likely be a new operation and a new portal would be required. Average annual coal production would be 1.0 million tons per year over a 40-year mine life. Approximately 146.4 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 4.6 miles of existing access would be improved and 21.5 miles of new road construction would be needed. Coal would be trucked about 17.6 miles down Cottonwood Canyon to Utah Highway 29, Utah Highway 57, and on to a loadout near Castle Dale. The average number of coal haul truck round trips per day would be 104.2 in addition to 20 trips per day for incidental service.

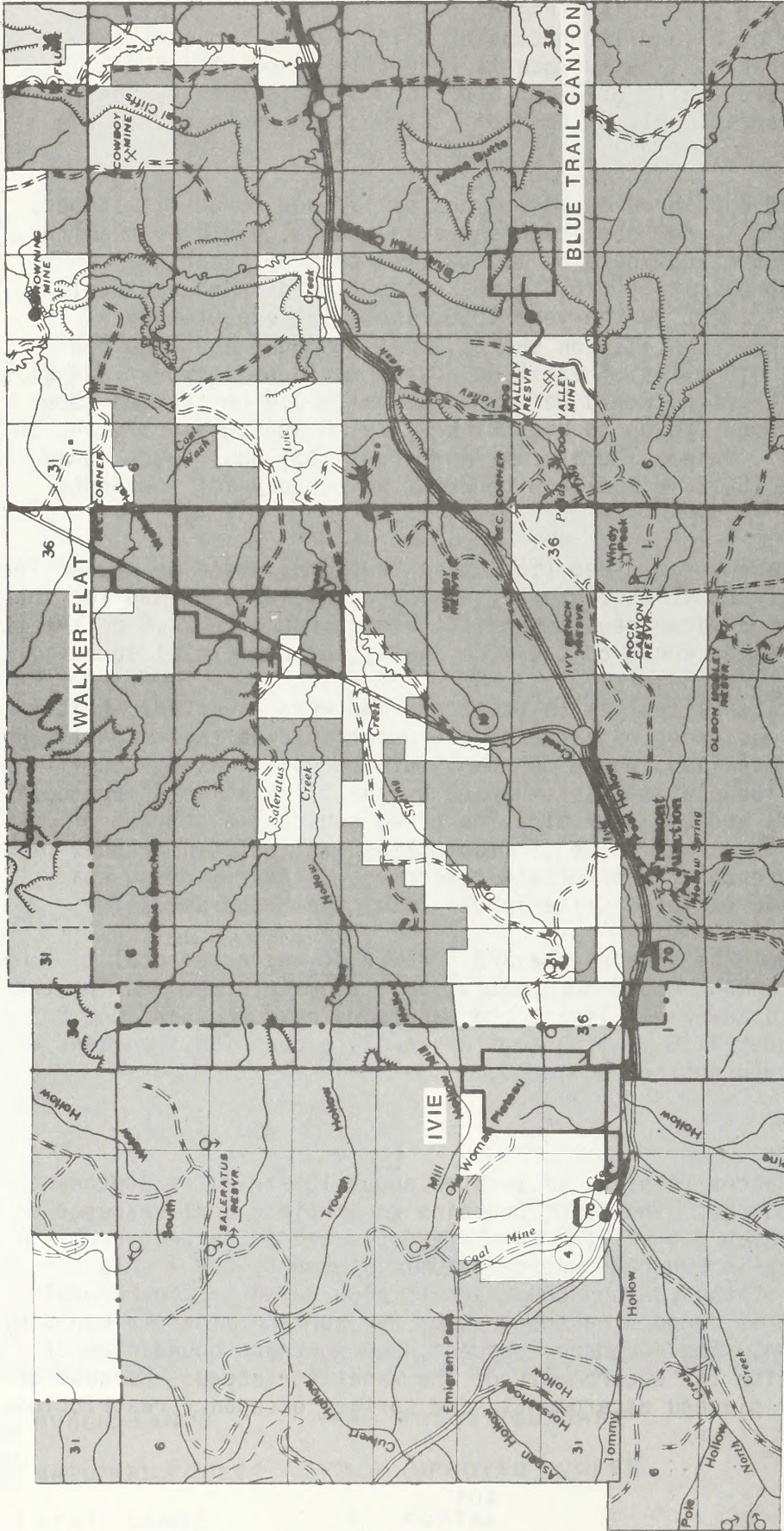
Approximately 337 permanent employees (including truckers) would be needed for the 40 years of mining. About 55 temporary employees would be needed for construction. The estimated water requirement for mining would be 21.5 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Three unsuitability criteria applied to the tract and were excepted. Criterion 1 (Federal lands) was excepted based on the determination that significant values on National Forest lands would be compatible to coal leasing activities. Criterion 16 (floodplains) was exempted by the formulation of appropriate mitigation measures and the determination of no substantial threat of loss to people or property or to the value of floodplains. Stipulated methods of coal mining and concurrence of appropriate government units regarding coal development on the tract excepted Criterion 17 (municipal watersheds).

The Cottonwood Road would be a safety hazard because of increased coal traffic. Portal development would not meet visual resource standards for the area. Subsidence would adversely impact the watershed resources and the hydrologic regime. About 47.3 million tons of in-place coal (54.1 percent of the total resource) would not be recovered.

Ivie Tract

The Ivie tract, 1,040 acres in size, is located about 13 air miles southwest of Emery, Utah (Figure 6-5). The tract contains an in-place coal resource of 10.1 million tons of which 5.6 million tons are estimated to be recoverable. The surface is entirely in Federal ownership administered by the Fishlake National Forest. All of the coal on the tract is also owned by the Federal Government. The tract is bounded on the west by fee surface/minerals owned by Coal Search Corporation. The southern, eastern, and northern boundaries of the tract correspond with the escarpments of the Wasatch Plateau. Because of adjacent private land, plateau escarpments, and surface occupancy restrictions



R 6 E

R 5 E

R 4 E

PUBLIC LANDS
 NATIONAL FOREST
 STATE LANDS
 TRACT BOUNDARY
 IMPROVED ACCESS
 PORTAL
N

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 SCALE IN MILES

FIGURE 6-5
 WALKER FLAT, BLUE TRAIL CANYON AND IVIE COAL TRACTS

due to the presence of bald eagle concentration areas and big game winter range, the only logical way to mine the tract is from the existing underground workings of Coal Search Corporation. With the exception of additional exploratory drilling and possible air breakouts, no surface disturbances or surface facilities are anticipated on the lease tract.

The coal would be mined underground by room and pillar methods. Average annual coal production would be 140,000 tons per year over a 40-year mine life. Approximately 2.93 acres of surface disturbance would be required for ventilation shafts and exploration activities including about 0.5 miles of new access for exploratory drilling. Coal would be trucked about 16 miles on I-70 and Utah Highway 10 to a new loadout near Emery. The average number of coal haul truck round trips per day would be 15 in addition to 3 trips per day for incidental service.

Approximately 30 permanent employees (including truckers) would be needed for the 40 years of mining. Development of this tract would extend the life of adjoining operations up to 16 years. The estimated water requirement for mining would be 3.0 acre-feet per year. Sources of water would be the mine, wells, or commercial sources.

Unsuitability Criteria 1 (Federal lands), 9 (crucial habitat for threatened and endangered plant and animal species), 12 (eagle roost), and 15 (critical wildlife habitat) are applicable for this tract. An exception to Criterion 1 was based on the compatibility of coal leasing to the management of National Forest resources. Mitigation measures were formulated to implement the exceptions to the remaining criteria. The mitigation measures deal with inventories of habitat and the protection of habitat through coal activity scheduling and/or no surface occupancy requirements. In addition to the above criteria, a portion of two township sections have been classified by the Forest Service as exhibiting significant visual qualities; no surface disturbance or surface occupancy would be permitted in this area.

Development of this tract would provide 140 new mining related jobs. The entire surface area of the tract is critical deer and elk winter range and some loss of this habitat may occur. Coal development would need to be coordinated with oil and gas lessees to avoid conflicts. About 4.5 million tons of coal (44.5 percent of the estimated resource) would not be recovered.

Blue Trail Canyon Tract

The Blue Trail Canyon tract, 320 acres in size, is located about 10 air miles south of Emery, Utah (Figure 6-5). The tract contains an in-place coal resource of 1 million tons of which 0.9 million tons are estimated to be recoverable. The tract is composed entirely of Federally owned surface administered by BLM underlain by Federally owned coal.

The coal would be mined by surface methods most likely independent of surrounding operations. Average annual coal production would be 45,000 tons per year over a 20-year mine life. The tract would be surface mined and reclaimed over an area of about 4 acres per year. Approximately 64.9 acres of

surface disturbance would be required for mine development by the year 2000, including the mine area, office space, coal storage areas, and required access. Twenty acres of mined area would be unreclaimed at one time. About 1.7 miles of existing access would be improved and an additional 1.7 miles of new road construction would be needed. Coal would be trucked about 19 miles on I-70 and Highway U-10 to a new loadout near Emery, Utah. The average number of coal haul truck round trips per day would be 8 in addition to 1 trip per day for incidental service.

About 12 permanent employees (including truckers) would be needed for the 20 years of mining. The estimated water requirement for mining would be 1.0 acre-foot per year. Sources of water would be wells or commercial sources.

No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

Portions of the tract exhibit significant scenic resources. Site specific analyses would be required prior to mine plan approval to develop mitigation measures for protection of the scenic resources as viewed from Interstate 70. From 20 to 50 perhistoric cultural resources sites could exist on the tract. Evaluation of these sites could indicate the need for complete or partial salvage prior to surface mining activities. Such requirements would entail significant costs to the prospective coal lessee.

Walker Flat Tract

The Walker Flat tract, 1,520.43 acres in size, is located about 5.5 air miles southwest of Emery, Utah (Figure 6-5). The tract contains an in-place coal resource of 73.6 million tons of which 25 million tons are estimated to be recoverable. BLM administers 1,440 surface acres of the tract while 80.43 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government. The only logical way to mine the tract is in conjunction with the existing leases held by Consolidation Coal Company. Mining would be underground by room and pillar and/or longwall methods. With the exception of 1 acre for exploration drilling to further define the coal resource, no surface disturbances or surface facilities are anticipated.

Average annual coal production from the tract would be 625,000 tons per year over a 40-year unit mine life. The overall unit mine could produce 3 to 4 million tons per year. New road construction would not be needed and no increase in truck haulage of coal would be expected as the proposed Castle Valley Railroad would terminate at the portal area. However, 13 trips per day would be required for incidental service.

Approximately 42 permanent employees (including truckers) would be needed for the 40 years of mining. The estimated water requirement for mining would be 13.4 acre-feet per year. The mine would likely supply adequate water.

Unsuitability Criteria 2 (rights-of-way), 15 (critical wildlife habitat), and 16 (floodplains) were applicable to the tract. Appropriate and acceptable mitigation measures have been developed, excepting the criteria.

The livestock water sources provided by Ivie Creek and Saleratus Creek could be lost due to subsidence. Loss of these water sources would necessitate large reductions in grazing numbers on the Saleratus Allotment until the amount of water lost was restored by the lessee as required by Surface Mining Control and Reclamation Act. About 48.6 million tons of in-place coal (66 percent of the total resource) would not be recovered.

Southern Utah: Alton Coal Field

Alton Amphitheater Tract

The Alton Amphitheater tract, 2,781.15 acres in size, is located about 0.25 miles north and east of Alton, Utah (Figure 6-6). The tract contains an in-place coal resource of 74.8 million tons of which 24 million tons are estimated to be recoverable. The tract is comprised of Federal coal and private surface.

The tract would likely be mined in conjunction with adjacent leases, however, independent development is possible. For the purpose of this analysis, an independent operation is assumed. The coal would be mined underground by room and pillar and possibly longwall methods. Average annual coal production would be 600,000 tons per year over a 40-year mine life. Approximately 71.4 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 4.0 miles of existing access would be improved and 9.0 miles of new road construction would be needed. Coal would be trucked about 10.7 miles from the portal east of Alton to a planned coal slurry preparation plant near Bald Knoll. The slurry preparation plant is analyzed in the Allen-Warner Valley EIS (BLM, 1980a). The average number of coal haul truck round trips per day would be 63 in addition to 12 trips per day for incidental service.

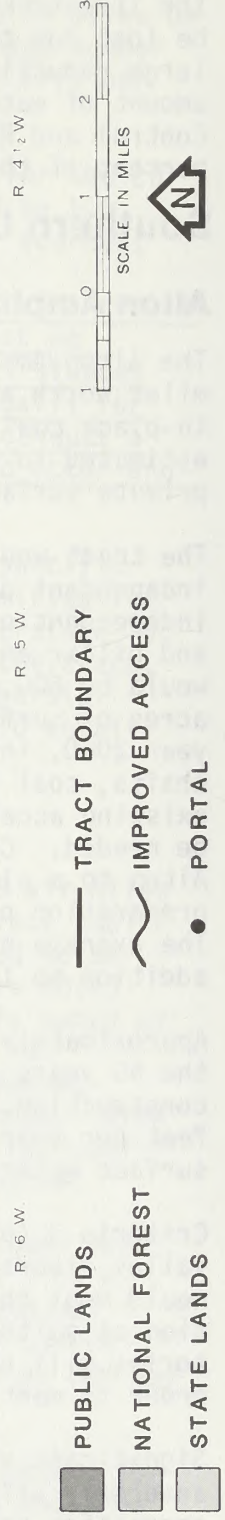
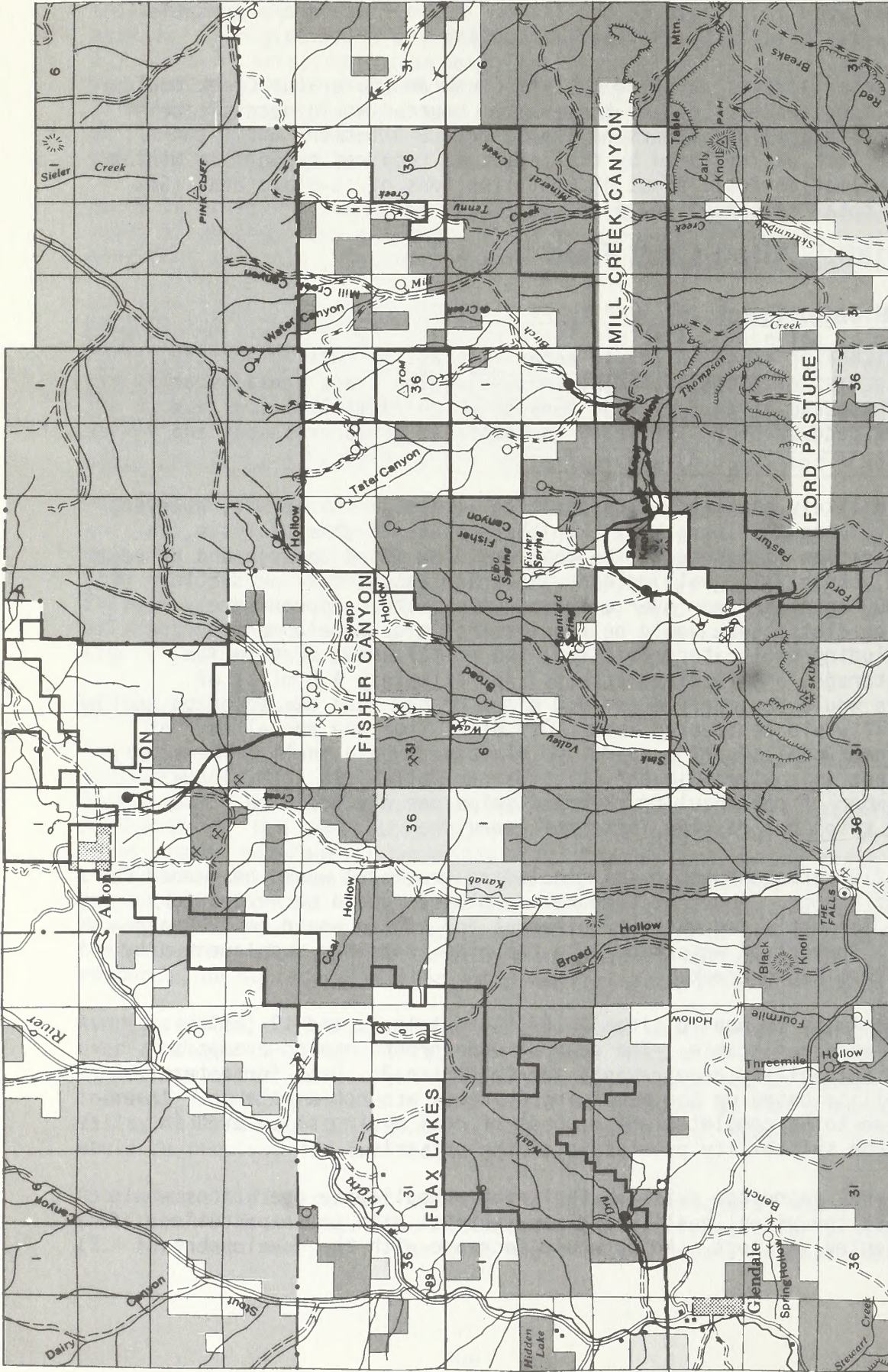
Approximately 210 permanent employees (including truckers) would be needed for the 40 years of mining. About 50 temporary employees would be needed for construction. The estimated water requirement for mining would be 12.9 acre-feet per year. Sources of water would be the mine, possibly supplemented by surface water from Kanab Creek.

Criteria 3 (proximity to public sites), 16 (floodplains), and 19 (alluvial valley floors) were applicable. The general underground mining exemption would meet the suitability requirements for Criterion 3. Data for determination of suitability based on the remaining criteria are not available. Inventories will have to be completed and methods of coal mining stipulated in order to meet the suitability provisions of the criteria.

Significant visual resources exist on the tract. Coal lease operations would adversely affect the visual quality and may contrast with the expectations of recreation oriented visitors. Noise would increase with the development of

T. 39 S.

T. 40 S.



FLAX LAKES, FISHER CANYON, MILL CREEK CANYON, ALTON AND FORD PASTURE COAL TRACTS

FIGURE 6-6

the tract. It is probable that the sound levels would be above the decibals weighted sound level (dBA) set as the national average for residential areas. Availability of new jobs, changes in the personal income and population growth would be significant based on existing conditions within Kane and Garfield Counties. County infrastructure needs for such changes would require specific socioeconomic mitigation involving the participation of appropriate Federal, State and local agencies and the coal lessee. About 50.8 million tons of in-place coal (67.9 percent) on the tract would not be recovered.

Fisher Canyon Tract

The Fisher Canyon tract, 5,724.91 acres in size, is located about 6 air miles southwest of Alton, Utah (Figure 6-6). The tract contains an in-place coal resource of 134 million tons of which 54 million tons are estimated to be recoverable. BLM administers 3,149 acres of Federal surface and Federal coal while 2,575.9 acres are private surface over Federal coal.

The coal would be mined underground by room and pillar methods. Logical access to the coal would be from existing leases to the south and new portal or other surface facilities would not be needed. Average annual coal production would be 1.35 million tons per year over a 40-year mine life. Approximately 60.2 acres of surface disturbance would be required for exploratory drilling purposes. About 18.0 miles of new road construction would be needed for exploratory drilling. Coal would be trucked 5.0 miles from an existing portal to a coal slurry preparation plant near Bald Knoll. The average number of coal haul truck round trips per day would be 141 in addition to 27 trips per day for incidental service.

Approximately 330 permanent employees (including truckers) would be needed for the 40 years of mining. About 70 temporary employees would be needed for construction. The estimated water requirement for mining would be 29.0 acre-feet per year. Sources of water would be from the mine possibly supplemented with surface flows from Thompson Creek.

Unsuitability Criterion 19 (alluvial valley floors) was applicable to the tract. Data for determination of suitability based on this criterion are not available. Inventories would have to be completed and methods of coal mining stipulated prior to meeting the suitability provisions of the criterion.

Underground mining and resulting subsidence could significantly affect spring flows on the tract. The continuity of the aquifers would change and some springs could cease to flow. Agricultural activities below the tract are highly dependent on the existing spring flows. The lessee would be required to replace any water lost as a result of coal mining.

Availability of new jobs, changes in personal income and population would all affect Kane and Garfield Counties. About 80 million tons on in-place coal (59.7 percent of the total resource) would not be mined.

Flax Lakes Tract

The Flax Lakes tract, 5,600.48 acres in size, is located about 0.5 mile west of Alton, Utah (Figure 6-6). The tract contains an in-place coal resource of 112.7 million tons of which 30 million tons are estimated to be recoverable. BLM administers 3,920.48 surface acres of the tract while 1,680 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government.

The tract would most logically be mined with adjacent lease holdings, however, independent development is possible. This analysis assumes an independent operation. The coal would be mined underground by room and pillar methods and a new portal would be required. Average annual coal production would be 750,000 tons per year over a 40-year mine life. Approximately 122.6 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 4.5 miles of existing access would be improved and 18.5 miles of new road construction would be needed. Coal would be trucked about 17.0 miles to a coal slurry preparation plant near Bald Knoll. The average number of coal haul truck round trips per day would be 78 in addition to 15 trips per day for incidental service.

Approximately 400 permanent employees (including truckers) would be needed for the 40 years of mining. About 100 temporary employees would be needed for construction. The estimated water requirement for mining would be 16.1 acre-feet per year. Sources of water would be the mine possibly supplemented with surface water.

No Unsuitability Criteria applied to this tract. Subsidence of up to 10 feet over most of the tract could not be avoided. Surface disturbance would result in soil runoff, and an increase in sediment yield over present conditions. Possible impacts to cultural resources have not been determined due to a lack of available data. Further studies are needed to develop appropriate mitigating measures. Based on 1975 travel data, nearly 20,000 visitors to the area would view the mining operation. These visitors are largely recreation oriented with the existing scenery an important part of the recreation experience. Noise associated with mining would be evident as mining is not now a part of the existing environment in southern Utah. Tract development would provide jobs and revenue in the counties; however local communities would also be under stress to provide necessary services for the increased population. About 82.7 million tons of in-place coal (73.3 percent of total resource) would not be mined.

Ford Pasture Tract

The Ford Pasture tract, 1,400 acres in size, is located about 16 air miles southeast of Alton, Utah (Figure 6-6). The tract contains an in-place coal resource of 36.3 million tons of which 20 million tons are estimated to be recoverable. The tract is comprised of Federal surface and Federal coal.

The Ford Pasture tract could be mined in association with other lease holdings or as an independent operation. The coal would be mined by both underground (room and pillar) and surface methods. About 56.5 acres per year would be surface mined for 12.4 years before the underground mining would begin.

Average annual coal production would be 1.0 million tons per year over a 20-year mine life. Approximately 644 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, surface mine area and coal storage, and required access. A maximum of 135.5 acres would be unreclaimed at one time. Access to the Ford Pasture tract would follow the Flax Lakes access and no additional portal access would be required. About 1.25 miles of new road construction would be needed for exploratory drilling. Coal would be trucked about 2.7 miles from the mine area to a coal slurry preparation plant near Bald Knoll. The average number of coal haul truck round trips per day would be 104 in addition to 20 trips per day for incidental service.

Approximately 330 permanent employees (including truckers) would be needed for the 20 years of mining. About 70 temporary employees would be needed for construction. The estimated water requirement for mining would be 21.5 acre-feet per year. Sources of water would be the mine area or wells possibly supplemented by surface water.

No Unsuitability Criteria applied to this tract. About 20 to 30 prehistoric cultural resource sites are known to exist on the tract. Prior to surface mining operations these sites as well as all other sites identified subsequent to actual mining would be evaluated and then would be avoided or salvaged as appropriate. Such requirements would entail significant costs to the prospective coal lessee. About 16.3 million tons of in-place coal (44.9 percent of total resource) would not be recovered. Impacts to recreation, visual resources, socioeconomics, and noise would be similar to those described for the Alton Amphitheater, Flax Lakes, and Fisher Canyon tracts.

Mill Creek Canyon Tract

The Mill Creek Canyon tract, 6,562.48 acres in size, is located about 8 air miles southwest of Alton, Utah (Figure 6-6). The tract contains an in-place coal resource of 204 million tons of which 65 million tons are estimated to be recoverable. BLM administers 2,911 surface acres of the tract while 3,651.48 acres are in non-Federal ownership. All of the coal on the tract is owned by the Federal Government.

The tract would logically be developed from adjacent properties, however, independent development is also possible. This analysis assumes an independent operation. The coal would be mined underground by room and pillar methods and a new portal would be required. Average annual coal production would be 1.65 million tons per year over a 40-year mine life. Approximately 130.8 acres of surface disturbance would be required for mine development by the year 2000, including exploratory drilling, the portal area, ventilation shafts, coal storage, and required access. Approximately 4.5 miles of existing access would be upgraded and 20.5 miles of new road construction

would be needed. Coal would be trucked about 5.0 miles to a coal slurry preparation plant near Bald Knoll. The average number of coal haul truck round trips per day would be 169 in addition to 33 trips per day for incidental service.

Approximately 550 permanent employees (including truckers) would be needed for the 40 years of mining. About 140 temporary employees would be needed for construction. The estimated water requirement for mining would be 34.9 acre-feet per year. Sources of water would be the mine possibly supplemented by wells or surface water.

Unsuitability Criteria 16 (floodplains) and 19 (alluvial valley floors) apply to the tract. Suitability provisions of these criteria cannot be adequately addressed until inventories and stipulated coal mining methods are completed. About 159 million tons of in-place coal (77.9 percent of total resource) would not be recovered. Impacts to recreation, visual resources, socioeconomics, and noise would be similar to those discussed for the Alton Amphitheater, Flax Lakes, and Fisher Canyon tracts.

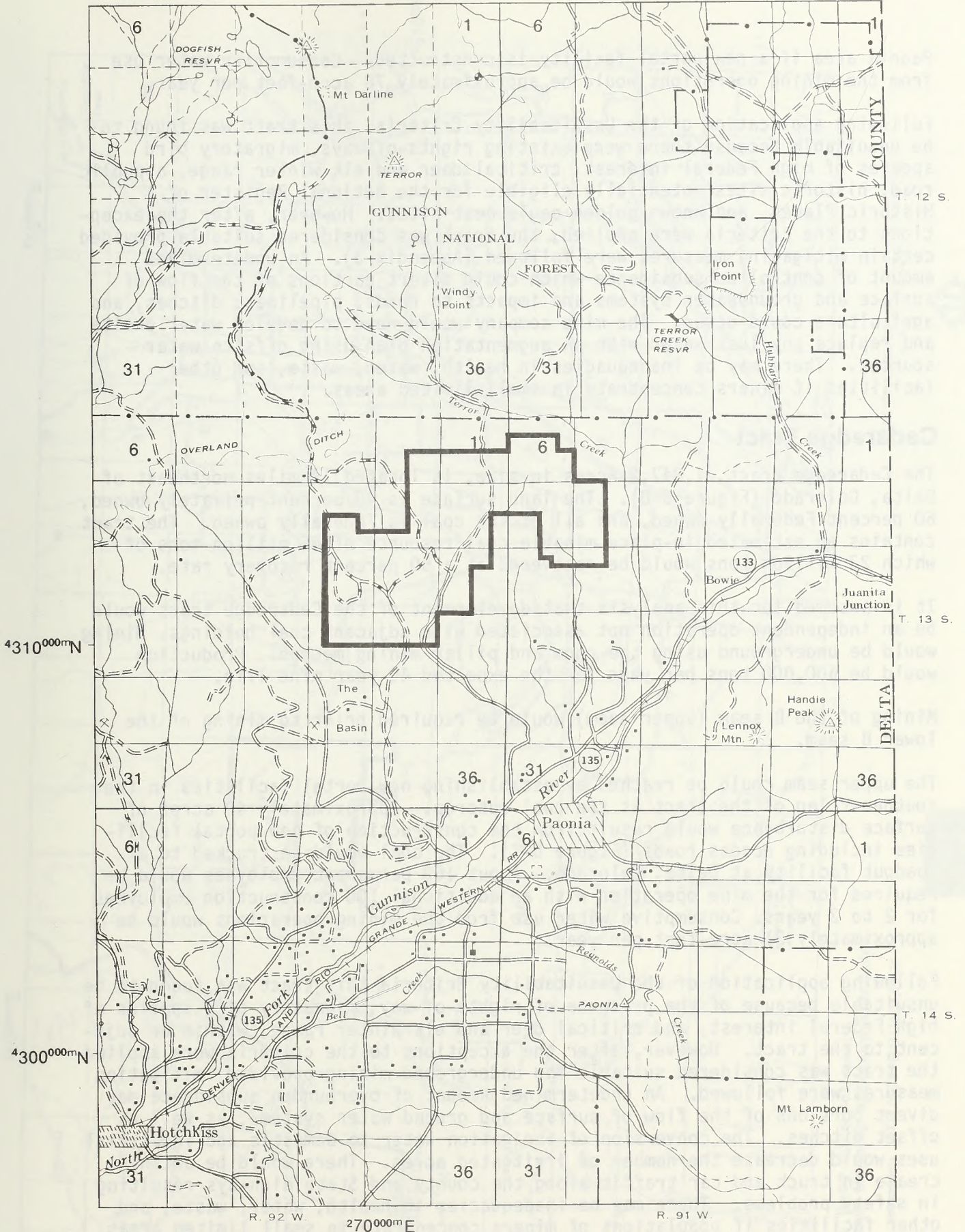
West-Central Colorado: Paonia-Somerset Coal Field

Paonia D Coal Bed Tract

The Paonia D Coal Seam tract is 4,997.85 acres in size and is located 3 miles north of Paonia and 30 miles east of Delta, Colorado (Figure 6-7). The land surface is 80 percent privately owned, 20 percent Federally owned, and all of the coal is Federally owned. The tract contains an estimated in-place coal resource (in the D seam) of 104 million tons of which approximately 80 million tons is minable. Approximately 40 million tons would be recovered at a 50-percent recovery rate. Mining would be underground using the room and pillar mining method. Only one of the three minable seams would be considered for leasing and mining at this time.

If the adjacent lease holder, Colorado Westmoreland, Inc., obtains the lease, the tract would be mined from their existing Orchard Valley Mine. Additional surface disturbance would be limited to ventilation shafts, drill holes and access roads. If another operator obtained the tract, an additional 40 acres of surface disturbance would be required for construction of new portal facilities, access roads, drill pads, and ventilation shafts. Annual coal production would average 1.5 million tons with a mine life of 27 years. Coal mined from the tract would be transported by a conveyor or other methods designed to avoid State Highway 133 to a loadout facility approximately 4 miles away.

About 275 permanent employees would be required for mine operation. If surface facilities are constructed, an additional 150 construction workers would be required for up to 2 years. If the adjacent coal owner does not obtain the proposed lease, their coal resources would be depleted by 1987 and employment would cease at the Orchard Valley Mine. At the same time, construction of new mine facilities on the lease tract would begin. As a result, it is not expected that there would be additional employees in the



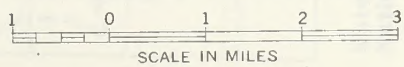
4310⁰⁰⁰mN

4300⁰⁰⁰mN

R. 92 W. 270⁰⁰⁰m E

R. 91 W.

Note: Base does not meet National Mapping Accuracy Standards



— TRACT BOUNDARY

FIGURE 6-7
PAONIA 'D' TRACT



Paonia area if a new portal facility is constructed. Consumptive water use from the mining operations would be approximately 78 acre-feet per year.

Following application of the Unsuitability Criteria, this tract was found to be unsuitable because there were existing rights-of-ways, migratory bird species of high Federal interest, critical deer and elk winter range, a public road, historic sites potentially eligible for the National Register of Historic Places, and known golden eagle nest sites. However, after the exceptions to the criteria were applied, the tract was considered suitable provided certain mitigating measures were followed (Appendix 3). An undetermined amount of controlled subsidence which could divert portions of the flow of surface and groundwater systems and impacts to roads, pipelines, ditches, and agriculture could occur. The mine company would need to develop water onsite and replace any lost water with an augmentation plan using offsite water sources. There may be inadequacies in health, water, waste, and other facilities if miners concentrate in small limited areas.

Cedaredge Tract

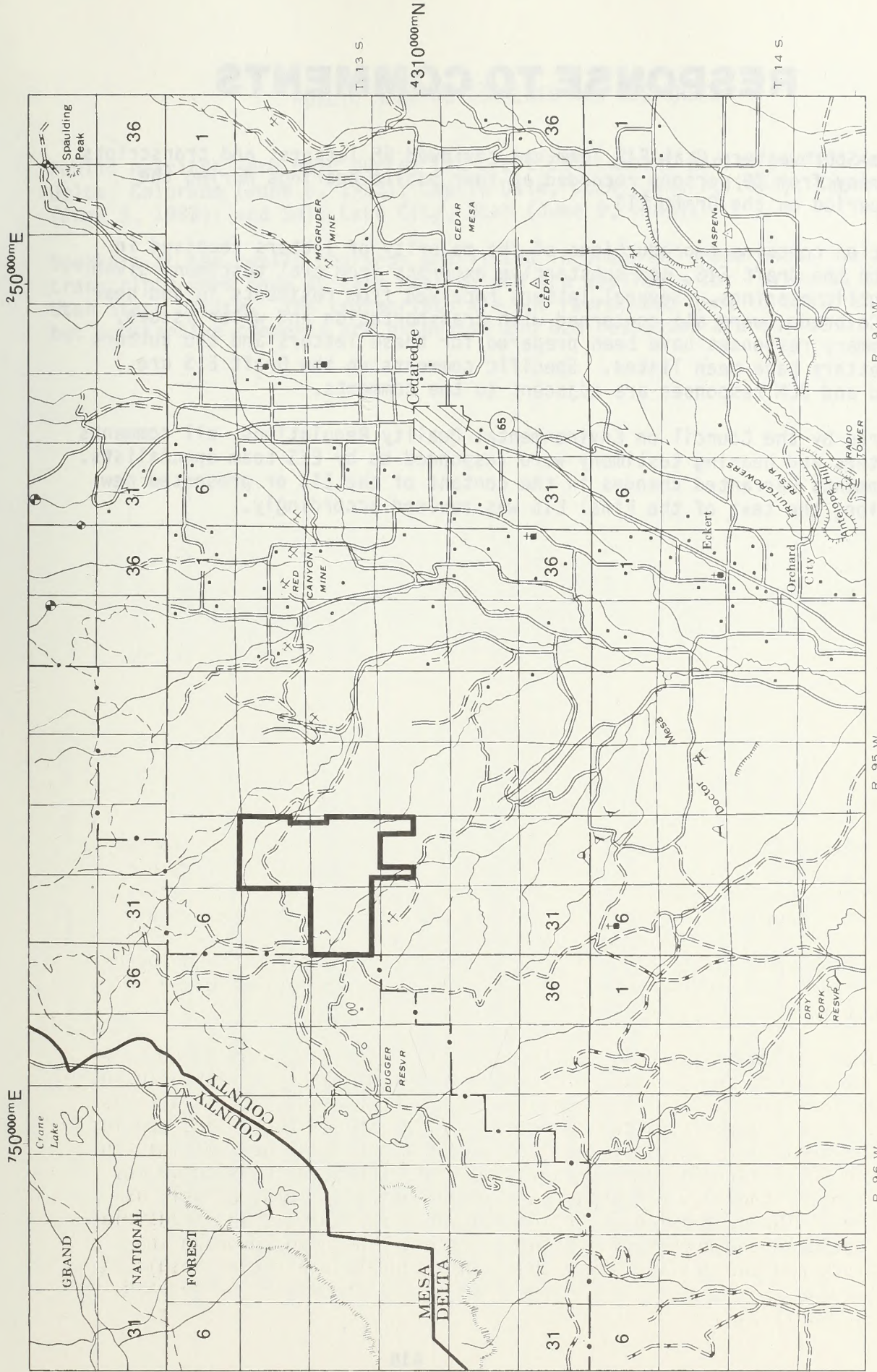
The Cedaredge tract, 1,847.2 acres in size, is located 14 miles northeast of Delta, Colorado (Figure 6-8). The land surface is 40 percent privately owned, 60 percent Federally owned, and all of the coal is Federally owned. The tract contains an estimated in-place minable coal resource of 45 million tons of which 23 million tons would be recovered at a 50 percent recovery rate.

It is assumed for this analysis that development of the Cedaredge tract would be an independent operation not associated with adjacent coal holdings. Mining would be underground using the room and pillar mining method. Production would be 600,000 tons per year for the expected 40-year mine life.

Mining of the D seam (upper seam) would be required prior to mining of the lower B seam.

The upper seam could be reached by establishing new portal facilities in the southeast leg of the tract at the coal outcrop. Approximately 40 acres of surface disturbance would result from the construction of new portal facilities including access roads (Figure 6-7). The coal would be trucked to a loadout facility at Delta, Colorado. About 160 permanent employees would be required for the mine operation with an additional 100 construction employees for 2 to 3 years. Consumptive water use from the mining operations would be approximately 31 acre-feet per year.

Following application of the Unsuitability Criteria this tract was found to be unsuitable because of the presence of rights-of-way, migratory bird species of high Federal interest, and critical deer and elk winter range, within or adjacent to the tract. However, after the exceptions to the criteria were applied the tract was considered suitable for underground mining provided mitigating measures were followed. An undetermined amount of overburden subsidence may divert portions of the flow of surface and ground water systems, as well as offset ditches. The conversion of irrigation water to domestic and industrial uses would decrease the number of irrigated acres. There would be an increase in truck and car traffic along the county and State highways resulting in safety problems. There may be inadequacies in health, water, waste, and other facilities if populations of miners concentrate in small limited areas.



Note: Base does not meet National Mapping Accuracy Standards

TRACT BOUNDARY

FIGURE 6-8
CEDAREDGE TRACT

RESPONSE TO COMMENTS

The Uinta-Southwestern Utah EIS Team has reviewed 55 letters, and transcripts of testimony from 29 persons recorded at four public hearings during the comment period on the Draft EIS.

This section contains reproductions of the majority of letters received in comment on the Draft EIS, and substantive excerpts from oral testimony given at the public hearings. Several letters received from residents in and near Paonia, Colorado, were all concerned with transportation and water issues. Three summary responses have been prepared for these letters and the authors of the letters have been listed. Specific comments on the Draft EIS are bracketed and BLM responses are adjacent to the comments.

As required by the Council on Environmental Quality Regulations, all comments from letters and hearing testimony were responded to by EIS team specialists. Where comments warranted changes in the content of the EIS or presented new information, the text of the Final EIS was revised accordingly.

PUBLIC HEARING COMMENTS AND RESPONSES

Public hearings were held during the Draft EIS comment period as follows: Delta, Colorado (June 6, 1983); Castle Dale, Utah (June 7, 1983); Kanab, Utah (June 8, 1983); and Salt Lake City, Utah (June 9, 1983).

Speakers at the public hearings are listed in order of appearance. Verbatim transcripts were made at each hearing and are available for review at the BLM Utah State Office. The transcripts are not reproduced here in their entirety, but substantive comments are excerpted and BLM responses are adjacent.

SPEAKERS

1. Virginia Egger, Delta County Board of Commissioners
2. Susan Brater
3. David Anderson, District 10 Regional Planning Commission
4. Allen Alexander, Savage Brothers Coal Transportation and Services
5. Christopher Seglem, CWI
6. James Colt
7. Linda Lindsey
8. Steve Wolfcott
9. Bob Kirby
10. Dave Bristow
11. Andy Mowbray
12. Shelley Hyde-Mann
13. William Ray Mann
14. Hanna Bristow
15. David Johnston, Western Slope Energy Research Center
16. Daniel Perkins
17. Paul Douglas
18. Ronald Brewer, Mayor, Town of Cedaredge
19. Edward Plouvier
20. Claire Moore
21. Matthew Sakurada, CWI
22. Virginia Egger, Delta County Board of Commissioners
23. Linda Lindsey
24. District 10 Regional Planning Commission

No Exhibits presented at this hearing.

Comments and Responses follow

DH Comment 1-1

First transportation: Historically, coal mining in Delta County has had an adverse impact on transportation systems in the county. Specific stipulations which are enforceable should, therefore, be developed to mitigate any foreseen impacts resulting from new coal production, as conditions of the lease, and not deferred to the permit stage.

DH Response 1-1

BLM cannot require special stipulations for state, county, or municipal highways because these roads are not under the authority of the Federal government.

DH Comment 1-2

Delta County feels that these should include the following: On the Paonia tract, an alternative transportation system must be developed due to the restriction of no additional truck traffic on Colorado Highway 133. As of this time, no acceptable method has been determined. It is important that a conveyor, pneumatic tube, or new access road be settled upon and made part of the lease contingency.

DH Response 1-2

The EIS does not analyze alternative transportation systems because the potential lessee and possible loadout sites are not known at this time. The responsibility to protect State and county roads lies with the State and county involved. BLM recognizes the need to protect existing road systems and have revised the mitigating measure for transportation (Appendix Three). The measure requires an alternative to truck haulage on Highway 133 and an assessment of possible alternatives by the future lessee.

DH Comment 1-3

Likewise, specific stipulations for the development of a coal transportation system for the Cedaredge tract is necessary. The draft statement has identified the inadequacy of the present roads to handle new coal production capacities, and the lease should detail that the lessee must construct a

DH Comment 1-3 (cont'd.)

new road or upgrade existing county roads to a level capable of handling heavy coal traffic. This should not be the responsibility of Delta County.

DH Response 1-3

See DH Response 1-1. Cedaredge and Orchard City would possibly receive an increase in coal related traffic, but more than likely, coal trucks, if used, would not directly affect either community.

DH Comment 1-4

The load-out facility identified in the Environmental Impact Statement in Cedaredge -- or to be utilized by the Cedaredge tract is also not adequate. Located adjacent to the City of Delta, the facility is an incompatible land use; and the stockpiling of coal in the past has lead to the degradation of air quality in the area. Trucking using the load-out facility have severely damaged city streets. For these reasons, the coal lease issued by BLM should require relocation of this load-out prior to mining of the Cedaredge tract.

DH Response 1-4.

See DH Response 1-1. BLM does not have the authority to prevent the use of this load-out facility which is located on private property.

DH Comment 1-5

Special stipulations should also be outlined which will protect municipal streets in Cedaredge, Orchard City, and Delta.

DH Response 1-5

See DH Response 1-1.

DH Comment 1-6

The best way to insure continuation of these rights is through specific lease stipulations which are enforceable rather than deferring of protection of water to the permitting state.

DH Response 1-6

The BLM has revised mitigation measures that have been incorporated into the Final EIS. These mitigation measures will be used to formulate lease stipulations which must be incorporated into the mine plan, by the lessee, prior to the issuance of the mine permit (Appendix Three).

DH Comment 1-7

The county supports a comprehensive water augmentation plan which includes no mine areas under critical streams and ditches unless other protective measures are proven, and the development of an adjudicated water augmentation plan prior to the construction and development of the mine.

DH Response 1-7

BLM considered requiring the lessee to develop a plan for augmentation. As stated in SS 37-92-103(9) CRS 1973, a "plan for augmentation means a detailed program to increase the supply of water available for beneficial use", etc., and is only required when an adjudicated water right holder plans to divert water out of priority. The extraction of coal does not require a water right; therefore, a plan for augmentation cannot be used for this purpose.

DH Comment 1-8

Because the BLM has conceded that there is a risk that some areas of the lease tracts could suffer from events such as subsidence and the subsequent loss of water many years after the mine is abandoned, Delta County supports the consideration of water insurance in these critical areas.

DH Response 1-8

The mitigating measures (Appendix Three) provide for the protection of water resources by:

1. The identification of buffer zones in areas where it has been determined that subsidence could impact the surface water resources of the area;
2. Bonding of existing cross-tract and on-tract water flows;
3. Requirement of water replacement;
4. Requiring the lessee to conduct an inventory of existing water rights prior to the issuance of the mine permit.

DH Comment 1-9

Air quality: Because total suspended particulate levels are expected to exceed the ambient air quality standards, if these tracts are leased and developed, Delta County feels BLM should include specific mitigation measures. These include the construction of paved roads and a new load-out facility for the Cedaredge tract to help reduce these particulates.

DH Response 1-9

Based on limited monitored data and modeled impact assessments, the ambient air quality standards for total suspended particulates are currently potentially exceeded in the towns of Delta and Orchard City. By the year 2000, even without additional mining, population growth is expected to aggravate the situation in these towns and cause a similar exceedance in Paonia. If the proposed tracts are leased and developed, their impacts will contribute to, but not cause the predicted exceedances.

Regarding potential construction methods, it is appropriate for the county to determine whether permits are required, and to what extent construction standards will be enforced. The lessee will be responsible to comply with all applicable state and local laws and regulations.

DH Comment 1-10

Finally, socioeconomic: Baseline projections seem unjustifiably low for Delta County based upon historical growth for the nonmine economic sectors. These projections should be justified in the final statement or revised upward so that population demands upon housing, capital infrastructure, and human services are not underestimated.

DH Response 1-10

Baseline projections in the "Planning and Assessment System, an Economic/Demographic model", and the "Socioeconomic Impacts of Energy Development on Delta County", a recent socioeconomic study, support significantly lower growth rates in Delta County over the next 20 years. The previous decade was characterized by dramatic coal production growth in Delta County. This trend is not expected to continue at past

rates, leading to reduced rates of change in population, employment, and per capita income. It is doubtful that the non-mine economic sectors will compensate.

DH Comment 1-11

Additionally, the assumption that Colorado Westmoreland would cease coal operations if they did not acquire the Paonia tract may be erroneous. It is possible the CWI could acquire other leaseholdings in the area and continue operations. Therefore, the impact of another firm acquiring the Paonia tract in terms of population growth have not been considered; but these should be done in the final.

DH Response 1-11

There are no adjacent leaseholdings to the Paonia tract that could be acquired by CWI to continue their present operations. Therefore, additional population growth was not considered.

DH Comment 1-12

To provide the infrastructure necessary to support coal-related population, Delta County feels it is important that the lease include stipulations for mitigating and assisting with any shortfalls that communities would have associated with the mines.

DH Response 1-12

BLM does not have the authority to impose infrastructural stipulations through its leasing process. Such a mandate falls within the province of state and local government, which can require such stipulations in granting operating permits.

2. Susan Brater, Delta Hearing Testimony

DH Comment 2-1

I would also add that the Congress suggests that the loss of severance tax to the states and the loss of federal revenues due to the probability that the sales of further tracts, at this point, would result in less money than they would in the future. And we would hope that that would be

DH Comment 2-1 (cont'd.)

considered in your consideration to lease these 20 tracts or 22 or 27.

DH Response 2-1

The decision to offer coal for lease at this time is based upon the existing long-term coal leasing policy. The purpose of the policy is to make coal available to industry in a systematic way based upon long-term demand. Revenues from coal leasing are paid to the Federal government in two ways: (1) the Bonus bid, the initial amount of money paid to the government by a coal leasing company, and (2) the royalty rate, paid per ton of coal, which is a percentage of the mine mouth value of coal at any given time. Usually the royalty rate is the far more significant portion of revenue received by government for leased coal because it is received annually as long as mining occurs and represents a significantly larger amount of money actually received by the government.

DH Comment 2-2

Our experience through this appeal has shown us that it would, indeed, be better to deal with protection of water during the leasing process instead of waiting for the permitting process.

DH Response 2-2

See DH Response 1-6.

DH Comment 2-3

We would recommend that leasing stipulations which would prohibit mining under important water areas be enforced, that water replacement be found for water which is lost, and that an insurance policy to compensate for any irreplaceable water loss be included as part of your leasing stipulations.

DH Response 2-3

See DH Response 1-8.

DH Comment 2-4

We would recommend that these stipulations be as specific as possible and that means of enforcing them be included in the leasing process.

DH Response 2-4

Lease stipulations will be developed from the mitigation measures incorporated into the Final EIS. The specificity of the lease stipulations is highly dependent on the availability and quantity of existing hydrologic and geologic data. The BLM has used all pertinent existing data to formulate the mitigation measures incorporated into the Final EIS. See DH Response 1-6.

3. David Anderson, Delta Hearing Testimony

DH Comment 3-1

However, the issue of transportation transcends local boundaries and appears to be inadequately addressed in the EIS, particularly in regard to the proposed Cedaredge Tract. Although some data is provided on pages 139 to 249 of the document, no real analysis is conducted.

For instance, it is mentioned that an estimated 63 coal trucks plus 12 service trucks would complete roundtrips to Delta each day. Unfortunately no time element is supplied in the document. If these trips were all to occur in an eight-hour shift period, a truck could pass a particular point every three or four minutes.

DH Response 3-1

When a lessee addresses alternative methods of coal transportation additional analytical and specific analyses will be employed to look at impacts from transportation. See DH Response 1-2.

DH Comment 3-2

No mention is made of other safety or health hazards like falling rocks and coal from trucks that in the past have caused windshield damage in the area. Problems associated with additional coal storage and loading in Delta are not analyzed.

DH Response 3-2

No documentation of accidents listed by the commentor are known and are expected to be infrequent. However, the

DH Response 3-2 (cont'd.)

revised transportation mitigation measure would reduce the frequency of potential accidents. See DH Response 1-4 regarding use of the loadout facility near Delta, Colorado.

DH Comment 3-3

District 10 suggests that greater attention be paid to these aspects. Relevant lease stipulations should be developed to insure that a coal developer be required to participate in the costs of road improvement and maintenance, and that safety and health problems be minimized. Such stipulations can be a benefit to all concerned because they define the situation at the outset and minimize problems along the way.

DH Response 3-3

See DH Response 1-1.

4. Allen Alexander, Delta Hearing Testimony

DH Comment 4-1

It is our understanding that as a condition of the leases granted to Colorado Westmoreland, there was included a provision requiring all truck traffic to be removed off of Highway 133. We wish to express some of our views on this:

First of all, many of the other alternatives are either unpractical or economically unfeasible to Colorado Westmoreland. We also see the building of roads to bypass Highway 133 does not necessarily change environmental impacts but simply shifts them from one area to another.

And it's our belief that unless a practical and an economical transportation alternative can be financed through probably some kind of outside help, the best alternative is to continue to transport coal along Highway 133 as it has been done in the past.

DH Response 4-1

A mitigation measure has been included which will

require the lessee to study different alternatives to remove coal traffic from State Highway 133. The analysis of the alternatives will consider economic feasibility as well as the impacts to the environment.

DH Comment 4-2

And we recognize that this panel and the BLM doesn't have specific responsibility over transportation issues; but we do believe that you folks can give help and support to at least having the proper agencies, the Colorado Department of Transportation, give these units fair and reasonable consideration. There's a proven history and a safety factor, and it's something that we feel is best for the community.

DH Response 4-2

Comment noted. See DH Response 4-1.

5. Christopher Seglem, Delta Hearing Testimony

DH Comment 5-1

In the occurrence absence of any serious competitor to CWI for this reserve, we think this tract is, in reality, a maintenance lease for CWI's existing operation and consequently involves less potential adverse impacts than considered in the Draft EIS.

DH Response 5-1

Comment noted. Because all tracts must be leased on a competitive basis, the possibility of an independent operator must be considered.

DH Comment 5-2

Moreover, CWI, with the cooperation of the community and the public agencies, has tailored this tract already to avoid and/or minimize potential land use and environmental impacts. Thus, for example, in coordination with community and in compliance with State Director Francis' response to the water protest to the Management Framework Amendment, CWI delineated and submitted an amended expression of leasing interest which concentrates coal reserves according to the areas of priority identified by the state director; calls for a single versus

DH Comment 5-2 (cont'd.)

multiple seam lease; limits the request to 30 million recoverable tons of coal; draws lease boundaries so as to avoid the water sources of primary community concern, Terror Creek, West Roatcap Creek, and the Stucker Mesa domestic water springs; and sets forth the detailed water diversion and up-graded conveyance system for inclusion as a lease stipulation mitigating potential impacts to the Intermittent East Roatcap Creek.

DH Response 5-2

The analysis in the EIS reflects the description of the tract as stated in the comment.

DH Comment 5-3

In addition to these very tangible, absolute protections for the key water resources inside the study area, we have, again with the community and government agencies, vigilantly considered other concerns and have attempted to pursue a program to collect and analyze empirical data relevant to them. Thus, over a year and a half ago we initiated a comprehensive hydrology subsidence and water rights study. Data and results from this effort are now becoming available in advance of the lease sale, in advance of permit applications, and years in advance of mining.

DH Response 5-3

Comment noted. If available, the data will be utilized in development of lease stipulations and the mine plan.

DH Comment 5-4

Similarly, we have raised with the community, and working with the community and government agencies addressed the question of acceptable transportation mitigation measures even though implementation of such alternatives are at least two to three years away. While no specific transportation alternative has or can be probably selected at this juncture, we think the numerous individual meetings and community meetings have at least helped to fashion a framework for an ultimate resolution which would take advantage of possible

benefits of innovative technologies in coal transport, address subjective as well as objective considerations of affected persons, and meet the economic constraints inherently confronting CWI, given this relatively limited lease reserve and the soft stage of the coal market.

We think that the Draft EIS should be viewed in the context of these efforts outside the formal scope of the coal leasing process. They lend detailed substance and meaning to the more generalized conclusions of the regional analysis.

DH Response 5-4

Comment noted. See DH Response 1-1.

6. James Colt, Delta Hearing Testimony

DH Comment 6-1

Number one, the lease boundaries must not be allowed to change. There is something in there that says that they possibly could change. They can't change; and the reason why I feel they can't change is to guarantee that the critical water areas that are presently not included will not be included will not be included at a later date.

DH Response 6-1

At this time there is no reason to enlarge or reduce the size of the tract. The primary reason to change a tract size is if additional environmental or coal reserve information became known. Because the site specific analysis has not been done on larger tracts in Colorado, the size of the tracts could only be reduced if additional information became available.

DH Comment 6-2

Number two, there should be certain areas in the lease area that mining would be prohibited. Now, I'm under the impression that there are no such areas. There should be areas that mining is prohibited -- we'll call them buffer zones, under water areas. And you could create these areas by taking the 40 million tons of coal which everybody has agreed to that exists in the D Seam of the lease area, and

DH Comment 6-2 (cont'd.)

subcontracting from that the 30 million tons that industry has decided they can function with economically; and you end up with an excess of 10 million tons of coal. By taking this 10 million tons of coal you can create these buffer zones under the water areas.

DH Response 6-2

See DH Response 1-8.

DH Comment 6-3

It should be included in the EIS that the coal company be forced to have a water replacement plan approved by the courts and approved before granting them the permit to begin mining.

DH Response 6-3

BLM considered requiring the lessee to obtain replacement water rights; however, without knowing the extent of potential water right injuries, the lessee cannot be required to obtain a specific quantity of water for replacement. Requiring the lessee to secure water rights for replacement that may never be put to a beneficial use is contrary to Colorado Water law.

BLM is requiring that the lessee replace the water supplies of any owner of a vested water right which is injured as a result of mining activities; however, the procedures for water replacement and the determination of water loss is strictly within the jurisdiction of the State of Colorado.

DH Comment 6-4

Number four, because of the obvious fact that subsidence can occur forty to fifty years from now -- which the lady over there stated just a few minutes ago -- and that it will, in fact, happen -- she also stated -- we need a water insurance policy to guarantee us and our heirs continued water protection years hence.

DH Response 6-4

See DH Response 1-8.

DH Comment 6-5

Number five, -- a little more on subsidence -- In the EIS it talks about allowing subsidence to occur early to prevent that later subsidence. Well, it seems to me extremely agalnst water protection to allow this to occur. The obvious alternative is to not allow subsidence which guarantees a preserved water source.

DH Response 6-5

The mitigation measure requiring the inducement of subsidence has been omitted from the EIS. However, the Colorado Mined Land Reclamation Division may require planned and controlled subsidence on selected areas, during the permit application review and approval phase of the coal lease process.

7. Linda Lindsey, Delta Hearing Testimony

DH Response 7-1

As a matter of fact, we would prefer to see no mining under our water sources. However, if the BLM is going to lease this property, we feel it is their obligation to provide mitigating measures based on the state director's response to the protest to the North Fork MFP; and to see that those mitigating measures are very specific, provide adequate protection, and are enforceable.

In the EIS there are some -- there's some attempt to provide mitigating measures, but I feel that the stipulations proposed need to be more specific and they need to have teeth in them so that they are enforceable. In the first place, it has to be clear that our water is going to be protected.

DH Response 7-1

See DH Response 1-8.

settle on one or the other of those, or at least make it clear how they can resolve this double mitigating measure.

DH Response 7-4

See DH Response 6-5.

DH Comment 7-5

We, of course, are not interested in trying to induce subsidence at all and feel that this measure should be written so as to restrict mining under areas in which subsidence may -- not necessarily would -- occur, because it cannot be proven that subsidence will occur. So this phrase should read:

Coal extraction shall be prohibited where overburden subsidence or fracturing may disrupt the quantity or quality of a surface or ground water, et cetera.

DH Response 7-5

See DH Response 6-5.

DH Comment 7-6

Secondly, a water replacement plan which is adjudicated in the water courts of Colorado should be required before any mining takes place. We don't want to be in a position where somewhere down the line we're arguing about what this water adjudication plan is. There's no reason why this can't be settled before mining takes place.

DH Response 7-6

See DH Response 6-3.

DH Comment 7-7

Thirdly, some provision such as an insurance policy is required to provide relief in case subsidence does occur after mining operations have ceased and the company has packed up and gone home. The BLM would like to say that their provisions would prevent that; however, nobody can assure that that is the case.

DH Response 7-7

See DH Response 1-8.

DH Comment 7-2

Well, most people don't necessarily classify our farm as an alluvial valley floor -- we live on a mesa -- or as prime or unique farmland. We see no reason why this cannot be spelled out, the specific drainages and water rights which need to be protected.

Both Colorado Westmoreland and the water owners have offered several times to furnish the BLM with this information, and we feel like it should be included in the EIS.

DH Response 7-2

The information supplied to BLM from Colorado Westmoreland, Inc., dealing with water rights, is confidential and cannot be incorporated into the EIS. In addition, it would be virtually impossible to determine what downstream water rights are satisfied by all of the cross-tract and on-tract water flows. Therefore, the mitigation measures incorporated into the Final EIS are tailored to protect the entire hydrologic balance in and adjacent to the lease tract which in essence will protect all of the downstream water users.

The mitigation measure dealing with restrictions to coal extraction was meant to include alluvial valley floors and prime and unique farmland in addition to all other areas. It was not written exclusively for them. This mitigation measure has been revised in the Final EIS.

DH Comment 7-3

Secondly, there should be three layers of water protection: in the first place, we need mining restrictions which will prevent water loss.

DH Response 7-3

See DH Response 1-8.

DH Comment 7-4

In the same paragraph there, we see the conflict, apparent conflict between a desire to prevent subsidence and the desire to induce it as soon as possible, so that it won't have to be dealt with in the future. I think the BLM has to

DH Comment 7-8

Finally, these provisions must be -- it must be stated that these provisions will be carried out before any permit is issued. It must be clear what will be done if the company does not carry out the provisions.

DH Response 7-8

See DH Response 1-6.

DH Comment 7-9

I would like to request an extension of the comment period so that the BLM can secure a water rights inventory and secure the data that is required to complete the EIS.

DH Response 7-9

In a written response to Eric Wolfe, Executive Director of the Colorado Open Space Council, by the Utah State Director on June 28, 1983, it was concluded that sufficient justification did not exist to extend the public comment period on the Draft EIS. The rationale are: Sixty days should be sufficient time for comment; additional data may be submitted until the Regional Coal Team makes its final recommendations (currently scheduled for October 18, 1983); and, modifications to stipulations can be made until 30 days prior to the lease sale. Further, the primary purpose of the public comment period is not to gather additional data for the Final EIS but to allow the public to review and comment on the Draft EIS.

8. Steve Wolcott, Delta Hearing Testimony

DH Comment 8-1

I believe there are ways to minimize this risk while allowing the coal to be mined. The first is mining restrictions which prevent water loss and not trying to promote early subsidence.

DH Response 8-1

A mitigation measure, incorporated into the Final EIS, does impose restrictions on mining to protect the water resource. Also, see DH Response 6-5.

DH Comment 8-2

The second is a water replacement plan that is adjudicated in water courts before mining takes place; and third is requiring the lessee to have an insurance policy to cover subsidence-caused water loss after mining ceases and the mining company is no longer here.

DH Response 8-2

See DH Responses 1-8 and 6-3.

9. Bob Kirby, Delta Hearing Testimony

DH Comment 9-1

And I'm primarily concerned about the effect on our irrigation and on our domestic water -- in fact, all of the water we have available to us comes from the vicinity or in -- it comes through the Paonia D Seam tract.

DH Response 9-1

See DH Response 1-8.

DH Comment 9-2

And I'd like to point out the problems as I see them are: When there is water lost to the mining, there's going to be a great deal of difficulty in determining just how much water is lost and how much really should be replaced. I don't see anything in this EIS statement that relates to any data that has been collected for either this year or past years.

DH Response 9-2

The data being collected by one of the prospective bidders on the Paonia D Seam tract are confidential and cannot be incorporated into the Final EIS. BLM believes that the revised water related mitigation measures in the Final EIS should adequately take care of potential irrigation losses. However, if through an unforeseen development, damages to water rights did occur, the determination of injury and award of compensation would be decided through the Colorado State court system.

DH Comment 9-3.

...like to see the -- I know for one thing, that one of the prospective bidders on the Paonia D Seam is presently undertaking the task of collecting data on the waterflow in the Roatcap Creeks. That's our runoff water; and on our domestic water -- I think that that should be included in the analysis of the Paonia D Seam coal.

DH Response 9-3

See-DH Response 9-2.

DH Comment 9-4

And I think that there should be -- I want to repeat some of the points that have been made before -- there should be a restriction on mining under areas where the water is transported.

DH Response 9-4

See DH Response 1-8.

DH Comment 9-5

And the replacement of water, there is a big question if somebody had to replace a large quantity of water, where are they going to get it from up there. I don't know. That's all been adjudicated to somebody. So it needs to be adjudicated as to where that replacement water is going to come from. And that has to be really taken care of through the state court, the district courts.

DH Response 9-5

The commentator is correct in stating that water replacement will be handled through the Colorado State court system. However, the BLM has incorporated revised mitigation into the Final EIS that is designed to protect the hydrologic balance, which in essence protects downstream water users from mine related water losses. There is also revised mitigation in the FEIS addressing water replacement through the Colorado State Laws.

10. Dave Bristol, Delta Hearing Testimony

DH Comment 10-1

Anyway, our -- I don't want to see the tract enlarged because there is room for enlargement in this EIS; and

DH Response 10-1

See DH Response 6-1.

DH Comment 10-2

I think that water protection must be number one in our county because on a dry year you can't let a mine use your domestic and irrigation water to mine under your water drainage, which is what could happen.

DH Response 10-2

The revised mitigation measures incorporated into the Final EIS are designed to protect the hydrologic balance and should, therefore, eliminate the concerns expressed by the commentator.

DH Comment 10-3

...into especially the Terror drainage area. You cannot replace this water. That sounds good, but you can't. I mean once it's gone, it's down the mine, whatever. But there's totally too many variables. The only way to deal with that is don't mine under it because you can't replace it; you can insure it, but you can't get water from above there. There is no water above there.

DH Response 10-3

See DH Responses 1-8 and 6-3.

DH Comment 10-4

The construction of a new alignment for State Highway 133 is in progress. The old highway will be used for local traffic, including coal trucks, while through traffic will be routed to the new highway. When completed, the new highway will result in a major reduction in accidents.

DH Comment 10-4 (cont'd.)

Anyway, that -- with the proposed overland coal road, over Garvin Mesa, that will make three highways, which is just a little bit too many for such a small valley; three large highways in one area is ridiculous. I mean, it's bad planning. We have to have more thought into this, and I find an overland haul road unacceptable over Garvin Mesa.

DH Response 10-4

See DH Response 1-2.

11. Andy Mowbray, Delta Hearing Testimony

DH Comment 11-1

As far as I am presently concerned, the proposed private coal-haulage road over Garvin Mesa is totally unacceptable. The main reasons that I see are: number one, noise; number two, deterioration of air quality; number three, hazard to the mesa residents on an already dangerous road; four, damage to the scenic beauty of the area; five, disturbance of natural wildlife which is part of that natural beauty; six, an obvious decline in property values; and seven, an overall diminished quality of life for area residents.

DH Response 11-1

See DH Response 1-2.

DH Comment 11-2

No real mention of how alternative routes would affect residents is mentioned. All that I could find was, and I quote from page 249 on transportation: "Lease stipulations for coal transportation from the Paonia D tract would eliminate coal traffic on Highway 133, which has been a concern of local citizens." That's all it says as far as the effect on the citizens.

DH Response 11-2

See DH Response 1-2.

12. Shelley Hyde-Mann, Delta Hearing Testimony

DH Comment 12-1

But I would also like to insist that the Bureau of Land Management address the impacts of long-term coal mining in the North Fork Valley in more detail. Specifically, after reading through the EIS, I feel it is very limited in the goals for mitigating the transportation system in future coal production in this area.

Present, as the Environmental Impact Statement reads on transportation in the Paonia tract, it allows for Colorado Westmoreland, if successful in their bid for this long-term lease, to construct a private haul road to truck the coal to their silo area.

As a resident and landowner of Garvin Mesa and the Paonia community, I find it completely unacceptable for a truck route to be positioned over Garvin Mesa. I feel this would only shift the impact again from the present route on Highway 133 to a much larger population of people directly affected by a change in this way: showing a substantial decrease in the air and noise quality, value of land, question of safety, and the overall desirability of long-term leasing in this area at the expense of the residents of the North Valley community as a whole.

DH Response 12-1

See DH Response 1-2.

DH Comment 12-2

I feel I am protecting my individual rights as a resident and landowner. I would like to recommend that the Bureau of Land Management make more responsibility -- take more responsibility -- for the greatest protection of the environment in the public interest and change the language in the Environmental Impact Statement from such a general stipulation as to eliminate trucking off Highway 133 to something a little more specific.

DH Response 12-2
See DH Response 1-2.

DH Comment 12-3
I recommend that the Bureau of Land Management assess the impacts of trucking more specifically and study other alternative routes more in detail with the financial analysis of cost.

DH Response 12-3
See DH Response 1-2.

DH Comment 12-4
And I would like to emphasize that I am not only affected by the proposed change in the transportation system in this long-term lease. Water is also an important issue that has not been completely assessed in the EIS, either. Water is our most important resource and should be protected as such with a review of all mining impacts to assess this problem.

DH Response 12-4
The BLM has incorporated revised mitigation into the Final EIS. The mitigating measures are as specific as possible given existing available data. The mitigating measures are designed to provide for protection of the hydrologic balance from the impacts of coal mining. This will in essence provide protection for all water sources and water rights from losses related to coal mining activities.

DH Comment 12-5
Finally, I would like to ask that there be an extension from the July 6th deadline for written commentary.

DH Response 12-5
See DH Response 7-9.

13. William Ray Mann, Delta Hearing Testimony

DH Comment 13-1
If long-term coal leases are let, I hope government agencies such as the Bureau of Land Management will help us protect the North Fork Valley by providing fair guidelines

for any coal company to follow on air, noise, water, and other environmental qualities as well as safety, that will not degrade the quality of life in Paonia/North Fork Valley.

DH Response 13-1
Comment noted. The mitigating measures in Appendix Three are designed to protect the resources noted by the commenter.

DH Comment 13-2
The current EIS addresses the fact that coal transportation from the Paonia tract will be by conveyor or other permanent alternative methods to avoid trucking on Highway 133. I feel that statement is too vague and leaves the future of the North Fork Valley in the hands of any coal company who wishes to justify its transportation methods no matter how environmentally sound, safe, or esthetically pleasing by a current economic scale.

DH Response 13-2
Comment noted. See DH Response 1-2.

DH Comment 13-3
I would recommend the BLM study transportation routes in the valley and their existing environmental effects and design guidelines to keep visual, noise, and associated impacts in corridors where they presently exist or design a new corridor with less impacts than we presently have. But at no point should they let any coal company increase undesirable impacts in the valley.

DH Response 13-3
Comment noted. See DH Response 1-2.

DH Comment 13-4
On the point of water, I hope the EIS will provide enough base data on quantity and quality of stream flow to monitor all future coal production in the valley as to their effect on current water rights and provide additional water in equal amounts for any water lost by the effects of mining to current water holders or to average stream flow levels, water being the lifeblood of the West.

DH Response 13-4

The collection of baseline water resource data and monitoring future conditions is the responsibility of the lessee as required by state and Federal law. Baseline hydrologic data must be incorporated by the lessee into the mine plan while monitoring the hydrologic system is a process (also required of the lessee) that continues throughout the permit phases.

Any injury to a water right holder from mining or any other reason must be settled through the Colorado State court system. However, the BLM has incorporated mitigation measures in the Final EIS that will protect the hydrologic balance of the lease tract and adjacent areas, which will in essence protect downstream water right holders.

14. Hanna Bristow, Delta Hearing Testimony

DH Comment 14-1

I have read through parts of the EIS and feel it is rather vague on these matters. I would like to see a stronger stipulation put in these to protect us from any possible water subsidence and also such ideas as a haul road through Garvin Mesa.

DH Response 14-1

See DH Responses 1-1 and 1-8.

DH Comment 14-2

Colorado Westmoreland has done a lot of homework and has figured out several alternatives. And I think that BLM should study these and study them carefully and consider all the impacts to everyone.

DH Response 14-2

Comment noted. See DH Response 1-2.

15. David Johnston, Delta Hearing Testimony

DH Comment 15-1

First, I would like to address the issue of need for

coal leasing. I would concur with the statement made by Susan Brater on behalf of Western Colorado Congress that nationally coal leasing is not needed since the coal market is soft and the prices are very depressed. I think that large-scale leasing should be deferred until the demand is up.

DH Response 15-1

It is the policy of the current administration to make coal available to the marketplace in an environmentally sound manner and at not less than fair market value. The number of expressions of interest for leasing received by BLM indicated that there is a demand for additional coal in the Uinta-Southwestern Utah Coal Production Region.

DH Comment 15-2

Secondly, as to transportation of coal from the Paonia tract, I think there is two primary criteria that should be addressed: One is safety; and the second is desires of the local residents. And we don't believe that another truck route over Garvin Mesa is the answer to these problems.

DH Response 15-2

Comment noted. See DH Response 1-2.

DH Comment 15-3

As far as the stipulations go, we think they are fine. However, we think there should be some more detail to them. One, we would advocate that there be a presumption of loss. If a company is mining under an area and there is a water loss in that area, we think that it should be presumed that it is caused by the mining and the company required to replace that water. Otherwise, we're forcing the irrigators to have to go in and prove the mining is causing the water loss.

DH Response 15-3

Any injury to a water right must be settled through the Colorado State court system.

DH Comment 15-4

Due to the nature of monitoring, there are gray areas that statistically you can't tell exactly whether there's a water loss or not. And we believe that the company mining under there should replace water if the measurements are in this gray area. We don't believe the irrigators should have to take these losses that can't exactly be measured.

DH Response 15-4

See DH Response 9-2.

DH Comment 15-5

Thirdly, we believe that the augmentation plan should be approved by the BLM and the water court prior to mining under the effected drainage.

DH Response 15-5

See DH Response 1-7.

DH Comment 15-6

Fourth, we believe that continued monitoring should occur after the mine has closed; and the duty to replace water should continue after the mine has closed. I don't believe that is in the stipulations.

DH Response 15-6

Monitoring is a function required of the lessee by the State Colorado Mined Land Reclamation Division. A mitigation measure has been incorporated into the Final EIS requiring bonding of existing cross-tract and on-tract water flows, after the reclamation phase.

DH Comment 15-7

Fifth, we believe that an insurance policy or bond should be posted to pay for any irreplaceable losses; and this is especially important after the mine closes, when the mining company is gone. And if there is a bond or an insurance policy to look to, it's much greater protection.

DH Response 15-7

See DH Response 1-8.

DH Comment 15-8

And we would also ask that the BLM enforce the stipulations and not delegate the enforcement to another agency.

DH Response 15-8

BLM will and can enforce only those stipulations over which it has jurisdiction. BLM cannot delegate its responsibilities to other agencies.

DH Comment 15-9

And we would like to ask for an extension of the comment period.

DH Response 15-9

See DH Response 7-9.

16. Daniel Perkins, Delta Hearing Testimony

DH Comment 16-1

And basically we can't -- I just can't urge you enough to put some kind of language into the EIS that's going to ensure us that whoever gets this lease isn't going to abuse us in some way and put in a road that I'm sure none of you or anyone else in the room would like to have out their back door.

DH Response 16-1

BLM will require that the lessee study alternative transportation routes. See the revised transportation stipulation in Appendix Three. However, it is not within the authority of BLM to eliminate coal traffic on private roads nor specify which method or location will be used.

17. Paul Douglas, Delta Hearing Testimony

DH Comment 17-1

It's somewhat confusing sometimes when you have a competitive leasing situation. It doesn't really address the problem of keeping a mine that presently operates successfully in business. It seems there ought to be some alternative to that, but I don't have that answer.

DH Response 17-1

Comment noted. Because all tracts must be offered for lease on a competitive basis, the possibility of an independent operator must be considered.

DH Comment 17-2

One of my concerns -- I'm quite concerned, actually -- that the Draft EIS does not include a study of transportation alternatives. And I'm specifically referring to Paonla traffic. I think to all the tracts, really, it's pretty ambiguous. I think a study is legally required in the EIS, and that's why I was surprised I did not see an alternative transportation study.

DH Response 17-2

See DH Response 1-2.

DH Comment 17-3

The proposed lease stipulations -- I think that's on page 249 -- and the mitigating measures on page A3-12, pages A3-1 through A3-14, actually, are entirely inadequate. As everybody said, we have considerable impacts on transportation; and they're not addressed in this EIS. And they need to be.

DH Response 17-3

Some of mitigating measures on pages A3-9 through A3-14 have been revised. Mitigating measures on pages A3-1 through A3-5 are standard lease stipulations and are not changed. Mitigation measures on pages A3-5 through A3-9 are Forest Service stipulations for the Utah tracts and do not apply to the Colorado tracts. See DH Responses 1-2 and 10-2.

DH Comment 17-4

The present stipulation concerning getting the impact off of 133 is totally inadequate. It's just passing the buck around and passing it back elsewhere where it won't do any good, either.

DH Response 17-4

See DH Response 1-2.

DH Comment 17-5

There's no mention, I don't believe, in the EIS of the fan noise that we presently experience. I'd like to know whether that's going to get worse or better.

DH Response 17-5

A sentence has been added to the Land Use Section in Chapter 3 discussing the existing noise in the area adjacent to the Paonla D Seam lease tract.

DH Comment 17-6

I think the EIS has to specifically address the issues of transportation and water. And at present the EIS does not do that.

DH Response 17-6

Site specific impacts are discussed in detail in the individual tract profiles. Because this is a regional EIS, the focus of impact analysis was on regional impacts, however, where site specific impacts were considered significant, they were also discussed. Finally, Chapter Six provides a summary of the individual tracts.

DH Comment 17-7

I think that situation points very dramatically to the need to get these stipulations into the EIS process and not wait until the permitting process.

DH Response 17-7

Comment noted. See DH Response 1-6.

DH Comment 17-8

I also, I guess, finally would like to request an extension to the present comment period which, I believe, ends on July 6th. I think the comments here tonight clearly show that there is a need for further study both on our part, the citizens, and on the part of the BLM.

DH Response 17-8

See DH Response 7-9.

18. Ronald Brewer, Delta Hearing Testimony

DH Comment 18-1

We've had considerable noise, speed, and deterioration of streets; and this is one of the things that we feel like should be pointed out within the EIS study.

DH Response 18-1

Comment noted. See DH Response 1-1.

19. Edward Plouvier, Delta Hearing Testimony

DH Comment 19-1

I can see leasing coal to this mine; but according to your figures in there, this is going to employ so many hundred or thousand people here and there. How they going to employ people when they open up a new mine? The mines we've got are shut down now. Where is that coal going to go? Who is going to buy it?

DH Response 19-1

It is impossible to project who will buy the coal or where it will go, however, it is doubtful that a mining company would consider leasing a coal tract without a reasonably good expectation of being able to mine and sell coal or sell the lease to another company in the future. If a mining company thinks that a tract cannot be economically mined or the coal from the tract sold, that company simply won't bid on the tract.

20. Claire Moore, Delta Hearing Testimony

DH Comment 20-1

We suggest that the EIS should contain water rights inventory and data on the amounts of flow and have water-protection lease stipulations that are very specific and enforceable.

DH Response 20-1

See DH Responses 1-8 and 2-4.

A mitigation measure has been incorporated into the Final EIS which requires the lessee to conduct a water rights inventory prior to the issuance of the mine permit.

More specific information dealing with the regional hydrology can be found in the references cited in the EIS. However, actual water quantity figures on ditches, springs, etc., were not included in the EIS because much of the data were not available. Some of this data has been collected since the writing of the Draft EIS and is located in the USGS Report 83-4069 available at the Colorado State BLM Office or the BLM-Montrose District Office. Ditch flows and other information pertaining to water rights are available at the Colorado State Water Engineer's Office, Division 4.

The usefulness of incorporating a detailed water rights inventory into the EIS is questionable at this point, without knowing the specifics of the mine plan; thus, detailed impacts could not be assessed. In addition, revised mitigation incorporated into the Final EIS will protect the hydrologic balance and will mitigate impacts to water rights.

DH Comment 20-2

The EIS should include a timetable for protection measures to be implemented; the EIS should address the problem of mining-caused water loss which might occur much later after mining has ceased; and the EIS should include definition of consequences for noncompliance with water-protection measures.

DH Response 20-2

This concern, for the most part, is spelled out in the mitigation measures that will be incorporated into the Final EIS. An exact schedule would be impossible, since the tracts have not been leased. Please refer to water related mitigation measures that are incorporated into Appendix Three of the Final EIS.

DH Comment 20-3

And we appreciate the efforts that have already been exhibited by the BLM for the water-protection measures, but we would urge you to be more specific in the formal details of how these stipulations will be carried out.

DH Response 20-3

See DH Responses 1-6 and 1-8.

DH Comment 20-4

I feel like the BLM should be deciding what the most appropriate method and route of transporting the coal to the load-out facility at the Paonia D Seam tract, considering the least noise impacts, the least air pollution impacts, and the best health and safety factors.

DH Response 20-4

See DH Response 1-2.

DH Comment 20-5

We do not -- we know that this lease -- we know who the potential lessee probably will be; but the BLM should be evaluating the merits of the various alternative coal transportation systems; and the BLM should be looking at this independently; and the potential lessee should not be dictating what they would like to have for a transportation system.

DH Response 20-5

See DH Response 1-2.

21. Matthew Sakurada, Delta Hearing Testimony

DH Comment 21-1

CWI believes the various proposed stipulations proposed to date and in the future should themselves meet certain standards. Number one, CWI requires only that stipulations bear some reasonable relationship to genuine potential impacts, provide legitimate mitigation to bonafide, unredressed potential impacts, and be obtainable as a matter of law, technology, and/or economics.

DH Response 21-1

Comment noted. The mitigation measures in Appendix Three are committed, enforceable, technically feasible, and designed to reduce potential impacts.

DH Comment 21-2

As a practical matter, CWI believes stipulations framed in detailed descriptive terms specifically identifying what water sources or water rights are to be protected, for example, and setting forth the specific mitigations as opposed to general, legalistic conditions of performance are preferable in this case.

DH Response 21-2

See DH Response 12-4.

DH Comment 21-3

Number two, the same stipulations must apply to all potential bidders and operators on the Paonia tract to insure equality of opportunity in fair market evaluation, bidding, leasing, and mining.

DH Response 21-3

The proposed mitigation measures for the Paonia D Seam tract will apply to all potential bidders and operators.

DH Comment 21-4

Number three, required mitigation measures should be reasonably comparable to those imposed on other federal tracts, especially in the local region.

DH Response 21-4

Comment noted. The standard measures are universally applied and the specific measures apply directly to the two proposed tracts.

DH Comment 21-5

Number four, Proposed Special Stipulation 15 should make clear that mining will not be prohibited until 1988, '89, or later in connection with the requirement of a five-year hydrology data baseline collection program.

DH Response 21-5

The mitigation, requiring 5 years of baseline water data collection has been deleted in the Final EIS.

DH Comment 21-6

Number five, Proposed Special Stipulation 13 calling for removal of trucks from Highway 133 must apply to all potential lessees. And the required alternative must be conditioned upon economic feasibility as expressed in the original Emergency Lease C-27432 language.

DH Response 21-6

Proposed mitigation measures in the Final EIS apply to any lessee who would obtain the tract(s).

DH Comment 21-7

Number six, final recoverable tonnages and lease boundaries should be revised downward to account for any acres or reserves eliminated due to environmental stipulations or refined exploration data and analysis.

DH Response 21-7

The total coal resources that will be restricted from mining because of environmental constraints will be identified prior to lease sale. These reserves will be eliminated from the presently calculated reserves.

DH Comment 21-8

Number seven, redundant mitigation requirements or stipulations should be avoided and cost minimized. For instance, if water insurance is required, its cost should be offset against bonding requirements.

DH Response 21-8

See DH Response 1-8.

DH Comment 21-9

Number eight, mitigation measures should be coordinated and complementary to the extent possible.

DH Response 21-9

Comment noted.

DH Comment 21-10

Number nine, the need for a prohibition of coal extraction inside the lease tract should be balanced against the other special mitigating measures finally attached to the lease tract. And a specific off-limits zone should be identified and announced prior to the lease sale, perhaps as a part of the call for comments on fair market value of the tract.

DH Response 21-10

See DH Response 21-7.

DH Comment 21-11

Number ten, specific provision should be made for the continued hauling of coal by trucks on 133 as a backup system if the lessee attempts to implement an innovative, technological measure to mitigate the impacts inherent in all standard modes of conveyance.

DH Response 21-11

Trucking will be avoided as the mitigation measure suggests, however, it is not the intent of the mitigation to prevent hauling of coal to the loadout should a temporary backup system be needed.

22. Virginia Egger, Delta Hearing Testimony

DH Comment 22-1

I have figures available. Delta County had a socioeconomic study prepared about a year ago that does a similar analysis. I think it uses assumptions very similar to what BLM was proposing in terms of other economic sector expansion. Those are available for the Final EIS.

DH Response 22-1

See DH Response 1-10.

23. Linda Lindsey, Delta Hearing Testimony

DH Comment 23-1

"Coal extraction shall be prohibited where overburden, subsidence, or fracturing would disrupt the quantity or quality of a surface or ground water supply needed to satisfy an adjudicated water right, including irrigation water supplies to alluvial valley floors and prime/unique farmland."

Now, did you want that expanded to include all irrigated land? Was that one of the points you were trying to make?

DH Response 23-1

See DH Response 7-2.

24. District 10 Regional Planning Commission, Delta Hearing Testimony

DH Comment 24-1

District 10 Regional Planning Commission wishes to make the following observations on the Draft EIS: We have encouraged our member governments - including Delta County, the Towns of Cedaredge and Orchard City and the City of Delta - to review the document and it is our hope that all significant issues will be addressed by these and other concerned groups.

However, the issue of transportation transcends local boundaries and appears to be inadequately addressed in the EIS, particularly in regard to the proposed Cedaredge Tract. Although some data is provided on pages 139 and 249 of the document, no real analysis is conducted.

For instance, it is mentioned that an estimated 63 coal trucks plus 12 service trucks would complete roundtrips to Delta - each day. Unfortunately no time element is supplied. If these trips were all to occur in an eight hour shift period, a truck could pass a particular point every three or four minutes.

No mention is made of other safety or health hazards like falling rocks and coal from trucks that have in the past caused windshield damage in the area. Problems associated with additional coal storage and loading in Delta are not analyzed.

District 10 suggests that greater attention be paid to these aspects. Relevant lease stipulations should be developed to insure that a coal developed be required to participate in the costs of road improvement and maintenance and that safety and health problems be minimized. Such stipulations can be of benefit to all concerned because they define the situation at the outset and minimize problems along the way.

DH Response 24-1

See DH Response 1-2. BLM does not have the authority to require a coal lessee to provide mitigation funds for the maintenance of county or state highways. However, the potential lessees will address coal transportation alternatives before mining (see revised coal transportation mitigation) to arrive at the most environmentally and economically acceptable method.

CASTLE DALE PUBLIC HEARING

1. Les Prall, Castle Dale Hearing Testimony

SPEAKER

1. Les Prall, Southeastern Utah Assoc. of Local Governments
2. Scott Johansen, Emery County Attorney

Exhibit 1 - Emery County (Response attached)

Comments and Responses follow

CDH Comment 1-1

I guess my first concern is the leasing itself. The large amount of leasing that is proposed, it seems that our forecasts that we've done at a local level differ somewhat from the forecasts in the EIS.

CDH Response 1-1

The leasing level is developed utilizing the standard Department of the Interior procedures which include mathematical calculations, expressions of interest in coal leasing, and RCT recommendations. The regional production goal based on the national coal model gives a projection of the role or significance of coal in the region.

CDH Comment 1-2

But my concern is why are we leasing new coal when there seems to be a substantial amount of leased coal already in this region that is now not producing coal.

CDH Response 1-2

The Federal Coal Program allows the marketplace to decide what coal will ultimately be leased and developed. The new coal will be evaluated by the potential producers along with uncommitted resources. The coal program encourages development of leases through diligence procedures which require production within 10 years and it is anticipated that only leases for marketable coal would be sold.

CDH Comment 1-3

And we seem to believe that there are plenty of other existing leaseable coal areas that would not conflict or be in high watershed areas which could potentially, you know, affect the quality of water to our residents.

CDH Response 1-3

Many of the water systems in southeastern Utah are in areas which have had active coal mining for a number of years without a great deal of documented conflict between the two uses given proper planning of the mine development and water protection stipulations. The two uses appear to be generally compatible. Coal tracts in more sensitive watershed areas were given lower ranking and priority in the alternatives to ensure full protection of water and water rights.

2. Scott Johansen, Castle Dale Hearing Testimony

CDH Comment 2-1

The county takes the view that such impacts should be mitigated by the industry which is proposing the development. The tax burden upon the residents of the county and existing industry, as well as the current public indebtedness, is simply too high for the property tax structure to pay for significant adverse impacts, should such occur.

CDH Response 2-1

BLM considers it appropriate for state and local governments to deal directly with developers in the preparation of detailed socioeconomic mitigation plans and programs. State and local governments have regulatory opportunities (e.g., Senate Bill 170) which can be used to develop and/or enforce detailed socioeconomic mitigation. Local communities are more familiar with their specific needs and programs than BLM and are in the best position to define, detail, and administer the implementation of specific mitigation.

CDH Comment 2-2

Of particular concern is the transportation system within the county. The Draft EIS seems to be based upon the assumption that the Castle Valley spur of the Denver and Rio Grande Railroad will eliminate a good deal of the coal haul traffic from the highway system. The Draft EIS recognizes that State Highway Utah 10 is already at a maximum usage considering the coal haul traffic which now exists. Not only has the Castle Valley spur been abandoned, but now with the formation of Thistle Lake the transportation problems in the area have been exacerbated.

CDH Response 2-2

After studying the issue prompting Comment 2-2, it was concluded that the proposed Castle Valley Railroad spur assumption used in the DEIS is still valid. If the second round tracts in Emery County are leased and development begins, sufficient demand would exist to justify construction of the railroad. A lack of coal production is the major reason given for delay of the railroad.

The railroad has already been reestablished in Spanish Fork Canyon and no long-term transportation impacts resulting from the formation of Thistle Lake are anticipated.

CDHE Response 1-1

The responses to the comments made in this letter are found in the responses to the oral testimony CDH 2-1 and 2-2. Your concern and involvement in the coal leasing program is appreciated.

1. James Kropf, Kanab Hearing Testimony

SPEAKER

1. James Kropf

No Exhibits presented at this hearing.

Comments and Responses follow

KH Comment 1-1

I noticed here you made a statement on page 4, S-4 of the summary, on the statement of visual resource management, VRM's. Are they really, in fact, a matter of law now?

KH Response 1-1

As was identified in Mr. Rowley's response to this question, management of the visual resource through VRM classification is not mandated by law. Although not legally binding, classifications are developed and used by the BLM and Forest Service agencies as a guide to management of the visual resource.

The BLM and Forest Service use scenic quality, sensitivity, and visual distance criteria to determine visual management objectives under their respective jurisdictions. The lands then classified according to management objectives. In Appendix 5 of the EIS, the objectives of each visual class are discussed. The agencies try to manage the multiple uses of the public lands in a manner consistent with visual management objectives so defined. When an action is proposed to take place on public lands, the effect of the action on the visual resource is assessed. A decision may be made to allow an action of merit that would conflict with visual resource management objectives. However, every attempt would be made by the agency to ease the visual impact through mitigation, and to bring the resource back to its current visual quality through rehabilitation after the action is completed.

KH Comment 1-2

I had a question, also, with the statement of conflict with the Kane County Master Plan. I'll probably submit a written statement in conjunction with the county commission on that. To the best of my knowledge I don't know where that conflict lies.

KH Response 1-2

Page 144 of the DEIS presented planning assumptions concerning community development and water needs. Realization

KH Response 1-2 (cont'd.)

of these assumptions would conflict with recommendations made on pages 5, 7, and 39 of the Amended Kane County Master Plan, dated August 5, 1982. These recommendations are that residential development be within the existing communities, that existing and potential irrigated cropland be protected by restricting incompatible land uses, and that development of water resources for existing county needs take precedent over its potential uses for coal development.

It is recognized in the Kane County Master Plan and associated zoning ordinances that the guidelines may be met by establishing and initiating appropriate project stipulations and mitigation measures. The use of the word "mitigation" in the plan implies that the conflicts resulting from coal development could be resolved by the county.

KH Comment 1-3

Well, I could stand corrected, but I believe that under the Petition for Unsuitability on the Alton Field, the majority lease under the Alton Warner Valley Project, mining of that coal on surface, I believe that it was demonstrated that they could meet the ambient air quality under mining under a much larger scale than just one lease. I could be incorrect, but at this point to the best of my memory, I said that in that statement of the unsuitability they were able to meet those.

KH Response 1-3

It is correct that the Southern Utah Petition Evaluation Document (OSM, 1980) did not predict violations of the NAAQS. That study only included emissions directly caused by the mines, whereas this EIS analysis also includes impacts from towns, dirt roads, etc. The modeling analysis approach was also different. The SUPED analysis used the ISC model with deposition; the Uinta-Southwest Utah analysis did not include deposition and may over estimate impacts as stated on page 200 of the Draft EIS.

KH Comment 1-4

I might jump in for one more. Why was the Kaiparowits Plateau excluded?

KH Response 1-4

Coal tracts in the Kaiparowits Plateau were eliminated from consideration in this round of leasing by the Department of the Interior after consultation with the Governor of Utah. Emphasis in leasing in the Kaiparowits Plateau will be processing of the 11 pending PRLAs for coal in the Kaiparowits coal field.

SPEAKERS

1. Nathaniel Goodman
2. John Garr
3. Carbon County

No Exhibits presented at this hearing.

Comments and Responses follow

SLCH Comment 1-1

Okay. Now, there are a number of tracts here that are listed as having things like I just pointed out: Alton Amphitheater is listed as "More exploration needed." And there's concern about water near the town of Alton. And yet in the main section of your study, again, it says there's 7.8 million (sic) tons of coal of which 24 million tons are estimated to be recoverable.

Blue Trail Tract is listed in the appendix as limited information. That's contained on page A2-3 of the appendix; yet in the main body of your study they say it "contains an in-place coal resource of 1 million tons of which 0.9 million tons are estimated to be recoverable."

Fisher Canyon is listed in the appendix: "Potential exists for faulting and splitting. Inadequate data indicated need for further drilling." But again in the main impact statement text, it says: "The tract contains an in-place coal resource of 134 million tons of which 54 million tons are estimated to be recoverable."

Ford Pasture tract listed in Appendix A2-4, it says: "Further exploration needed." And in the main section of the text, again, it says: "contains in-place resource of 36.3 million tons of which 20 million tons are estimated to be recoverable."

SLCH Response 1-1

The leasing levels indicated in the alternatives are based on the best available data at this time. As stated in the Introduction to Chapter 2, mining plans are not prepared for coal tracts until after lease issuance. Because mine plans have not been prepared, coal reserves have not been fully measured and additional exploration will be required on many tracts. Table 1-2, Summary of Individual Tract Data, has been modified in the Final EIS to indicate the current level of information on coal reserves in the individual tracts.

SLCH Comment 1-2

On page 23 of your Impact statement, as a part of a paragraph concerning the no-leasing Alternative No. 4, I would like to know why -- there is part of a paragraph there that says that there would be a "possible re-offering of some or all of the four tracts offered but not leased in Round One leasing effort."

That seems inconsistent that those tracts would be re-offered for leasing, either all or part of them, if Alternative Four is no further leasing.

SLCH Response 1-2

The environmental work for the four tracts that were unsold on the first round was completed with that effort and needs no further analysis. The No Leasing Alternative does allow for additional coal production from lands that are already leased or from lands to be leased in preference right lease applications or the unsold tracts. The EIS does not try to specifically estimate where the additional production in the No Leasing Alternative would come from.

SLCH Comment 1-3

There are at least four tracts listed in the Index -- in the appendix, again, I should say -- and also listed in the main body of the impact statement: Dugout-Pace, Trail Canyon, Coal Creek, and Graves tract which are listed as not fully meeting the Unsuitability Criteria 14, Migratory Birds, due to a lack of data.

I would think that if you are doing a complete study like this, there should be a -- further lack of data would be inconsistent, that there should be a complete study. It seems logical to me that if these tracts are going to be offered for lease, that complete studies should be made to find out if, in fact, they are leaseable or if there are faults or things wrong with the tracts that would make them not suitable for leasing, if they are to be leased.

SLCH Response 1-3

Preliminary investigations by USFWS personnel and BLM resource specialists indicate that data on migratory birds of

high Federal interest are limited. Twenty-two species are listed as migratory birds and up to 13 may be found in the Book Cliffs area (USFWS memorandum to BLM, Price, Utah, August 15, 1980). No significant impacts to migratory birds have yet been identified as a result of proposed coal mining. Based on available data, Criterion 14 must be applied prior to offering the tracts for lease. However, additional studies are needed. Therefore, the Land Use Management Plan for the area calls for the successful lessee (at the permitting stage) to be required to conduct a survey for migratory birds in areas where surface disturbance would occur and apply necessary mitigation after consultation with USFWS and BLM.

SLCH Comment 1-4

It seems rather illogical to me to lease more coal lands now when the in-place coal that is being mined now on existing leases and existing coal mines is rather low amounts; and some of the mines, in fact, are shut down due to the economy being the way it is now.

SLCH Response 1-4

The Federal Coal Leasing Program has been set up to recognize the long-term implications of coal leasing and development. No provisions are provided for short-term setbacks or cutbacks in mine development due to the economy. The overall analysis and projections for the role of coal in this country indicate that it will continue to grow and provide an increasingly greater share of the energy needs. No production is anticipated from the tracts under consideration for about 10 years.

SLCH Comment 1-5

But, if what you say is true, though, it does not make it seem clear to somebody reading it. It makes it seem, as I say, inconsistent because you're saying there is not enough data; and in another part of your thing you're saying that there is definite information. So it should be changed in the text, to clarify that point what you just said.

SLCH Response 1-5

See SLCH Response 1-1.

2. John Garr, Salt Lake City Hearing Testimony

SLCH Comment 2-1

With respect to the previous commentator's comments that perhaps because of the industry's being in the state of depression -- I guess that is probably one of the softest terms -- I could use other words -- that it is, that perhaps we don't need additional leasing. And yet that really, ladies and gentlemen, is all the more reason for leasing to move forward. For without this type of basis to look toward and to be able to develop and guarantee to prospective market buyers, we may find ourselves in the long run -- and surely in the short run we probably have ample areas that we can work from as we're certainly not meeting maximum production right now -- but in the long run -- and we hope that's in the next few years, sooner or later -- we hope we're going to find that there will be demand for Western coal and more specifically for Utah Western coal. And as such, then, we need these kinds of leases to have available, at least for the opportunity to bid on. That doesn't mean that our people -- when I say our people, I mean our present operators, -- are going to be the recipients of those bids, those leases. They may not be.

But we feel that those kinds of long-range goals must be available if Utah coal is to remain a viable industry in the state.

SLCH Response 2-1

Your comments and interest in the Federal coal leasing program are appreciated.

3. Carbon County, Salt Lake City Hearing Testimony

SLCH Comment 3-1

There are millions of tons of coal under private and federal lease currently; we do not feel that more leasing at this time is prudent. This round of leasing will be more for speculation than to supply coal for a specific need.

SLCH Response 3-1

The Department of the Interior's policy is that since

the Federal Government controls such a large percentage of the coal in the western states, a reasonable tonnage of coal that is environmentally acceptable for development will be offered for leasing by competitive bid. The tracts will be leased at no less than the fair market value. The coal industry will take the amount of coal that is needed to meet future production needs in the free market economy.

SLCH Comment 3-2

We specifically ask that you do not consider the Mud Creek tract and the North Trough Springs tract in any of the leasing alternatives.

The Gooseberry tract in Sanpete County is actually in the Scofield Reservoir drainage and should also be avoided until such time that the coal market demands new coal sources.

SLCH Response 3-2

The Mud Creek and North Springs tracts were eliminated from the Preferred Leasing Alternative due to concern about additional impacts in the Scofield drainage area. The topographic maps indicate that only a portion of the Gooseberry tract in Sanpete County is located within the Scofield Reservoir drainage but the major portion of the tract is within the Upper Huntington Creek drainage which goes into Electric Lake and into Emery County. The Gooseberry tract will be offered for lease by the State of Utah.

SLCH Comment 3-3

We feel that the Dugout-Pace Canyon tract should be added back into the preferred Alternative No. 2 for these same reasons. The reason that we feel this way is because the data presented in the EIS does not convince us that water quality can be protected while allowing the mining to occur. There are so many unknowns concerning subsidence and the effect of underground mining, that these topics need to be researched and studied so that we can protect our water sources while we allow mining.

Many other tracts along the Book Cliffs could be leased without having the same level of potential impact on the human population.

SLCH Response 3-3

The Dugout-Pace Canyon tract has been determined to be a lower priority tract due to its location and the difficult mining conditions anticipated due to the depth of the coal. This tract can only be mined from existing leases which have not been developed at this point in time. The tract could not be mined for a number of years due to its location in the coal field.

SLCH Comment 3-4

We, as the Carbon County Commission, hope that you will take these concerns into account and adjust your future actions accordingly. An EIS such as the one that you are involved with currently is just too general on which to base a decision which can affect thousands of people.

SLCH Response 3-4

The concerns of the County are recorded and responded to in the Final EIS, see public hearing comment responses 3-1, 3-2, and 3-3. These issues will be included in future decision documents and brought to the attention of the decisionmaker.

In the event that the tracts of concern to the County are leased, these issues would be further addressed during the mine plan approval process.

SLCH Comment 3-5

The first general comment deals with water quality and watershed preservation. Carbon County does not feel it is necessary to lease the North Trough Springs and Mud Creek tracts at this time. This may even apply to the Gooseberry tract which is in Sanpete County and which drains into Carbon County. The maintenance of water quality in the Scofield drainage is the main reason for our objecting to these tracts.

SLCH Response 3-5

See SLCH Response 3-2.

SLCH Comment 3-6

With reference to water quality, the EIS states that

maximum development will have minor impact on surface water quality. Yet two paragraphs later, the report states that accidental pollution and pollution-control failures will add nutrients to an already polluted reservoir. These types of events will push the reservoir deeper into the atrophic state, counteracting all of the pollution-control measures currently being enacted by Carbon County.

SLCH Response 3-6

As written, the EIS notes that regional impacts of the proposed action would be minor, but that local impacts could be more serious. Note that contributions to eutrophic conditions would be of an accidental nature and would occur only for short periods of time.

SLCH Comment 3-7

The report states that the Mud Creek and Gooseberry tracts will contribute .11 percent of the average sediment inflow into the reservoir. But when you combine this with the other existing and proposed mining operations in the area, you will see a coal mining sediment component much larger than the report indicates.

SLCH Response 3-7

The reported estimates are for the proposed action only and assume the worst possible case. Cumulative totals can be obtained by combining any of the leasing alternatives with Alternative Four.

SLCH Comment 3-8

The report should look at the cumulative totals; individual totals are misleading.

SLCH Response 3-8

See SLCH Response 3-7.

SLCH Comment 3-9

Our proposal is that the Mud Creek and North Trough Springs tracts be dropped from further consideration in all of the alternatives at this time.

Further, the Gooseberry tract should not be leased until the effect of subsidence on the surface and ground water can be determined.

SLCH Response 3-9

See SLCH Response 3-2.

SLCH Comment 3-10

The report makes it clear that there are many unanswered questions concerning subsidence. Subsidence should, as a result, play an important role in the decisions of where to lease.

Lease coal in those areas where subsidence will have a minimal effect.

We suggest that the Dugout-Pace Canyon tract be added back into your preferred alternative for the same previously mentioned reasons. And, of course, the Castle Valley Ridge tract is also one that we concur with, because of the fact that it is outside of the watershed and that it can be accessed through existing developed portals.

SLCH Response 3-10

The EIS indicates the available information on subsidence from underground coal mining. For this reason the stipulations concerning subsidence will be quite general at this time. At the time the mining plans are presented adequate protection measures will be required for approval of the mining plans to protect resources and values that might be impacted from subsidence from underground coal mining. Regarding the Dugout-Pace Canyon tract, see SLCH Response 3-3.

SLCH Comment 3-11

The report should address the area of enforcement. To assume it will take place is a dangerous assumption.

SLCH Response 3-11

The mitigating measures and stipulations included in Appendix Three are based on law and are real and enforceable. The BLM cannot assume that mining companies and/or government

enforcement agencies would carry out illegal activities. The EIS does acknowledge that accidents and pollution control failures could reduce the efficiency of mitigating measures.

SLCH Comment 3-12

The document completely misunderstands the Carbon County attitude towards growth related to coal mining. We do not fluctuate in our opinions depending upon the economic well-being as indicated in the report on page 191. Carbon County approaches growth as expressed in our comprehensive plans. We desire growth to occur in an orderly manner. The mines should be responsible for identifying specific, related impacts; and then they should provide solutions to them, be it social, economic, environmental, or location.

SLCH Response 3-12

The narrative refers to the residents of the county and not the policies of the Carbon County Commission. In making the narrative more concise some information from the technical report was omitted possibly leaving the reader with the wrong impression. The discussion under Social/Attitudes has been expanded in the final EIS.

SLCH Comment 3-13

The current county zoning map designates part, or in most cases, all, that each of the Carbon County coal tracts in the Critical Environmental Zone 1 classification, which in the document states that there is only three of the tracts that are in the Critical Environmental Zone 1 classification. And in deference to that, they are all in the Critical Environmental Zone 1. There are parts of some of the tracts that are outside of it at this time.

SLCH Response 3-13

The text has been revised to reflect the CE-1 zoning of the Book Cliffs area.

SLCH Comment 3-14

We'd like to stress also at this time that one of the infrastructure elements that was not listed in those as being most important is transportation, the overall question of

SLCH Comment 3-14 (cont'd.)

transportation. The road quality in most of the major coal-mining areas is extremely poor, in need of extensive repair at this time. And that's repair that neither the State or the counties can afford to pay for at this time.

SLCH Response 3-14

Transportation is not discussed in the socio-economic section of the EIS but is a separate discussion under its own heading. The importance of transportation and the general condition of the roads have been noted.

SLCH Comment 3-15

Railroad crossings are another severely limiting transportation problem. And they are definitely a constraint to growth and a safety hazard. There are many standard railroad crossings in the Carbon County area.

SLCH Response 3-15

Railroad crossings were not dealt with in depth in the EIS because it was assumed that railroad crossing construction commensurate with anticipated traffic would be provided when existing or needed roads were upgraded to accommodate anticipated traffic. The D&RGW railroad crossing of Highway U-10 south of Price was discussed as a potential traffic problem.

SLCH Comment 3-16

The overload comment at the end of the transportation section is in conflict with comments made earlier in the text concerning Highway U-10. It is at its carrying capacity now. The County is planning for a commuter alternative roadway to decrease the load on Highway U-10. And you should make the report consistent, if possible, in the area of transportation planning.

SLCH Response 3-16

At the end of each Transportation section, it was noted that traffic anticipated from increased mining would not by itself overload any of the State Highways in the area. The

accumulated traffic, including present and projected traffic plus the incremental traffic resulting from increased mining, would result in overloads in traffic and increased frequency of repairs on several of the State Highways in the area including U-10.

The Transportation section of the EIS was closely coordinated with the Utah Department of Transportation's Division of Transportation Planning, which furnished much of the data for the transportation model. The model gives not only a picture of traffic which would result from additional mining but also provides a basis for future highway planning in the mining areas.

Carbon County is planning a commuter route which will be mainly confined to local traffic to the northwest of Price, routing it around the south and west sides of Price, essentially taking some of the traffic load off downtown Price and the D&RGW railroad crossing there. The effect of the commuter route would be beneficial, but major upgrading of U-10 will still be required during the study period. Information on the commuter bypass has been added to the final EIS.

SLCH Comment 3-17

Chairman Nielson: Okay. I believe - Ron, correct me if I'm not right - we don't have Mud Creek, North Trough Springs either one? They're not in the preferred alternative.

Mr. Walker: I think North Trough Springs is... Gooseberry is also, and Dugout-Pace Canyon is not. And that's one thing that we wanted to stress, is that probably ought to be added back in because of its location as well.

SLCH Response 3-17

The Mud Creek, North Trough Springs, and Dugout-Pace tracts are not in the Preferred Alternative. The Gooseberry tract is in the Preferred Alternative. However, the Gooseberry tract has been selected by the State of Utah as a part of its indemnity selection. The tract will be offered for lease by the State.

SLCH Comment 3-18

...and, John, maybe you can shed some light on this. We were surprised Tuesday night in Castle Dale regarding the status of the Castle Valley railroad spur. We thought that was still on line. And that's not?

Mr. Walker: Yeah, I've got that in my notes as well, my comments.

Mr. Garr: No. Consol has backed away from that. And as such, the railroad lost their support. So their position now is not to move ahead.

However, they still do have options on all of the land that would be necessary; but they have no intention at this time of moving forward. There is no good reason to.

Mr. Walker: I think that would depend on, you know, what the coal mining operations in Emery County do. If there is a demand, I think that most of the planning and legwork has been done; and it would just be a simple matter of completing the EIS with a federal agency that was involved with it at that time, whatever agency it was.

SLCH Response 3-18

See CDH Response 2-2.

SLCH Comment 3-19

Carbon County is very concerned with this round of coal leasing mainly because of the current extent of unemployment in the coal industry which is reflective of the nationwide health of the industry. There are millions of tons of coal under private and federal lease currently. We do not feel more leasing at this time is prudent. This round of leasing will be more for speculation than to supply coal for a specific need. If the federal government is determined to lease coal at this time then it is important to lease those tracts which are located in the least environmentally sensitive areas. We specially ask that you do not consider the Mud Creek tract and the North Trough Springs tract in any of the leasing alternatives. The Gooseberry tract in Sanpete County is actually in the Scofield Reservoir drainage and

should also be avoided until such time that the coal market demands new coal sources. We feel that the Dugout/Pace Canyon tract be added back into the preferred alternative (No. 2) for these same reasons.

The reason that we feel this way is because the data presented in this EIS does not convince us that water quality can be protected while allowing the mining to occur. There are so many unknowns concerning subsidence and the effect of underground mining that these topics need to be researched and studied so that we can protect our water sources while we allow mining. Many other tracts along the Book Cliffs could be leased without having the same level of potential impact on the human population.

We as the Carbon County Commission hope that you will take these concerns in to account and adjust your future actions accordingly. An EIS such as the one you are involved with currently is just too general on which to base a decision which can affect thousands of people. We hope you will contact us if you have any questions concerning our written comments.

SLCH Response 3-19

Your comments and concerns are appreciated and will be considered in the decision-making process. Also see SLCH Response 3-17.

SLCH Comment 3-20

The maintenance of water quality in this Scofield Drainage is the main reason for our objecting to these tracts. With reference to water quality the EIS states that maximum development will have "minor" impact on surface water quality. Yet two paragraphs later the report states that "accidental pollution and pollution control failures" will add nutrients to an already polluted reservoir. These types of events will push the reservoir deeper into the eutrophic state counteracting all of the pollution control measures currently being enacted by Carbon County. The reservoir cannot be sacrificed. It is the only water source for the 20,000 plus people living in the Price River Valley.

SLCH Comment 3-24

As is the case with most EIS's with the scope of this report it is so general it really does not identify the real issues of concern especially to local government. The use of regional data misrepresents local values. An example would be the discussion of water quality where it states that the impact may be felt locally, but not regionally. That approach really upsets localities for obvious reasons. More site specific information should be generated.

SLCH Response 3-24

Site specific impacts resulting from individual tract development can be found in the tract profiles. In the EIS it was necessary to focus on regional impacts due to the scope of the action. However, we did try to identify important areas on a site specific basis, such as Scofield Reservoir, where significant impacts could occur.

SLCH Comment 3-25

The document completely misunderstands the Carbon County attitude towards growth related to coal mining. We do not fluctuate in our opinions depending upon the economic well being as indicated in the report (page 191).

Carbon County approaches growth as expressed in our comprehensive plans. We desire growth to occur in an orderly manner. The mines should be responsible for identifying specific related impacts and then provide solutions to them be it social, economic, environmental and locational. We have not been opposed to development in the past good times. Our ordinance base has recently been stiffened which happens to be in a lean period. We will require the same compliance in future developments as we do now. The reason we are asking the BLM to review certain development locations is not because we are against mining, but that we think mining in the Scofield Watershed is risky and unnecessary at this time.

SLCH Response 3-25

The Social/Attitudes section in the EIS has been revised by the Office of the State Planning Coordination for the State of Utah which has been working under contract to BLM for this effort. Also, see SLCH Response 3-12.

SLCH Response 3-20

See SLCH Response 3-6.

SLCH Comment 3-21

The report states that the Mud Creek and Gooseberry tracts will contribute .11 per cent of the average sediment inflow into the reservoir. When you combine this with the two large existing mines and the other two smaller mines proposed in the area on private leases, you will see a coal mining sediment component much larger than the report indicates. The report should look at the cumulative levels, individual levels are misleading.

SLCH Response 3-21

See SLCH Response 3-7.

SLCH Comment 3-22

Our proposal is that the Mud Creek and North Trough Springs tracts be dropped from further consideration in all of the alternatives at this time. Further, the Gooseberry tract should not be leased until the effect of subsidence on surface and ground water can be determined. The report makes it clear that there are many unanswered questions concerning subsidence. Subsidence should as a result play an important role in the decisions of where to lease. Lease coal in those areas where subsidence will have a minimal effect.

SLCH Response 3-22

See SLCH Responses 3-2, 3-3, and 3-9.

SLCH Comment 3-23

There are many existing laws and regulations which if enforced would allow mining with minimal impacts. Carbon County will be the first to agree that the coal industry is heavily regulated. We feel the problem lies in enforcement of the existing regulations. We could probably do with less regulations and better enforcement of compliance. The report should address the area of enforcement. To assume it will take place is a dangerous assumption.

SLCH Response 3-23

See SLCH Response 3-11.

SLCH Comment 3-26

There is one more infrastructure element left out of the list of most affected elements by these projects and that is transportation. The road quality is most of the major coal mining areas is extremely poor and in need of extensive repair. Repair that neither the states and the counties can afford to pay for. Railroad crossings are another limiting transportation problem.

SLCH Response 3-26

Table 2-8 (p. 28-34) includes Transportation as one of the major elements affected by the projected mining activity. Necessarily brief, it points out only the worst effects.

Many of the access roads to proposed mine portal sites are poor to nonexistent. It was anticipated that a mining company would have to construct access roads in order to mine coal. County roads used for commuting and hauling coal would in many cases need to be upgraded. In this, the rationale backing the EIS took into account Utah's law allowing prepayment of taxes in order to achieve needed road upgrading.

Also see SLCH Response 3-15 concerning railroad crossings.

SLCH Comment 3-27

Recreation developments as well are severely lacking in this area. This is an amenity that can heavily influence the happiness of employees and their desire to stay in the area.

SLCH Response 3-27

The DEIS (p. 84) indicates that available recreation facilities are inadequate according to State and local standards. A sentence has been added to the text to stress that the lack of available recreation facilities is particularly severe in Carbon (and Emery) Counties.

SLCH Comment 3-28

All roads in the area will see rapid deterioration, not just unpaved roads. (These comments also apply to all alternatives).

SLCH Response 3-28

This sentence has been clarified to indicate that both paved and unpaved roads would deteriorate.

SLCH Comment 3-29

Part of the North Trough Springs tract will drain into the Price River drainage.

SLCH Response 3-29

Even though a portion of the North Trough Spring tract will drain into the Price River, it is not indicated on Table 3-5 as the purpose of the table is to show the drainage basin in which most of the tract is located and which could receive the major impact.

SLCH Comment 3-30

The Book Cliff tracts are not zoned CE-2 as the document states. They are almost all zoned CE-1. This zone does not allow coal mining. The rezoning shall include only the areas of disturbance.

SLCH Response 3-30

Text has been revised to reflect the CE-1 zoning in the Book Cliffs area.

SLCH Comment 3-31

The school district has had a bond election passed for the construction of new schools in the amount of 13 million dollars.

SLCH Response 3-31

This information has been incorporated into the Final EIS.

SLCH Comment 3-32

Septic tanks are not the primary waste water facilities in Carbon County. A vast majority of people are on the sewer system. Price City does not maintain a treatment plant. The Price River Water Improvement District maintains the regional treatment plant which has passed its design capacities at this time.

SLCH Response 3-32

The Final EIS has been modified to reflect the conditions within the counties as stated by the commentor.

SLCH Comment 3-33

East Carbon has a state approved sanitary landfill. It does not have an open dump. In Carbon County there is no service district which maintains the landfill. The county pays for the facility out of the general fund.

SLCH Response 3-33

The Solid Waste section of the Final EIS contains the information as stated in the comment.

SLCH Comment 3-34

The new road past Coastal States Energy which connects U-96 and U-31 is not a county road, it is a continuation of U-96 and is a state owned and built road. The mines in the area will try to keep the road open during the winter.

SLCH Response 3-34

According to Ken Riddle, Transportation Planner for the Division of Transportation Planning, Utah Department of Transportation (telephone communication 7/13/83), the road improvement from U-96 at Eccles Canyon across the divide to U-31 east of Fairview was constructed from prepaid sales taxes paid by Coastal States Energy. The State of Utah provided much of the engineering. Mr. Riddle said that the road was legally a county road, in that it had not yet been accepted into the State Highway net, but that it was likely that the road would come under consideration for State Highway designation.

SLCH Comment 3-35

The DRG&W spur line into Emery County has been delayed indefinitely.

SLCH Response 3-35

See CDH Response 2-2.

SLCH Comment 3-36

The assumption of 18 people per acre is high, especially in a county setting which is where 1/2 of the total development will occur if it occurs on irrigated crop land. A better figure would be 15 people at the most per acre.

SLCH Response 3-36

The figure of 18 people per acre was developed by the USGS for the Southern and Central Utah Regional Coal EIS's (USGS 1978 and 1979). It was also utilized in the Uinta-Southwestern Utah Coal Region Round One EIS (BLM, 1981). The figure is based on average household and building lot size and includes a factor for streets, schools, and other infra-structural services. It assumes that even if placed on agricultural land, housing will be concentrated in subdivisions and will not be disbursed on acreage as is presently the case. The assumption appears to be adequate for continuity with previous coal EIS's and gives a good relative comparison of alternatives.

SLCH Comment 3-37

The Emery County Spur is a dead proposition beyond 1990.

SLCH Response 3-37

See CDH Response 2-2.

SLCH Comment 3-38

Carbon County will try to limit sediment into Scofield Reservoir because it is the number one pollutant in the reservoir. The soils are high in nutrients and Scofield is already eutrophic. Carbon County really doesn't care that there will be no "regional impact" from sediment pollution.

SLCH Response 3-38

See SLCH Response 3-6.

SLCH Comment 3-39

Sediment must be controlled. We understand that it cannot be assured, therefore we are suggesting that the tracts affecting Scofield Reservoir not be leased at this time.

SLCH Comment 3-39 (cont'd.)

The second paragraph on page 161 should be deleted. Maximum development of the central Utah tracts will definitely have an impact on surface water quality. This is especially true in the cumulative analysis of four other existing mines in addition to the new leases.

Recent, heavy, rapid snow melt has destroyed Coastal States Energy surface drainage system and slide hill revegetation attempts. The accidental sediment load from the one mine is tremendous.

The nutrient/sediment relationship cannot be downplayed by your report.

SLCH Response 3-39

The "minor impact" applies to the general area of the tracts. There could, however, be more serious local impacts. The paragraph has been revised accordingly.

SLCH Comment 3-40

There are extremely limited water development alternatives available to Carbon County at the present time. The Indian Head project is not realistic at this time. This is why we must protect the Scofield drainage now.

SLCH Response 3-40

Text has been changed to reinforce this concern by adding the sentence, "Alternative water sources are not generally available to the affected communities."

SLCH Comment 3-41

Price City will need to upgrade its culinary treatment plant within 3-5 years contrary to what your report states. Engineering analysis is underway right now.

SLCH Response 3-41

This situation was described on page 75 of the draft EIS for communities in Carbon County.

SLCH Comment 3-42

Zoning statement needs to be reversed. All tracts are in non-development zones.

SLCH Response 3-42

The text has been revised to reflect CE-1 zoning in the Book Cliffs area.

SLCH Comment 3-43

The report should tell how many new schools will be required to house the 64 new teachers. The county will replace two schools within the next two years. One is being built now.

SLCH Response 3-43

The analysis has focused on the impact in terms of numbers of students and teachers; it has not developed a full mitigation plan in terms of school facilities and their costs.

SLCH Comment 3-44

The costs for the new treatment plant are between 5 and 7 million now. Price will need to replace several miles of water line within the next 2-3 years.

SLCH Response 3-44

The text has been changed to reflect the new information provided by the commentor.

SLCH Comment 3-45

One critical problem which is a constraint to growth and a safety hazard are the many standard railroad crossings in the area. In order to allow the increase in train traffic, the crossings need to be improved. At least two the major crossings a separation of grade should be constructed. This is of "regional" consequence.

SLCH Response 3-45

Except for the railroad crossing at Price on U-10, which was taken to be a severe impact, upgrading of railroad crossings was implied in the needed upgrading of other roads. See SLCH Response 3-15.

SLCH Comment 3-46

The overload comment at the end of the transportation section is in conflict with comments made earlier in the text concerning U-10. It is at its carrying capacity now. The county is planning for a commuter alternative roadway to decrease the load on U-10. You should make the report consistent.

SLCH Response 3-46

See SLCH Response 3-15.

SLCH Comment 3-47

This section is sketchy and does not express the true problem facing Carbon County in the next few years.

SLCH Response 3-47

The EIS indicates that increased population (under all alternatives) would act to accelerate the deterioration of recreation facilities and the user dissatisfaction that is already occurring in the four county area. It is impossible within the scope of this document to quantify the impacts further. The text has been changed, however, to stress that because of the severe lack of recreational facilities in Carbon and Emery Counties and because the majority of the coal related population would live there, recreation-related impacts would be greatest in Carbon and Emery Counties.

SLCH Comment 3-48

Water use is a real restriction to growth. Scofield Reservoir is a finite resource. Agriculture will suffer more than just through conversion of land. Water withdrawal will remove more than the 1% figure in the document.

SLCH Response 3-48

The fact that agriculture will suffer more than just through conversion of land is recognized and analyzed in the EIS. The Analysis Assumption and Guideline No. 9 on page 144 of the Draft EIS states that irrigated cropland would be retired to provide community water needs, and exploration and mining water needs would also affect agricultural lands off coal tract areas.

LETTER COMMENTS AND RESPONSES

The following section presents reproductions of all letters received during the Draft EIS comment period. Letters are numbered in the order they were received. Specific comments are bracketed, with BLM responses adjacent.

Letter

1. Sierra Club
2. Town of Paonia, Colorado
3. Hanna Bristow, Paonia, Colorado
4. James Colt, Paonia, Colorado
5. Don C. Foster, Paonia, Colorado
6. Dave Bristow, Paonia, Colorado
7. A. J. Mowbray, Paonia, Colorado
8. Kate Roberts, Paonia, Colorado
9. Gordon Yarrington, Paonia, Colo.
10. Laura Yarrington, Paonia, Colo.
11. Marici Garber, Paonia, Colorado
12. Robert Soby, Paonia, Colorado
13. A. Paul Douglas, Paonia, Colo.
14. Leslie Taylor, Paonia, Colorado
15. Thomas Lawley, Paonia, Colorado
16. Yvonne Biggs, Paonia, Colorado
17. Shelley Hyde Mann, Paonia, Colo.
18. Patricia Soby, Paonia, Colorado
19. William Ray Mann, Paonia, Colo.
20. Melvin & Edith Moore, Paonia, Colorado
21. Mr. & Mrs. Clark Seabloom, Paonia, Colorado
22. W.F. & J.P. Frank, Paonia, Colo.
23. Buzz Burril, Paonia, Colorado
24. Mrs. J. Cunningham, Paonia, Colo.
25. Edward & Dorothy Plouvier, Paonia, Colorado
26. Utah Wilderness Association
27. NRDC, Inc.
28. Carbon County
29. Ed Overfield, Paonia, Colorado
30. Dan Perkins, Paonia, Colorado
31. Deanna Vaughan, Paonia, Colorado
32. Alfred F. Cunningham, Paonia, Colorado
33. Mr. & Mrs. Franklin Daley, Paonia, Colorado
34. The Humane Society of Utah
35. Getty Oil Company
36. Duncan, Allen, & Mitchell
37. Friends of the Earth
38. U.S. Forest Service
39. U.S. Fish and Wildlife Service
40. Colorado Open Space Council
41. Roberts-Stucker Ditch Assoc.
42. State of Utah
43. State of Utah, Department of Transportation
44. Southeastern Utah Association of Local Governments
45. Friends of the Earth
46. Office of Surface Mining
47. Delta County Commission
48. State of Colorado, Department of Natural Resources, Division of Mined Lands
49. State of Colorado, Division of Local Government, State Highways
50. Colorado Westmoreland, Inc.
51. National Park Service
52. Utah Coal Operators
53. Lindsey-Wolcott
54. Kaiser Steel
55. Environmental Protection Agency



ARCHES NATL. PARK by Karen Vendell

SIERRA CLUB Utah Chapter
Issues Specialist Coal Leasing
Nathaniel Goodman
6053 South 2300 East
Salt Lake, Utah 84121
(801) 277-0193

Ron Bolander
Bureau of Land Management
136 East South Temple
Salt Lake, Utah 84111

June 26, 1983

Dear Mr. Bolander

These written comments are submitted in addition to oral comments given by myself at the June 9, 1983 Coal Leasing Round II hearing in Salt Lake City.

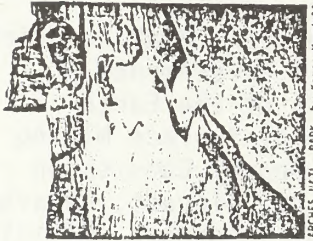
The Comments are being submitted for inclusion in the final F.I.S. Statement.

While we feel that alot of work went into the Draft E.I.S. Statement, there are some basic flaws in the study that need to be addressed.

I would question the accuracy of the figures sited in the discriptions of the individual tracts for numbers of mineable coal when in the tract ranking section of the appendix pages A-1-1 A-1-4 A-1 to A-4 show data lacking for some tracts. For example Ferron Canyon page A-2-1. Lacks information concerning coal quantity and quality. The study however, on page 402 claims that the tract contains 10 million developable tons.

The other tracts listed in the appendix are Blue Trail "Limited information available," Alton Amphitheater "More

SIERRA CLUB Utah Chapter
Coal Leasing Page 2



ARCHES NATL. PARK by Karen Vendell

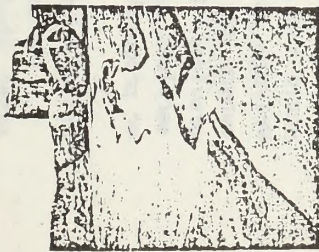
exploration needed, "Fisher Canyon" Potential exists for splitting and faulting. Inadequate data indicated need for further drilling," Ford Pasture "Further Exploration needed." Each of these tracts in the main body of the study have complete mineable tonage figures given. It makes no sense to lease tracts which have unknown data ,or conflicting data on their recoverable resources.

I would also question the way in which other criteria were arrived at. Four tracts; Blue Trail Canyon, Coal Creek, Doughout Face, and Graves Tract are listed as having unsuitability criterion 14 Migratory Birds not fully applied due to lack of data.

It is information like this missing data that should be determined through complete study of each tract before it is leased. An effect on the migratory birds that nest in these tracts caused by mining operations could be a serious threat to their existance in the region. I also have very serious concerns about polution caused by mining operations to the drainage of Scofield Reservoir and the Scofield Basin. Mining in the Mud Creek and Gooseberry tracts would not only pose a threat to the Basin water quality, but I fear there could be problems caused by possible subsidence of land due to underground mining.

SIERRA CLUB Utah Chapter

Coal Leasing Page 3



ARCHES HOTEL - PARK by Karen Vendetti

The quality of roads leading to existing mine sites is poor at best, with several hazzardous rail crossings. Further new mining roads in the Carbon County area would cost large sums of taxpayer and county money to provide safe roads to mine sites and improvements to existing roads.

The Baseline Data used to provide the tract ranking in the study is very poorly compiled and looks very incomplete. The Mitigating Measures listed in the Appendix do not seem to fully make sense and should be re-worked.

Alternative Four: No Leasing as listed on page 23 of the E.I.S. states that some tracts offered on the first round of leasing and not leased could possibly be re-leased. This action if followed would make Alternative Four a Leasing Alternative instead of a No Lease one.

These are just a few concerns which clearly in my opinion lend support to Alternative Four: No Leasing, as the only way prevent potential problems with environmental damage to the land and overcrowding of surrounding communities in the projected leasing areas.

cc: Sincerely Yours,
Nathaniel Goodman
Coal Leasing Issues Specialist
Utah Chapter Sierra Club
Alan Miller Chapter Chair Utah Chapter
Bill Curtiss, Sierra Club Legal Defense fund

1-5
1-6
1-7
1-8

Sierra Club

Letter Response 1-1

See Public Hearing SLCH Response 1-1.

Letter Response 1-2

See Public Hearing SLCH Response 1-1.

Letter Response 1-3

See Public Hearing SLCH Response 1-3.

Letter Response 1-4

The possible effects of mining the Mud Creek and Gooseberry tracts on Scofield Reservoir were adequately addressed on page 161 of the DEIS. Subsidence is a probability above any large underground mine. Therefore, the potential for subsidence and related hydrologic impacts (as addressed on page 162 of the DEIS) cannot be discounted on the tracts should they be leased and mined and would be addressed in appropriate mine plans.

Letter Response 1-5

The poor quality of existing roads to various mine sites is a fact. Several members of the public pointed out the poor access roads and railroad crossings which range from the inadequate to the hazardous (See Public Hearing SLCH Response 3-14 and 3-26)

Our rationale considered that upgrading of railroad crossings would take place concurrently with upgrading of the roads. Private access roads would be upgraded as needed by the owners of the roads or the mining companies. Utah law provides for prepayment of taxes by firms who desire services, such as road upgrading, in advance of county plans or proposals for such upgrading.

Letter Response 1-6

The baseline used in the EIS is a summary of several other studies including, Development of Coal Resources in Central Utah; Final Environmental Statement, Development of Coal Resources in Southern Utah; Final Environmental State-

ment, and Uinta-Southwestern Utah Regional Coal EIS (Round One). An additional socioeconomic study was performed by the State of Utah under contract to BLM. These studies represent our best projections of coal development and related impacts to the year 2000.

Letter Response 1-7

The site specific mitigating measures can be found in the individual tract profiles. Appendix Three of the EIS contains the standard mitigating measures, and when circumstances warrant, special measures and what the special stipulations could include. Appendix Three has been reviewed in response to other, more specific comments and minor text revisions made.

Letter Response 1-8

The first round of leasing in the region considered the impacts of leasing eleven tracts, however, four tracts remain unsold. In the current effort, Alternative Four considers no new leasing but recognizes increased production from existing holdings as well as the four unsold tracts as a part of the baseline situation.

IN THE HEART OF THE NORTH FORK VALLEY



TOWN OF PAONIA, COLORADO

226 Grand Ave. P.O. Box 460 Paonia, CO 81428

Phone (303) 527-4101

June 28, 1983

Mr. Ron Bolander
Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Re: Unita-Southwestern Utah Coal Region, Round Two, Draft Impact Statement.

Dear Mr. Bolander:

The Town of Paonia recognizes the responsibility of the federal government, through the Bureau of Land Management, to lease additional coal in west-central Colorado. We understand the efforts of the federal government in directing our country toward energy independence, so that we do not have to rely on unstable foreign governments for our energy needs. With this in mind, we would like to address the concerns raised over the Paonia "D" coal seam tract and express our support of leasing this tract to the existing operator, Colorado Westmoreland Inc. (CWI). Although we are aware that this tract is of a competitive nature, we would feel more secure in the sale of this tract to CWI, whose operation and markets are established.

Employment opportunities offered by CWI are important to this valley and to the Town of Paonia. Due to the soft coal market and resulting shut-downs of local coal mines, the citizens of Paonia have experienced the pains of unemployment and the associated problems. It is our understanding that without the Paonia "D" coal seam tract, CWI would exhaust their existing reserves, leading to an eventual shut-down of the mine. We believe that CWI has contributed much to this valley and has the kind of principles that lead to a stable coal mine, and hence a stable labor force. Because of present high unemployment it is important for CWI to be able to continue the practice of these principles as well as continue with its attitudes toward obtaining even larger future coal markets. This will surely aid in easing the unemployment pains that the citizens of the valley have suffered.

It is important that BLM consider the state of our local economy and assist CWI to continue as a strong reliable local employer and good neighbor, particularly in the areas of transportation alternatives, water supply & quality, fair market values, and related impact mitigation efforts.

We are concerned about water. Argiculture is an important industry to the North Fork Valley and the Town of Paonia. We understand that CWI has worked with local water users and has begun resolutions of potential impacts. For this effort, CWI should be commended. We feel that it is important that specific stipulation be written, so potential competitors will recognize the requirements that will be set on the Paonia "D" coal seam tract and bid accordingly. It is also important that any stipulation be specific, reasonable, and attainable. Only through the stipulation will the conflicts of land use be resolved.

Transportation is always important to governmental entities. We understand the impact of trucking on the few who live along the transportation route. We also understand the absence of CWI in the valley as a grave concern. It would effect not only the existing employees, but the people who service those employees. For that reason, we would recommend stipulation for transportation alternatives that consider economic feasibility. Without that economic feasibility CWI will become less competitive and in times of soft coal markets, could shut down, much like other mines in the valley.

In summary we would like to express our appreciation for BLM listening to our concerns and hope that they will consider our comments, as the most immediately and directly effected community impacted by your decision making process.

Respectfully submitted,

Mayor Donald Wood and the
Paonia Town Council

Town of Paonia, Colorado

Letter Response 2-1

Mitigation measures have been incorporated into Appendix 3 of the final EIS to provide guidance for the development of specific lease stipulations.

Letter Response 2-2

Comment noted. The mitigation measures on transportation have been revised. See Appendix Three.

Comments received from the following individuals from Colorado concerning water, transportation and tract boundary issues are answered collectively below.

Letter

#3	Hannah Bristow	#17	Shelly Hyde Mann
#4	James Colt	#18	Patricia Soby
#5	Don C. Foster	#19	William Ray Mann
#6	Dave Bristow	#20	Melvin & Edith Moore
#7	A.J. Mowbray	#21	Mr. & Mrs. Clark Seabloom
#8	Kate Roberts	#22	W.F. & J.P. Frank
#9	Gordon Yarrington	#23	Buzz Burrell
#10	Laura Yarrington	#24	Mrs. J. Cunningham
#11	Marci Garber	#25	Edward & Dorothy Plouvier
#12	Robert Soby	#29	Ed Overfield
#13	A. Paul Douglas	#30	Dan Perkins
#14	Leslie Taylor	#31	Deanna Vaughn
#15	Thomas Lawley	#32	Alfred F. Cunningham
#16	Yvonne Biggs	#33	Mr. & Mrs. Franklin Daley

Response 3-1

In response to comments received, the mitigation presented in the DEIS have been revised. The revisions incorporated into the Final EIS are designed to work in conjunction with existing Colorado State rules and regulations.

The mitigating measures provide for the protection of the water resources by:

1. The identification of buffer zones in areas where it has been determined that subsidence could impact the surface water resources of the area;
2. Bonding of existing cross-tract and on tract water flows;
3. Requirement of water replacement;
4. Requiring the lessee to conduct an inventory of existing water rights prior to the issuance of the mine permit.

The State of Colorado also provides for the protection of the water resources in their rules and regulations (Colorado Surface Coal Mining Reclamation Act 34-3-101 EI SEQ, C.R.S. 1973 as amended, and Regulations of the Colorado Mined Land Reclamation Board for Coal Mining) which are administered by the Colorado Mined Land Reclamation Division. The rules and regulations identified above and their enforcement have been approved by the Office of Surface Mining.

In contrast to the protection of the water resources is the administration and distribution of the water of the State of Colorado, of which the Colorado State Engineer has full responsibility as stated in § 37-92-301(1) CRS 1973.

Several comments were received requesting that the BLM require the lessee to develop an approved plan for augmentation and/or a water replacement plan prior to the issuance of the mine permit. The BLM considered requiring the lessee to develop a plan for augmentation. As stated in § 37-92-103(9) CRS 1973, a "plan for augmentation means a detailed program to increase the supply of water available for beneficial use", etc. and is only required when an adjudicated water right holder plans to divert water out of priority. The extraction of coal does not require a water right; therefore, a plan for augmentation cannot be used for this purpose.

Similarly, the BLM considered requiring the lessee to obtain replacement water rights; however, without knowing the extent of potential water right injuries, the lessee cannot be required to obtain a specific quantity of water for replacement. Requiring the lessee to secure water rights for replacement that may never be put to a beneficial use is contrary to Colorado Water Law.

The BLM is requiring that the lessee replace the water supplies of any owner of a vested water right which is injured as a result of mining activities; however, the procedures for water replacement and the determination of water loss is strictly within the jurisdiction of the State of Colorado.

Response 3-2

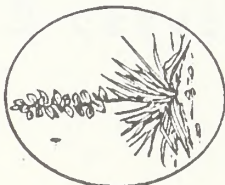
The EIS did not analyze alternative transportation systems because the lessee and possible loadout sites are not known at this time. The transportation mitigation has been revised to require an analysis at the mine plan stage of different alternatives for transporting coal to a loadout facility. The analysis will consider all resources including safety, noise and economic feasibility.

The BLM cannot stipulate the means of transportation however, we can require that an analysis be done to identify the most environmentally and economically acceptable route.

In addition, the BLM does not have research and development funds available to give to a lessee to build a transportation system. It is the responsibility of the lessee to secure funds.

Response 3-3

The boundaries of the Paonia D Seam tract are not expected to change. See Public Hearing DH Response 6-1. The existing fan noise adjacent to the Paonia D Seam tract has been added to the final EIS.



Utah Wilderness Association

325 JUDGE BUILDING - SALT LAKE CITY, UTAH 84111-1801/359-1337

June 30, 1983

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, UT 84111

Dear Mr. Bolander:

We would like to provide a brief comment on the Uinta-Southwestern Utah Coal Region, Round Two, Draft EIS.

We have analyzed the document and found a number of deficiencies. First, it is exceedingly clear that existing leases, existing coal facilities, existing approved mining plans should preclude any further leasing activity in the Central Utah coal region. This is supported in the EIS on page S-7, which reads, "Even though no new federal coal would be developed, the region would continue to be an active coal producing area and the following impacts would be expected." Obviously, there is no need for further leasing now or in the foreseeable future.

Recent developments regarding the entire federal coal leasing program need to be considered before a decision is reached on the second round of leasing. The House of Representatives has questioned the amount of coal being offered for lease and the prices received for the leases. A "go slow" approach is definitely in order. The controversy surrounding the coal leasing program would dictate selection of a no-leasing (non-action) alternative.

The recent Ninth Circuit Court decision on California v. Block, the RARE II case, raises questions concerning tracts proposed for leasing in the Manti-LaSal National Forest. How will coal leasing and the recent decision by the Forest Service to reevaluate RARE II roadless areas be coordinated? Wouldn't leasing be inconsistent with wilderness reevaluation in the forest plan? The Muddy Creek roadless area (4-423) is an example of an important non-selected RARE II unit. The Manti-

Mr. Ron Bolander
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LaSal National Forest noted in a letter to Roland Robison (January 13, 1983) that several problems exist with the Muddy Creek area. This roadless area is within the Utah Wilderness Association Forest Service wilderness proposal. Allowing leasing inside RARE II roadless areas would bias the wilderness evaluation.

Several points concerning the demand and need for coal, the ability of the local areas to handle increased coal production adequately and the availability of other resources need to be used in the decision making process. The first paragraph on page 2 of the EIS refers to these concerns. This paragraph states:

The region produces very high quality coal, but increased markets are relatively limited due to the reduced growth of local electric power generation, higher production costs resulting from underground mining, and distances to other markets. Currently, the coal demand is somewhat evenly split between use in the region and export to other states. Nevada, California, and the midwest are the primary users of exported coal. Coal use for electric power generation accounts for about 60 percent of the market. The remainder is used for general industrial use. Future market expansion is expected to be in local electric power generation with moderate growth in exports outside the region.

Again, the information seems to indicate no need for further leasing.

At present, the Manti-LaSal National Forest has about one billion tons of coal already under lease. Utah's annual coal production generally ranges from ten to twenty million tons. At present production rates, the leased coal on the Manti-LaSal National Forest alone could supply the market for fifty to one hundred years.

The array of alternatives is very disappointing. There is little difference between alternatives one, two and three in the number of tons proposed for leasing. A wider range of alternatives must be addressed.

The alternatives treat the Manti-LaSal National Forest in an inconsistent manner. The high level alternative proposes fewer tracts for lease in the Manti-LaSal National Forest than does the medium alternative. Why has the EIS proposed leasing more tracts in the Manti-LaSal National Forest under the medium leasing alternative than under the high leasing alternative?

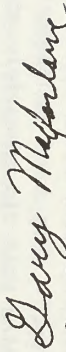
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Other sources of coal in the region could supply industry needs. What consideration has been given to evaluating the availability of other coal resources? Of particular importance are state coal leases, Indian land coal leases and private coal lands and how they contribute to the coal supply. These coal producing lands themselves could preclude the need for any new federal leases.

There is no immediate need to lease any more federal coal in the region. Utah's distance from coal markets, the lack of production and transportation facilities in the Alton area, the depressed condition of the coal industry, the low rates received for federal coal leases, energy conservation and alternative energy sources all contribute to the inevitable conclusion that no new federal coal should be leased. There is already enough coal under lease. Further leasing will only depress the market and cheat the taxpayers out of revenues they could receive under a timely leasing program.

Thanks for the opportunity to comment.

Cordially,



Gary E. Macfarlane
Staff Member

Utah Wilderness Association

Letter Response 26-1

As a result of a 1979 Ninth Circuit Court Decision (California v. Block), National Forests have been directed to reevaluate for possible wilderness designation those areas recommended for nonwilderness in the Roadless Area Review and Evaluation (RARE II). This reevaluation will be incorporated into the National Forest Land and Resources Management Plan (NFMA) currently being prepared by the Individual Forests. The Mantli-LaSal's plan and EIS is scheduled for completion in 1985.

Further direction from the Chief, Forest Service, states that the Forest Service will be responsive to BLM requests for mineral permit or lease issuance in accordance with Section 262 of the Energy Security Act of 1980, notwithstanding the current status of the Forest planning effort. This direction continues with a discussion on the status of RARE II areas and states that "an existing plan may be used as a basis for leasing provided the plan adequately addressed wilderness and leasing alternative." The Land Management Plan for the Ferron-Price Planning Unit did adequately address wilderness and leasing with recommended management permitting coal leasing. No areas were recommended for wilderness or further wilderness study (Record of Decision on EIS dated May 29, 1979). Six roadless areas discussed in the Ferron-Price Unit Plan (4-408, 4-415, 4-417, 4-423, 4-424, and 4-427) are located within one or more of the following coal lease tracts: Castle Valley Ridge, Trail Mountain, Ferron Canyon, The Pines, and Quitcupah. Offering these tracts for lease in 1984 will not exempt the roadless areas from reevaluation for wilderness in the Mantli-LaSal Forest Plan in 1985, but the status of the lease, additional data on coal values, and proposals for development will be taken into consideration when addressing the tradeoffs of a wilderness recommendation.

The FEIS has been updated to identify impacts to RARE II nonwilderness areas.

Letter Response 26-2

The Wasatch Plateau coal field the majority of which is located on the Mantli-LaSal National Forest has an estimated 700 million tons of recoverable Federal coal under lease. The majority of this coal is allocated reserve to existing operations. Some mines have existing holdings to operate for the economic life (30-40 years) of the mine while others have very limited reserves (less than five years). Virtually all of the leased coal is committed to existing operations or operations that have plans for production within the next 10 years. Some small leases that are not of sufficient size for an economic operation will have to be developed in conjunction with other properties. Analysis of the situation in the Wasatch Plateau coal field does more to indicate the need for Federal leasing than support for no leasing. The need for further leasing, however, is indicated by the current leasing level procedures and the policy of the Department of the Interior concerning making Federal lands available for leasing consideration.

Letter Response 26-3

It is agreed that the array of alternatives is grouped toward the upper end of the leasing spectrum. There are several reasons for this. First, the coal management regulations in effect at the time the alternatives were recommended by the Regional Coal Team directed that the various alternatives be "...designed to meet the leasing target." Even so, the Regional Coal Team chose to select one alternative slightly below the leasing target in addition to the no leasing alternative. Secondly, the Secretary of the Interior has the discretion to select an alternative intermediate to those analyzed in the EIS. Therefore, the Secretary may choose to offer for lease a number of tracts (and hence an amount of coal) intermediate between the medium level alternative and the no action alternative.

Lastly, while some commentors did suggest specific alternatives, a consensus for a given alternative did not surface. One suggestion was made for consideration of only maintenance type tracts. However, seven of the tracts considered in Alternative Three could either be maintenance or new operations, depending on who obtained the lease. It is our opinion that to attempt to define a maintenance alternative would prejudice the competitive nature of the coal leasing program. If an intermediate alternative were selected for analysis, determination of tracts to be included would be arbitrary. Eight of the 18 tracts still available for lease consideration in Alternative Three could only be developed in connection with adjoining holdings and could not be developed by a new operator. Four of these tracts (Wiltmore Park, Soldier Creek, Graves, Walker Flat) are adjacent to operations currently in production. The other four tracts (Dugout-Pace, Skumpah, Ivle, Acord) are adjacent to non-producing holdings. Seven tracts (Coal Creek, Alkali Creek, North Trough Springs, Castle Valley Ridge, Trail Mountain, Ferron Canyon, Paonia D Seam) could either be developed from existing holdings or as new mines depending on who obtained the lease. Three tracts (Quitcupah, The Pines, Cedaredge) would probably be new operations. If the 15 tracts as described above which could be developed in association with adjoining operations were in fact developed in such manner then the impacts would be somewhat higher but would approach the impact analysis discussed for Alternative Four, because of only limited increases in personnel, surface facility, construction, etc. However, if a number of the seven tracts that could be either new operations or a part of adjoining operations in fact become new operations, the impacts analyzed for the maintenance alternative would be understated as development of new operations is much more environmentally intensive than the underground expansion of existing operations. On the other hand, if the tracts which could possibly be new operations (10 tracts) did become new operations the resulting anticipated impacts would be somewhat less than but would approach those discussed for Alternative Three. Therefore, no significant differences in impacts would be realized which would justify creation of a new alternative.

Letter Response 26-4

The high level or preferred alternative eliminated tracts that were ranked low by the Regional Coal Team or were considered low priority (based on location, mineability, competitive interest, potential for impact on the natural environment and opinion of local government).

The medium level alternative did not consider tracts that were ranked low or any of the five southern Utah tracts in the Alton coal field. One purpose of the medium level alternative was to confine environmental impacts of coal development to central Utah. Three central Utah tracts deleted from the preferred alternative including the North Trough Springs tract on the Mantli-LaSal National Forest were placed into the medium level alternative in order to bring that alternative closer to the leasing target selected by the Secretary of the Interior.

Letter Response 26-5

See Response 26-2.

Natural Resources Defense Council, Inc.

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Public Lands Institute
1720 RACE STREET
DENVER, COLORADO 80202
303 377 9742

-2-

order to correct the pervasive deficiencies and provide a useful tool to decisionmakers and the public. Below we describe these deficiencies.

27-1

In a continuation of the Interior Department's new policy of leasing far more coal than is needed by the market, the BLM proposes to lease 1.67 billion tons of coal. Not only does the EIS fail to document the need for leasing such preposterous amounts of coal, it does not consider leasing any amount significantly different from the selected target. The EIS describes the impacts of this massive action in only the most general of terms, frequently citing lack of information as a limitation on the ability to specify impacts. As a result of these and other inadequacies, the BLM has failed to meet its fundamental obligations under the National Environmental Protection Act (NEPA), and the EIS must be substantially supplemented before the BLM may proceed with its proposed action.

27-2

It is clear from the description of "need" for the proposed action that the leasing target has no relationship to the region's actual demand for coal production, but rather relates to industry's demand for coal reserves. This policy represents, of course, the modus vivendi of the Department's new coal leasing program established by regulations issued in July 1982. It is interesting to note that the actual planning for aid adoption of the preferred target occurred well before the adoption of those new regulations. Further, the lack of need for large-scale coal leasing in the region is amply demonstrated by the failure to lease four out of the eleven tracts offered in Round 1 and the extremely depressed coal market in the region. Thus, the integrity, if not legality, of the decisionmaking process leading up to the proposed action is questionable at best.

27-5

The EIS amply demonstrates that the BLM has not considered a fair range of alternatives before deciding on the preferred action. The EIS does analyze

June 30, 1983

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

RE: Comments on the Unita-Southwestern Utah Coal Region, Round Two, Draft Environmental Impact Statement

Dear Mr. Bolander:

The following comments on the Draft Environmental Impact Statement for the Unita-Southwestern Utah Coal Region are submitted on behalf of the Natural Resources Defense Council, Inc., and its Public Lands Institute. NRDC is a national environmental law and policy organization with a long-standing interest in public land management and coal leasing issues.

Based on our analysis of the draft, we have found that the document has little to recommend it as a serious attempt to identify and evaluate the impacts or to comply with NEPA. Clearly it was written in haste to conform to an unreasonable and impractical schedule that ignored the needs of BLM.

Of particular concern to us is the rejection of the Manti-La Sal National Forest's position that this EIS should await their comprehensive land use plan so that meaningful evaluation and mitigation measures could be designed.

As the surface managing agency for a large portion of the region which will be overwhelmed by the proposed additional leases, the Forest's position should have been heeded. We believe a supplement to the draft must be prepared in

27-1

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the impacts of the required "No Action" alternative, but otherwise looks only at the impacts of two other alternatives very close in size to the preferred alternative -- a "maximum" level of 1.907 billion tons and a "medium" level of 1.316 billion tons. The EIS's failure to consider the impacts of one or more alternative leasing levels substantially less than the preferred level represents a serious violation of NEPA and the Council on Environmental Quality's (CEQ) implementing regulations. As the CEQ regulations state,

27-5

"[The alternatives] section is the heart of the environmental impact statement... [I]t should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14

That an agency is required to consider a meaningful range of alternatives has been explicitly addressed in a recent opinion of the U.S. Court of Appeals for the Ninth Circuit. See *California v. Bergland*, 483 F. Supp. 465 (E.D. Cal. 1980), aff'd sub nom. California v. Block, ___ F.2d ___ (9th Cir. 1982). The alternatives section of the Unita EIS fails to meet this fundamental requirement.

In part, perhaps, because the BLM has determined to lease such an excessive amount of coal, it is clear from the EIS that the BLM does not have sufficient information on the proposed action. As a result, the descriptions of impacts on many of the resource types are vague and meaningless. See, for example, the discussion of subsidence at pp. 209-210. Despite the lack of data, the EIS frequently makes optimistic assertions that impacts will be minimal. For example, the EIS states that "there appear to be no important aquifers on that part of the tract most likely to be affected by surface mining." See p. 212. Coal mining has the potential to severely impact local water resources and users, but the EIS fails to include information critical to a meaningful analysis. Instead of analysis of specific anticipated impacts, the sections which are supposed to be analytical largely describe general processes in a

27-6

science textbook fashion. Hydrologic information which must be presented includes groundwater recharge areas; nature and sources of the groundwater systems; aquifer flow characteristics; location of possible alluvial valley floors; identified perennial, ephemeral, and intermittent streams and their flow characteristics over time; and the amount and types of overburden.

27-6

Much of this information is available from existing mine permits and pending applications so that it could be used to correctly assess the baseline conditions. Additionally, information on current problems must be used. For example, E. S. Crawford has submitted detailed information to the House Interior and Insular Affairs Committee on the damage caused by underground mining to springs hundreds of feet above in an area of perched aquifers.*

27-7

The tract profiles give no specific information on soils, type and chemistry, vegetation types and cover percentages, water quantity and quality, and slope. Reclamation of mine sites is given short shrift in the EIS and the discussion lacks tract-specific information on present conditions and analysis of reclamation prospects such that the reader can reach an independent conclu-

27-8

sion. For example, only generalized "blob" maps on vegetation types in Utah are included that do not even show the tracts (pp. 57 and 106). No maps are shown of Colorado. Conclusions on reclamation success are not supported or explained.

27-9

For example, page 166 states that reclamation attempts on the Book Cliffs and Wasatch Plateau tracts are expected to be "50 to 80 percent successful (Magihara, et. al, 1972)". However, the reference cited addresses rangeland seeding in Nevada, not mined land revegetation in Utah to meet the standards set by the federal Surface Mining, Control and Reclamation Act.

*The information can be obtained from us or Mr. Crawford at 1809 Yalecrest Avenue, Salt Lake City, Utah, 84108.

These data lacks and the resulting inability to assess impacts of the proposed action are pervasive throughout the EIS and make it useless for the statutory purpose for which it is ostensibly intended. The EIS must be supplemented with the missing data. See, 40 C.F.R. § 15022.22(a).

The failure of the EIS to identify the true impacts of the preferred alternative is also reflected in the so-called mitigation measures, which in reality would provide little if any actual mitigation of the environmental devastation that will result from the proposed action. The failure of the EIS to describe tract-specific mitigation measures is, of course, a glaring deficiency. In fact, the mitigating measures consist of little more than standard lease stipulations which warn the lessee that he might be required to protect the environment at some point in the future. Indeed, many of the "mitigation" measures underscore the data inadequacies of the EIS by requiring the lessee to collect -- after the lease has been issued -- the data needed to determine whether a specific tract should actually be leased. For example:

"The lessee shall establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology, and vegetation." EIS at A3-6.

Clearly, ex post facto data gathering is not mitigation.

Stipulations for the Colorado tracts, though impotent, at least were attempted, but those for the Utah tracts do not appear. For example, eight Wasatch Plateau tracts lie within municipal watersheds (Table 3-9), yet no stipulations are proposed that address this tract-specific issue. The EIS states that existing Forest Service and BLM land use plans identified constraints and mitigation measures. What are they?

One of the most glaring defects is the failure to conform to county and BLM land use plans. For example, portions of three Wasatch Plateau tracts located in Carbon County are in areas where mine developments are not permitted (p. 71). Activity planning and development of stipulations for any tracts in the North Fork area are required to conform with the BLM's December 30, 1981 Protest Decision on the North Fork Coal Leasing Amendment, which was incorporated in the land use plan. That decision required BLM to protect water resources that may be affected by subsidence and related mine activities through an effective combination of analysis of the pre-mining hydrologic conditions and lease stipulations. Although BLM has proposed stipulations on the Colorado tracts (p. A3-9 - 14), these stipulations have loopholes and lack specifics that make them ineffective to achieve the protection necessary to conform with the Protest Decision. For example, the second stipulation requires prevention of "changes in natural streamflow velocities" but then allows changes if they "cannot be avoided" and BLM approval is obtained (p. A3-10). The fifth stipulation prohibits subsidence where it would disrupt water rights that supply alluvial valley floors and prime/unique farmland but fails totally to protect the vast majority of agricultural lands which do not fall into those two categories and which were clearly the principal concerns of those filing the protest.*

Throughout the EIS analysis of environmental impacts and presentation of detailed mitigation measures are deferred to the mine plan stage. See pp. S-9, 23, 162 for example. This contradicts the CEQ requirements that an EIS contain detailed analysis and mitigation measures so that the environmental impacts of

*The protestors were the Terror Creek Ditch and Reservoir Company, the Western Slope Energy Research Center and individual water users.

a government action will be minimized. The Courts have consistently found coal leasing to be a major federal action significantly affecting the environment and, thus, the CEQ requirements must be met. Kleppe v. Sierra Club, 427 U.S. 390, 399-400 (1976); Davis v. Morton, 469 F.2d 593, 596 (10th Cir. 1972); Cady v. Morton, 527 F.2d 786, 793 (9th Cir. 1975); NRDC v. Hughes, 437 F. Supp. 981 (D.D.C. 1977), as modified 454 F. Supp. 149 (D.D.C. 1978); and see National Indian Youth Council v. Watt, 664 F.2d 220, 223 (10th Cir. 1981) (two EISs for one coal lease).

Moreover, the Department has consistently taken the position both in the courts and in its public documents that impact analyses and site-specific lease terms cannot be totally deferred to the mine plan stage:

"The setting of lease terms is an essential administrative action prior to the issuance of a lease. . . . An EIS which discusses those lease terms is therefore required." NRDC v. Berklund, 609 F.2d 553 (D.C. Cir. 1980); accord, 609 F.2d, Brief for the Federal Appellees at 32-33.

Further, the Department recognized that leasing coal tracts without performing essential environmental analyses and drawing up specific lease stipulations would run a high risk of leasing deficient tracts. To prevent that, the Department's policy requires it to:

"Develop sufficient information prior to leasing to answer basic environmental and economic questions (i.e., reasonable certainty that tract will meet SMCPRA standards) but may proceed with less information than needed for mining plan. Stipulations are to be detailed, must require compliance with SMCPRA, and be subject to change in response to new information from mining plan." (Final Environmental Statement, Federal Coal Management Program, 1979, at 3-21.)

In conclusion, we have a number of concerns with the lack of quality and the conditions under which this EIS was prepared. In order to rectify them we believe a supplement must be prepared which properly identifies and

27-16

27-17

analyzes impacts for an appropriate range of alternatives. We appreciate the opportunity to comment.

Very truly yours,

Carolyn K. Johnson
Carolyn K. Johnson

Laura B. King
Laura B. King

:km

27-17

Natural Resources Defense Council

Letter Response 27-1

As clearly stated in the Draft EIS, the Price-Ferron Land Management Plan and EIS, which covers all of the tracts on the Mantli-LaSal National Forest, was completed in May, 1979. Unsuitability criteria were applied during plan preparation. We recognize that both the Fishlake and Mantli-LaSal National Forests are in the process of preparing Land and Resource Management Plans. However, after examining the Price-Ferron Land Management Plan and holding discussions with Forest Service personnel, it has been determined that the current Price-Ferron Management Plan is an adequate land use plan as defined in 43 CFR 3420.1-4 for this second round of leasing. The first round of leasing was also based on this plan. The Forest Service will be given an opportunity to give recommendations regarding leasing on National Forest Service System lands. Before any tracts on National Forest Service lands can be leased, consent must be obtained from the Secretary of Agriculture.

Letter Response 27-2

See Response 26-2 regarding the need for leasing. The Regional Coal Team identified one alternative which is below the target range. Also see response 26-3.

Letter Response 27-3

The EIS is necessarily regional in nature and as such analysis of impacts focused on regional concerns per 40 CFR 1502.4. Cumulative regional impacts were identified and analyzed. As an extra effort, we divided the region into three logical subparts, west central Colorado, central Utah, and southern Utah to better focus on potentially affected areas. Anticipated impacts to each of these areas were identified and analyzed. No overlapping of impacts between the three areas would occur. Specific areas where significant impacts were expected to occur were also identified in the EIS. The site specific impacts resulting from individual tract developments are analyzed in the tract profiles and summarized in Chapter 6 of the EIS. In each of the cases referred to above, the anticipated impacts were identified,

quantified, and analyzed, therefore we believe the fundamental requirements of NEPA have been complied with.

Letter Response 27-4

The EIS explains in a general way the Department's coal leasing program. Leasing reserves involves making Federal lands, which dominate ownership in the western coal, available for the industry to lease at no less than fair market value when the market is ready for allocation of the additional reserve.

The fact that four of the leases or tracts offered in the first round of leasing did not sell is not necessarily a reflection on the integrity of the coal leasing program and is certainly not a reflection on its legality. If the conditions are right industry will take the offered tracts into their operations at the fair market value or more. If conditions are not right on a specific tract it either will not be bid upon or will not receive adequate bids and consequently will not be leased. The program is to make the Federal coal lands available for leasing in an environmentally sound manner.

Letter Response 27-5

See Response 26-3.

Letter Response 27-6

We have attempted to provide a regional description of the surface and groundwater resources of the area, and to identify the local and regional hydrologic impacts that could result from leasing and development of the tracts under various development options. As indicated on page 162, third paragraph, more information about development (such as mining and reclamation plans) would be needed to better identify and quantify hydrologic impacts, including those caused by subsidence. Impacts relating to specific tracts are contained in the individual tract profiles. We focused on those resources expected to be significantly impacted and believe the information and analysis is adequate for the purposes of the EIS. It is recognized that additional information and review will be required later on in the leasing process.

Letter Response 27-7

Tract profiles were prepared for all tracts addressed in the EIS as per 43 CFR 3420.3-3. Specific information on soils, vegetation, water and topography was included in these analyses. The analyses served as the basis for preparation of the EIS. The resource information included in the individual tract assessment was comprehensive.

Following Council on Environmental Quality Regulations for implementing the provisions of the National Environmental Policy Act (43 CFR 1502.2), resource discussions in the EIS were analytic rather than encyclopedic and impacts were discussed in proportion to their significance; therefore site specific information included in the tract profiles is also included in the EIS. If the analyses determined that significant impacts could or would result from coal lease developments.

Letter Response 27-8

It is difficult to identify specifically where reclamation would be required because detailed mine plans are not available for the proposed tracts. However, general assumptions as to where development would most logically occur were made. Based on this information, the general reclamation potential of the individual coal fields was discussed and specific problem areas identified (e.g., slide canyons, rocky inclusions including a basalt flow). Areas where reclamation would be difficult were identified and suggestions for reclamation made. A detailed reclamation plan is presented in the mine plans developed after the tracts have been leased. These plans are reviewed and approved by State and Federal agencies.

Letter Response 27-9

In an attempt to limit the length of the document and per 40 CFR 1500.4 detailed discussions of impacts and affected environment was limited to those resources expected to be significantly affected. It was judged that on a nationwide basis vegetation types would not be significantly affected. The type of vegetation map used in the EIS is a standard type map used in most regional EIS's and has been

judged to be sufficient. The vegetation information is adequate for the analysis needs in the EIS. A detailed discussion of vegetation on the individual tracts is available in the tract profiles. See Response 27-8 regarding reclamation. The Hagihara, et. al, 1972 reference was used because the pinyon-juniper woodland area discussed in Nevada is similar to those pinyon-juniper areas discussed in Utah.

Letter Response 27-10

The information in this EIS represents what is currently available concerning leasing issue areas and worst-case analysis is done where data are lacking. Section 1502.22 of 40 CFR provides for utilization of a worst-case analysis approach where data retrieval costs are exorbitant or the means of obtaining data are not known.

Letter Response 27-11

The mitigating measures described in the EIS are those from which stipulations would be developed as a part of any lease issuance. Specific measures are identified in the individual tract profiles. Analysis in the EIS is based on adherence to stipulations and appropriate laws.

Letter Response 27-12

The mitigating measures consist of the standard lease stipulations plus those site specific requirements that are identified in the site specific analysis developed for each tract. The site specific requirements apply only to conditions encountered on the specific tract being analyzed.

The requirement that the lessee collect data after the lease has been issued does not necessarily "underscore" data inadequacies. It is required because the actual mine plan design and location of mine facilities are unknown until a mine plan is received. The stipulations are designed to provide for site specific mitigation for impacts identified at the mine plan approval stage.

In regards to monitoring the effect of underground mining, the effects of subsidence are impossible to predict until actual mining occurs. This monitoring requirement is also

similar to the requirements imposed in the regulations promulgated under SMCRA.

Letter Response 27-13

The Forest Service Ferron-Price Land Management Plan identifies the municipal watersheds listed in Table 3-9 of the DEIS. The plan describes the unsuitability criteria for municipal watersheds and its application affecting lands in the Ferron-Price Planning Unit. The possibility exists that roads, portals, and other coal lease surface developments would be constructed within these watersheds. The unsuitability criteria for municipal watersheds states that Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable, unless conditions exist to permit an exception. The exceptions state a lease may be issued where: the surface management agency determines, as a result of studies that all or certain stipulated methods of coal mining will not adversely affect the watershed any significant degree; and the municipality (incorporated entity) or the responsible governmental unit concurs in writing in the issuance of the lease. If best management practices for water pollution control are imposed on mining operations, then the municipal watershed should not be adversely affected to any significant degree. State of Utah water quality standards would be used to quantify what is implied by "significant degree." Adherence to Environmental Protection Agency and State water discharge criteria and standards would protect the established beneficial uses of the streams classified as sources for domestic water systems.

Letter Response 27-14

The Carbon County Land Use Plan and Zoning Ordinances are written to recognize and plan for probable and proposed land use activities. The county wants to plan for, and direct use activities in a manner that will protect sensitive resources. Knowing the restrictions of their Critical Environmental 1 Zones, Carbon County elected to zone most coal lands as the CE-1 Zone. Several existing coal lease operations and all or portions of future lease operations on

both private and federal surface are located within this critical zone.

By way of written correspondence, Carbon County has informed the BLM that the CE-1 zoning could be rezoned to permit existing and new coal lease operations (Carbon County, 1982). This would be done upon lease adherence to land use plan mitigating measures and zoning regulations. Consideration to rezoning would be given only to disturbed sites within the lease areas.

In the case of existing coal leases and operations within the CE-1 zones, the county is working with operators, securing adherence to mitigating measures and regulations, with the objective of rezoning the disturbed areas to the CE-2 zone. (Coal mining developments are classified as "permitted conditional uses" in the CE-2 zone.)

Letter Response 27-15

The proposed lease stipulations have been revised. See Response 3-1.

Letter Response 27-16

The question as to what is sufficient information in order to lease a coal tract is judgemental since almost any level of information presented could be perceived as insufficient. The Regional Coal Team is responsible for the determination as to information sufficiency in their rating, ranking and recommendations to the Secretary as to which tracts should be leased. In addition, sufficient safeguards are presented in standard stipulation no. 2 (page A3-1) to assure that coal will not be mined that is unsuitable.

Site specific lease terms are contained in the individual site specific tract profiles. It must also be pointed out that SMACRA and attendant regulations also contain numerous post-lease requirements that would be required in addition to the site specific stipulations.

Letter Response 27-17

See Response 26-3.



CARBON COUNTY

PRICE, UTAH 34501

June 29, 1983

Ron Rolander
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Rolander,

In the Uinta Southwestern Coal Round II EIS, on page 31 in the comparative analysis matrix it states that development of the Castle Valley Ridge Tract conflicts with the Carbon County Zoning ordinance. While this is currently the case with at least part of the lease Carbon County does not view this as a constraint to leasing the tract. This particular tract could be accessed through existing portals although even if a new portal were required Carbon County does not feel there would be insurmountable problems with the proposal.

The report states on page 396 that the Castle Valley Ridge Tract might, in combination with other Scofield area tracts, have significant impacts. This tract is located outside of the Scofield drainage and there would be no impact from the Castle Valley Ridge Tract on the Scofield area. Plateau Mining Company will be responsible to address the socio-economic implications of their 289 employees in association with in place county and state as well as O.S. M. regulations. They will have to address water quality and subsidence problems in the Huntington Drainage with Emery County as well.

Unlike some of the other tracts Plateau needs this coal to meet future known coal markets. Therefore at least with this tract we feel very comfortable with it being leased. The zoning ordinance will help guide the related development and should not be considered a constraint to its being leased originally.

If you have any questions on this information or if you would like to review the socio-economic data in the report please let me know.

Sincerely,

Richard E. Walker
Richard E. Walker
County Planner

ER/ml

Carbon County

Letter Response 28-1

See Response 27-4.

Letter Response 28-2

The text on page 397 has been changed. The reference to the Scofield area has been deleted and replaced with a reference to the central Utah - Wasatch Plateau and Book Cliffs areas. Although the social and economic impacts resulting from leasing and development on the Castle Valley Ridge tract are not in themselves significant, the cumulative impacts in conjunction with other proposed tracts in central Utah - Wasatch Plateau and Book Cliffs areas could become significant.

Letter Response 28-3

See Response 27-4.

28-1

28-2

28-3



4613 South 4000 West
P.O. Box 20222
Salt Lake City, Utah 84120
Phone 968.3548

July 4, 1983

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander,

The Humane Society of Utah appreciates the opportunity to comment on the Uinta-Southwestern Utah Coal Region Draft E.I.S.

The potential for massive losses of wildlife numbers seems evident with all four alternatives. An important need of this E.I.S. is an inventory of animal species for the Southern Utah area tracts. Without such an inventory, no accurate impacts can be assessed. Unsuitability Criteria 14 can not be met or considered without knowledge of migratory birds in the southern area tracts. Information is needed on species of wildlife in this area to meet Unsuitability Criteria 13 and 15.

The loss, or potential loss, of surface water in all four alternatives would be a determining factor in the loss or displacement of wildlife.

The increase in human population shown in the first three alternatives will cause a loss and/or displacement of area wildlife. There is a large potential for loss of wildlife due to domestic pets brought into the area by the human population.

There is a projected loss of cock pheasants in alternative 1 and 2 of 13% and 12%, respectively. This projected high percentage would be unacceptable. In alternative 3, this loss is shown as 4.5%.

The Humane Society of Utah favors incorporation of suggestions 2 and 3 (page 361) for alternatives, and expanding the issues considered (page 381-384) #1,2,6 and 7. We would support

DEDICATED TO THE ELIMINATION OF FEAR, PAIN AND SUFFERING OF ALL ANIMALS
Gifts and Requests to the Society are deductible for income and estate tax purposes.

34

Mr. Ron Bolander, Team Leader
July 4, 1983
page 2

the use of Alternative 3. In this alternative there seems to be the least amount of impact to wildlife and wildlife habitat.

Thank you for this opportunity to comment on the draft U-SW. U.C.R. - E.I.S.

Sincerely,
Helen D. Robison

Helen D. Robison
Senior Investigator

34-1
34-2
34-3
34-4
34-5

34-5

Humane Society of Utah

Letter Response 34-1

Standard mitigating measure 5 in Appendix Three requires that site specific detailed inventories of disturbed areas be completed as part of the mine plan approval process. They cannot be done at this time because leases have not been issued and actual locations of mining facilities have not been identified. The information presented in the EIS is the best available at this time and represents on-site tract conditions as much as possible.

See Public Hearing SLCH Response 1-3 regarding application of the coal unsuitability criteria.

Letter Response 34-2

The potential for this impact is discussed in paragraph 6 on page 167 of the Draft EIS.

Letter Response 34-3

These potential impacts are discussed in paragraph 7 on page 169 of the Draft EIS.

Letter Response 34-4

The losses in Carbon County are estimated as 5.7 percent for Alternative One, 5.7 percent for Alternative Two, and 4.5 percent for Alternative Three (pages 167, 272 and 317 of the DEIS respectively). The estimated cumulative losses are 13 percent for Alternative One, 13 percent for Alternative Two, and 12 percent for Alternative Three (pages 256, 304, and 348 of the DEIS respectively). The 12 and 13 percent loss estimates are high and are reported as a significant impact.

Letter Response 34-5

As directed by the coal regulations in place when this effort began, the alternatives considered are alternative levels of leasing. However, these alternatives referred to in the comment may also be considered by the Secretary of the Interior as the lease schedule is developed. Issues 1, 2, 6, and 7 were analyzed in the EIS under the appropriate and corresponding headings.



Getty Oil Company | P O Box 7900 Salt Lake City Utah 84107 • Telephone (801) 263-3850

J.D. Spaulding, Chief Manager, Minerals Division

July 5, 1983

Mr. Ron Bolander
Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander:

The Getty Mining Company (Getty) appreciates the opportunity to provide the comments on the Uinta-Southwestern Utah Coal Region, Round Two, Draft Environmental Impact Statement.

Getty would like to go on record as supporting Alternative Two (the Preferred Alternative) which provides for the offering of twenty-two (22) tracts containing an estimated total in-place coal resource of 1,667.5 million tons.

Getty is interested in several of the proposed least tracts and especially interested in one particular proposed lease tract - Castle Valley Ridge. The Castle Valley Ridge Tract is located adjacent to Getty's Plateau Mining Company operation.

Several statements in the Draft EIS are of particular concern to Getty. At least two (2) references (page 31, Table 2-8, "Comparative Summary of Major Impacts", and page 71, "County Plans" paragraph 5) cite conflicts between the Castle Valley Ridge Tract (and others) a Carbon County zoning ordinance. The EIS staff and the Regional Coal Team should not view this "conflict" as prohibiting leasing. Through verbal communication with Richard Walker (Carbon County Planner), Getty is informed that Carbon County will transmit a letter to the BLM rescinding any objection(s) the county (Carbon) may have had to the leasing of the Castle Valley Ridge Tract.

35-1



Mr. Ron Bolander
July 5, 1983
Page Two

Based upon the above, Getty urges your support for a Round II lease-offering of the Castle Valley Ridge Tract.

Very truly yours,

J.D. SPAULDING

JDS:mkt

Getty Oil Company

Letter Response 35-1

By way of written correspondence, Carbon County has informed the BLM that the Critical Environmental Zone 1 (CE-1) could be rezoned to permit existing and proposed lease operations (Carbon County, 1983). This would be done upon lease adherence to land use plan mitigating measures and zoning regulations. Consideration to rezoning would be given only to disturbed sites within the lease areas.

In rezoning considerations for new leases, long-term effects of mine interception of water, subsidence, erosion, and sediment, and enforcement of regulations would be carefully analyzed by the County.

Duncan, Allen and Mitchell
Counselors at Law

36

- 2 -

July 5, 1983

C. FARMER BINGHAM, D
DONALD B. ALLEN
PATRICK B. MITCHELL
E. T. BENT TALMAAGE, III
MYRON B. NORDBLUIT
CLINTON A. VINCE
JAMES S. FRIEDLANDER
KENNETH E. NATALE
DAVID P. TATPE
ALAN I. ROBBINS
SALIN DRANJIC
GREGORY D. STUBBS
GREGORY D. STUBBS
GEORGE E. BUSHNELL, III
MARE BOBSON
MARGARET V. M. HASL
PAUL F. HENDERSON
JAMES W. HENRY
NICHOLAS V. CHEN*

*NOT ADMITTED TO D. C. BAR

VIA FEDERAL EXPRESS

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Re:

Utah Municipal Power Agency
Comments On Uinta-Southwestern
Utah Coal Region, Round Two,
Draft Environmental Impact
Statement

Dear Mr. Bolander:

On behalf of the Utah Municipal Power Agency, I submit herewith the following comments in connection with the above-noted Draft Environmental Impact Statement.

The Utah Municipal Power Agency ("UMPA") is a governmental entity formed by its members under the Utah Interlocal Co-operation Act. Its members formed UMPA for the purpose of developing a reliable, economical power supply. A Fact Sheet describing UMPA is attached to this letter.

On several occasions UMPA has expressed its interest to the Regional Coal Team in the development of a tract located in Central Utah called "The Pines." UMPA

36-1

1375 Eye Street, National Washington, D. C. 20005
TEL (202) 590-6400 TELE (301) 450-0600 DANCI
917 15th Street, N.W., Republic of Panama
TEL 3000 TELE 2740 DANTR
11111 13th Street, Panama City, Panama
TEL 26 01 00 TELE 2630 DANCI
P.O. Box 16107, Kansas, City, Mo.
TEL 800-777-7777 TELE 8706 DANEE

July 5, 1983

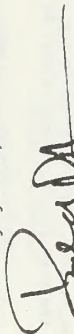
notes that development of this tract is recommended under development alternatives 1, 2 and 3. UMPA strongly supports the concept of proceeding as soon as possible with the development of coal resources in The Pines tract under either development alternative 1, 2 or 3.

UMPA has also expressed its interest in establishing a "public set aside" for The Pines tract. UMPA reiterates this recommendation and also its interest in participating in the development of The Pines tract.

UMPA opposes Alternative 4 which would provide for no development of these important coal resources.

Please contact me if you have further questions regarding these comments.

Sincerely yours,


Donald R. Allen

Attachment

cc: Mr. Clark Bigler
Mr. Bud Bonnett

Duncan, Allen and Mitchell, Counselors at Law

Letter Response 36-1

Your comment is noted and will be considered.

Letter Response 36-2

The Pines tract has been identified by the Regional Coal Team as a potential public body setaside tract. The Regional Coal Team will make a final recommendation on the public body setaside issue at their October meeting concerned with the final recommendations on coal leasing. The Secretary of the Interior will make a final decision on all aspects of leasing including the public body setaside issue.

Letter Response 36-3

Your comment is noted and will be considered.

FRIENDS OF THE EARTH

530 7TH STREET S.E., WASHINGTON, D.C. 20003
(202) 543-1312

July 5, 1983
Moab, Utah

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, UT 84111

Dear Mr. Bolander:

Friends of the Earth, a national conservation organization dedicated to the preservation, restoration, and rational use of the earth, respectfully submits the following comments on the Uinta-Southwestern Utah Coal Region Round Two Draft Environmental Impact Statement prepared by the Bureau of Land Management.

I. INTRODUCTION

Our analysis of this document has found it to be extremely deficient and of little or no use in natural resources decision-making except to justify a politically motivated energy program designed to turn over huge amounts of federal coal reserves to private coal mining interests. Our conclusion in this regard is further supported by two studies undertaken by the GAO and House Appropriations Committee and released this spring which noted that the massive coal leasing sales proposed for the Powder River Basin region were offered at "fire sale" prices. These studies also noted numerous other problems inherent in this aspect of the federal give-away program of public lands now being undertaken by the Reagan Administration.

Friends of the Earth supports the conclusions expressed in these reports and recommends that no additional coal leasing on federal lands be allowed until a blue-ribbon commission is formed and allowed to study the entire Reagan Administration coal leasing program. The recommendations of such a commission should then form the basis of a rational federal coal leasing policy. This document also cannot be expected to serve a decision-maker in reaching a logical decision regarding leasing federal coal reserves since it does not consider in any degree (except to dutifully repeat the Administration's public lands give-away rhetoric) the question of a legitimate need for any additional federal coal leasing.

Considering that the huge tracts of coal-bearing federal lands already under lease contain enough recoverable coal to serve this nation's need for domestic as well as for export steam and metallurgical coal for at least the next five decades, in this or any EIS now available for public review, of the real need for such additional coal leasing invalidates the legitimacy of this EIS and of the entire program.

*Committed to the preservation, restoration, and rational use of the ecosystem
100% recycled paper*

Mr. Ron Bolander
Bureau of Land Management
July 5, 1983
Page Two

We would recommend, therefore, that a blue-ribbon commission also review the question of the legitimate need for any additional leasing of federal coal reserves as recommended by the Reagan Administration.

II. SPECIFIC EIS COMMENTS

This document, in our view, does not meet the NEPA or CEO requirements for an EIS because of its numerous deficiencies, the most blatant of which include:

1. A general lack of any substantive quantitative information regarding the lease sales offered. 37-4
2. An absence of a quantitative analysis of the anticipated environmental impacts from the development of the tracts to be offered for leasing. 37-5
3. An absence of any viable alternatives, except the Alternative #4--No Action. The two accelerated levels of present leasing listed in the EIS cannot be considered legitimate alternatives to the Administration's preferred alternative. 37-6
4. An alternative, by definition, represents something other than an increased level of development. 37-6
5. An absence of any analysis of the legitimate need for additional coal leasing, as previously noted. 37-6

A number of specific deficiencies, errors, and/or omissions are also present in the document. Again, only the most glaring examples will be reviewed:

1. The proposed coal leasing program allegedly considers "only those lands for which land use planning has been completed..." (p.4). Yet, on page five, the document concedes that both the Manti-La Sal and Fishlake National Forests "are presently in the process of developing Land and Resource Management Plans..." 37-7
- It would seem, then, that the BLM is prejudging the final contents of these USFS Land Management Plans by proposing new leasing in these areas. Such an approach constitutes a violation of the directives of the Federal Land Policy and Management Act of 1976 (FLPMA).

2. No specific mitigating measures are outlined regarding the expected environmental impacts resulting from the proposed coal leasing.
3. The discussions of environmental impacts to water resources are either particularly deficient or lacking entirely although such impacts could affect several municipal watersheds as well as the Colorado River system.
4. The documents reflects a pro-development bias instead of a more rational, balanced attitude towards the management of the public's resources. Two examples should suffice to illustrate this attitude:

(a) On pages 121 and 145, in the section "Analysis Assumptions and Guidelines," points #12 and #17 assumed two proposed coal-related developments will be built. Such an assumption ignores, in the case of #17, the level of controversy and uncertainty involved in any future decision to export the ground water from Kane County, Utah to be utilized in a coal slurry from the Alton Coal Field. This proposal is now contingent upon the approval of the Allen-Warner Valley Energy System at a level of coal development which could support such a slurry operation as well as a resolution of pending judicial action (of which Friends of the Earth is a plaintiff) regarding the availability of such ground water for use in any such slurry pipeline proposal. Until and unless such pending proposals and continuing judicial reviews are resolved in favor of Utah International's proposal to develop a slurry operation, the assumption made in the document that the slurry line would be in place should be changed to reflect the situation as it exists rather than as the development-biased attitude expressed here would prefer.

(b) On page 200, the air quality impacts to Bryce Canyon National Park from proposed nearby coal strip mining are minimized, although the data presented indicate a Class I violation for twenty-four hour TSP. This section would likely read quite differently were it written by an NPS, rather than a BLM, official.

III. CONCLUSION

Friends of the Earth recognizes the need for the judicious use of domestic coal resources in building an energy bridge to a sustainable future based on renewable energy resources. However, an accelerated coal leasing give-away program, as proposed in this document, represents an energy policy which will be ultimately dictated by multi-national corporations and driven solely by incentives for their financial gain.

We believe that citizens deserve a better choice in natural resources management decisions and urge the Bureau of Land Management to adopt the No-Action, no new coal leasing alternative.

Sincerely yours,

Gordon Anderson
GORDON ANDERSON
Colorado Plateau Representative
Friends of the Earth
170 South, 300 East #5
Moab, Utah 84532
(801) 259-8493

Friends of the Earth

Letter Response 37-1

Refer to the discussion on target calculations in Public Hearing CDH Response 1-1 and Responses 26-2 and 27-4.

Letter Response 37-2

See Responses 26-2 and 27-4

Letter Response 37-3

This question is concerned with the overall policy on the Federal coal leasing program beyond the scope of the EIS.

Letter Response 37-4

See Responses 27-3, 27-7 and 27-10.

Letter Response 37-5

See Response 26-3.

Letter Response 37-6

The question of the need for coal leasing is explored on previous comments. Refer to Responses 26-2 and 27-4.

Letter Response 37-7

See Response 27-1.

Letter Response 37-8

See Responses 27-11, 27-12, and 27-16.

Letter Response 37-9

The potential hydrologic impacts were discussed consistent with available hydrologic data and assumed mining and reclamation practices. More detailed site specific analyses will be made when mining and reclamation plans are filed for the leased tracts.

Letter Response 37-10

It was determined that the only ways coal could be removed from the Alton coal field was by either the slurry pipeline or railroad (ERT, 1980b). To make a railroad a viable consideration, a larger amount of coal would need to

be transported than is currently under analysis, therefore the Allen-Warner Valley slurry pipeline is believed the most viable transportation method in southern Utah.

Construction of the Castle Valley Railroad has been delayed because of a lack of sufficient coal development in Emery County. It is our belief that should coal development increase (including coal from the proposal tracts) sufficiently, the railroad would again be a viable project and would be constructed.

Letter Response 37-11

BLM does acknowledge that increased concentrations at Bryce Canyon National Park could be higher than the Class I increments. However, it should be noted that PSD regulations do not require review for coal mines, so the Class I increment is not strictly applicable to the proposed lease tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

324 25th Street
Ogden, UT 84401

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Mr. Roland G. Robison, Jr.
Utah State Director
Bureau of Land Management
136 East South Temple
Salt Lake City, UT 84111

Dear Roland:

This letter and enclosure are the Forest Service, Intermountain Region response to the Utah-Southwestern Utah Coal Region Draft Environmental Statement-Round Two for Coal Leasing. The enclosure contains the more technical and editorial comments. This letter expresses our concerns and comments related to the process and to portions of the draft statement.

We support and are active participants in the Federal Coal Management Program. Our basic intent and objective has been, and is still, to meet our obligations under the Coal program, but within the established direction and guidelines for the management and protection of the National Forests.

Over the past months, many of our concerns regarding Round Two for the Coal Program have been brought to the attention of those involved in the coal leasing process including the EIS Team, Regional Coal Team, and others in the Department of Interior. A discussion of these concerns and our recommendations follow.

Our primary concern is to ensure that coal leasing and subsequent development proceed within attainable timeframes with reasonable volumes of coal made available in proper locations, in concert with overall management direction for the involved National Forest System lands.

The Forest Service recognized and established direction in the Ferron-Price Land Management Plan (1979), that coal leasing "will be compatible with multiple use resource management," and "should not allow coal mining to dominate any given area at the expense of the other resource values." The Manti-LaSal and Fishlake National Forests are presently in the process of developing Land and Resource Management Plans as directed by the National Forest Management Act of 1976 (NFMA) (90 Stat. 2-949, et seq.) (16 U.S.C. 1601-1614). The planning process for these plans will strengthen or redefine

Mr. Roland G. Robison, Jr.

management goals, objectives, and guidelines included in the existing Ferron-Price Land Management Plan and Salina Land Use Plan. These goals, objectives, and guidelines will address biological and social resource values within and adjacent to the National Forest boundaries. As a result of the planning process, the quantification of coal leasing impacts to National Forest resources, including socioeconomic concerns, may be different than addressed by the existing Land Use Plans. Final consent to lease will be subject to such conditions as may be prescribed in these respective planning efforts (43 CFR 3400.3-1).

In essence, we would prefer to delay leasing of as many coal tracts as possible on Forest land until after Forest Management Plans are completed (tentatively late 1985), but recognize our commitment to the ongoing program.

We have no problem with those tracts on the Fishlake National Forest (Skumpah, Acord, Ivie) since utilization of these tracts, according to the Draft EIS, would probably not entice a new operator nor flow into the heavily impacted Emery area.

Because the coal resource is nonrenewable, it is particularly important to provide for development in such a way as to minimize adverse socioeconomic and environmental impacts, while developing a solid economic base. Presently on or adjacent to the Manti-LaSal National Forest, nearly a billion tons of coal is currently under lease, another third of a billion tons is apparently available for lease (unsold in Round One), and the preferred Alternative for Round Two would add nearly three-quarters of a billion tons more. This total of approximately two billion tons exceeds the reasonable amount to be processed in this limited geographical area in a logical timeframe. Should this additional coal be leased and development occur in the near future, unacceptable social, economic, and environmental impacts would occur. Similar concerns were expressed at the recent public meeting by the Carbon and Emery County Commissioners.

For the Preferred Alternative on the Manti-LaSal National Forest, we suggest that Round Two lease sales be confined to the Castle Valley Ridge, Gooseberry, Quitchupah, and Trail Mountain Tracts. Not committing Ferron Canyon and The Pines at this time could reduce many of the possible undesirable impacts and permit us to more fully evaluate the tracts in our Forest Plan process.

Deferment of these two tracts would reduce the total amount of coal available in Round Two by 80 million tons. We believe this could be more than compensated for by acknowledging the North Horn and three Emery tracts still pending from Round One with 336 million tons. These pending four tracts plus the four we recommend for Round Two would provide an adequate supply of coal.

We further recommend that the four unleased Round One tracts be added to Alternatives 1 and 2 of the EIS Round Two. We also

Mr. Roland G. Robison, Jr.

3

recommend that in future lease sales, all unleased tracts be reevaluated for possible site-specific changes, such as size and configuration, and for consideration of total cumulative effects based on current conditions.

We are not recommending a major revision of the Draft Statement but believe that a reduction in total tracts on the Manti-LaSal for the Preferred Alternative would accomplish several objectives, primarily the reduction of possible environmental and socioeconomic impacts, and would give us the opportunity to again look at these two tracts in our Forest Plan.

Please contact us if you wish to discuss this proposal or have any questions on the enclosed list of specific comments.

J. S. Tixier
J. S. TIXIER
Regional Forester

Enclosure

cc:
BUM - Bolander

Forest Service Comments
Uinta-Southwestern Utah Coal Region
Round Two
Draft Environmental Impact Statement

(Enclosure)

1. Page S-1, paragraph 2: It is stated that the four tracts, unsold in round one, will be offered independently of round two and are considered as part of baseline (Alternative 4). From reading the rest of the document, there is no way of assuring that the impacts of production from these tracts have been considered on all direct and indirect areas such as subsidence, transportation, population, etc. As an example, the summary for Alternative 4 on page S-2 makes no mention of the four pending tracts. This statement should be made more explicit.

2. Page S-4, paragraph 4, first sentence: Include the town of Castle Dale.

3. Page S-5: In the leasing alternatives, some mention should be made as to what counties would be severely impacted. There is basically no difference in impacts for Carbon and Emery Counties in any of the leasing alternatives. This should be mentioned.

4. Page S-7, paragraph 6: Central Utah could not withstand 21.6 million tons of coal mined annually.

5. Page 2, paragraph 4, sentence 1: Include Multiple Use Sustained Yield Act.

6. Page 4, paragraph 7, sentence 3: Identify the acreage that is state owned (surface and/or minerals) in the Quitcupah and North Trough Springs tracts.

7. Page 6, paragraph 1: Implies that coal unsuitability criteria have been applied to the Salina Land Use Plan. This is not true. Unsuitability criteria addressed a portion of the Salina Unit; completed in 1980.

8. Page 6: Plans prescribed under the National Forest Management Act will not be completed for either the Manti-LaSal or Fishlake National Forests before late 1985; not late 1983 as stated. (Statement included in several places in document.)

9. Page 6, paragraph 2: Add the following: The new Forest Plan could identify areas with management decisions which oppose existing plans.

10. Page 9, paragraph 3: The Denver and Rio Grande Western Railroad in Castle Valley proposal has been dropped indefinitely.

11. Page 17, paragraphs 1 and 5: No mention is made of state surface or state coal acres contained within the Quitcupah and North Trough Springs tracts. This information should be included.

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12. Page 17, paragraph 6, sentence 1: Surface mining will occur on 622 **38-16**
acres.
13. Page 20, paragraph 1: The number of miles of road to be improved or
constructed for Alternative 2 has been changed from the pHEIS. No comparable
changes have been made for Alternatives 1 and 3 in the DEIS. **38-17**
14. Page 20, paragraph 4: The last sentence is incorrect. State coal is **38-18**
included on the Quitcupah and North Trough Springs tracts.
15. Page 28, Alternative 2, "Climate, Air Quality" section: Include **38-19**
Castle Dale and change Alternatives 1 and 2.
16. Page 28: Particularly under Soils, it should be clarified that **38-20**
amount of surface disturbance for any alternative is in addition to that which
will occur under the "No Action" Alternative.
17. Page 28, Alternative 3, "Climate, Air Quality" section: Change **38-21**
alternative.
18. Pages 28-34: A statement should be included that there is no **38-22**
difference in impacts for Carbon and Emery Counties in Alternatives 1, 2, and
3.
19. Page 29: Add the following sentence under "Alternative 3," "Mineral **38-23**
Resources" section: Conflicts with oil and gas operations could occur in some
areas.
20. Page 29, "Topography, Geology, Paleontology" section: The impacts to **38-24**
paleontological resources due to strip mining should be addressed.
21. Page 30, "Vegetation" section: Some mention should be made as to **38-25**
what areas will be impacted the most locally.
22. Page 31, "Wildlife" section: Locally, impacts are significant in the **38-26**
Ferron Canyon and Quitcupah areas.
23. Page 32, "Socioeconomics" section, Alternative 3: Sentence 2 is **38-27**
incorrect. Much of the growth is coal related.
24. Page 33, "Transportation" section: The impact to U-10 and SR-29 must **38-28**
be reevaluated since the assumption that the Denver and Rio Grande Railroad
would be built is no longer valid.
25. Page 40, "Trail Mountain and Ferron Canyon" section, sentence 1: The **38-29**
word "could" should be changed to "might."
26. Page 42, "Topography, Geology, Paleontology" section, paragraph 3: **38-30**
Omit the last sentence, "in-place coal resources on the tracts . . ."
27. Page 44, Paragraph 5, last sentence: Add the upper Hiawatha and **38-31**
Muddy No. 1 after the word Ivie. Page 44 states 3,000 ft. displacement for
Joe's Valley Fault, page 45 states 2,000 ft. Is this a discrepancy?
28. Page 48, Castle Valley Ridge: Change Huntington Creek to Price River **38-32**

29. Page 52, Flagstaff Limestone: The work "pick" is incorrect. **38-33**
30. Page 56, paragraph 1, sentence 3: The word "unapproved" should be **38-34**
changed to "unappropriated."
31. Page 57: No riparian areas are mapped. **38-35**
32. Page 59, paragraph 4: Sentence 2 should be changed to "the available **38-36**
summer habitat could . . ." sentence 3 should be changed to "the available
summer habitat could . . ."
33. Page 61: The map title Central Utah Deer Management Areas and Mule **38-37**
Deer Winter Range does not have Mule Deer Winter Range identified.
34. Page 63: Paragraph 1 should be changed per February 28, 1983, **38-38**
telefax correction. Substitute "after higher elevations of the Wasatch
Plateau and Book Cliffs" to the following: "In the past, it has been thought
that elk usually utilize the bench areas above the escarpment of the Wasatch
plateau, and this area has been described as the critical and high priority
winter ranges." More recently, heavy winter use has been found on the
escarpment and valley floor below, and that in some areas (the pines and
Wildcat Knolls) the elk do not remain on the bench area even on an average
winter.
- Two well defined elk migration trails have been located. One from the
television tower on the North Horn Mountain, across the escarpment, and into
the Rock Creek drainage, and the other from Wildcat Knolls, across the
escarpment into Quitcupah. In both cases, the trail off the top is very
narrow and due to physical barriers, is exact in location. As the elk travel
down into the escarpment, they spread out and, in Quitcupah, the trail is no
longer defined. It appears that the escarpment is providing a substantial
amount of winter forage in Quitcupah and in the Muddy Creek, with a lesser
amount in Rock Creek and Ferron Canyon. Other migration trails exist, but
have not yet been located. The UDMR and Forest Service are cooperating in a
joint effort to better define these migration trails, critical wintering
ranges, and calving areas, along with other critical portions of the elk
habitat. This study began in 1982-1983, with 24 radio transmitter collars
being placed on elk in the Muddy drainage, South and North Horn Mountains, and
Trail Mountain. In 4 to 5 years, we should have the critical wintering ranges
and migration trails defined. At that time, a more adequate assessment can be
made as to the impact of each of the proposed lease tracts on critical elk
winter ranges and elk migration routes.
35. Page 63, paragraph 1: Add the following: "High priority winter **38-40**
ranges include the escarpment areas."
36. Page 63, paragraph 1, sentence 3: Add Wildcat Knolls, Pines, Ferron **38-41**
Canyon, and Quitcupah.
37. Page 36, Paragraph 2: Sentence 2 should be changed to the following **38-42**
per February 28, 1983, correction telefax entry: "The UDMR has proposed to
develop an antelope herd in the 226,560-acre Castle Valley. The population of
the Icelandic Wash Herd, in eastern Carbon and Emery Counties, has fluctuated
around 200 animals since a 1972 transplant."

Paragraph 3 should read as follows: "Moose were introduced into the Fish Creek drainage, west of Scofield Reservoir in 1973. The initial herd of 18 was supplemented with 19 more moose in 1974 and 6 in 1978. From the original transplant site, moose have been seen from Ferron Canyon on the south, to Sixth Water in Diamond Fork on the north, to Mount Nebo on the west, and also in the White River drainage. Illegal kills have apparently limited the expansion of the herd. Current populations are unknown, but the herd appears to be healthy and is reproducing."

38. Page 63, paragraph 5: Add the following at the end of the last sentence per February 28, 1983, telefax entry: "and two known leks are located on the North Horn Mountain."

39. Page 63, paragraph 7: Add bears and mountain lions.

40. Page 64, paragraph 1: The fisheries information is inadequate. The information should at least include miles of stream, acres of reservoir, and fishermen days.

41. Page 64, paragraph 3: Are any of the proposed access routes of the proposed lease tracts near the roost sites?

42. Page 66, paragraph 4: Include Straight Canyon in sentence two.

43. Page 66, paragraph 5: Include The Pines and Trail Mountain tracts.

44. Page 67, paragraph 3, sentence 7: A potential gas line may occur in Cottonwood Canyon.

45. Page 69: This is one of many statements that addresses county zoning. We prefer not to open discussion on the issue of state or local authority to "zone" Federal lands but believe the document leaves the impression that Federal recommendations and actions must be approved by the counties. We would suggest this general topic be introduced with wording such as "All tracts and alternatives were evaluated in light of local zoning and planning ordinances. Although county zoning restrictions are not applicable to Federal lands, the direction of these plans has been considered in the proposals."

46. Page 72, paragraph 2, sentence 1: "Portions" should be changed to "All."

47. Page 73, Socioeconomics: It would be helpful to have more detail on the origin of material supplied by the State of Utah. Perhaps specific studies could be cited.

48. Pages 80-83: If available, a little more information on site types, densities, locations, and significance would be helpful.

49. Page 80, "Transportation" section: Should the Thistle slide be mentioned?

50. Page 82, paragraph 5: Even if these tracts have "low site density potential," might the site type and location(s) make them more important?

38 43

51. Page 82, paragraph 6: This paragraph should be reworded to better explain "individually significant sites," "site of extreme value," "stratified sites with dry deposits."

52. Page 82, paragraph 7, sentence 2: The site is not National Register quality.

53. Page 82, paragraph 8: Add "and ledges" to the first sentence.

54. Page 83, paragraph 4, sentence 2: "Tracts" should be changed to "Tracks."

55. Page 84: County-wide, National Forest recreation sites are often overcrowded, especially on weekends. The statement that there are camping and picnicking sites in excess of demand is somewhat misleading.

56. Page 85, "Indian Creek Campground" section: The numbers are incorrect. Visitor days are 9,380, Percent of Theoretical Capacity is 9.

57. Page 87: Add Ferron Reservoir Campground to the Recreational Access Area for Ferron Canyon Road.

58. Page 90: The roads associated with the Quitcupah Tract have very little use and are of low concern.

59. Page 145: Assumption 12 is no longer valid.

60. Page 155: "The Trail Mountain, Ferron Canyon . . . etc.," tracts "Percent Increases Over Present" is 150 to 400.

61. Page 155, Emery Area Tracts: Why aren't there any "Difference Attributed to Tract Developments" or "Percent Increases Over Present?"

62. Page 155, Emery Area Tracts: "The Percent Increase Over Present" is 150.

63. Page 158, paragraph 3, sentence 1: Insert (1980) after Nawrocki. In sentence 2, insert "of the field" after representative.

64. Page 158, before last paragraph: Add "Reference water resources section (following) for more information on hydrologic effects of subsidence."

65. Page 159, paragraph 2: Insert at the end of the paragraph that "locally impacts could be significant."

66. Page 159, Table 4-5: The following comments sent by telefax February 28, 1983, should be included:

Comparisons of sediment yields and water use should be made at critical points along the affected streams. The points shown in this table are for downstream and should only be minimally affected by the proposed actions (see comment 74 for page 266).

67. Page 161, paragraph 3, sentence 3: Sentence 3 is not correct. SUFCO is presently discharging 800 gallons per minute into Quitcupah Creek.

84. Page 263, Table 4-43: In the "Trail Mountain, Ferron Canyon, etc.," "percent Increases Over Present" sections should be 150 to 400.

85. Page 264, paragraph 5, sentence 3: The third sentence should read, "The lateral extent of the surface effects could range up to 168 to 180 percent of the mined area."

86. Page 266, Table 4-45: The following comments sent by telefax February 28, 1983, should be included: "Add estimates for Huntington Creek at the National Forest boundary, North Hughs Creek at the confluence with Huntington Creek, Straight Canyon above the Mammoth Canal diversion, Upper Ferron Creek at the U.S. 65 gage, Muddy Creek near Emery, Fish Creek above Scofield Reservoir."

87. Page 280: The final paragraph of the "Rights-of-way, Special Uses, Other Land Uses" subsection states that the Eccles Canyon Road could be damaged by subsidence on the Gooseberry tract. This is not true. It is possible, that subsidence on other fee or federal properties mined in conjunction with this tract could impact the new Eccles-Fairview Highway.

88. Page 283: The Total Population figures do not coincide with Tables 4-52 and 4-81.

89. Page 284: The numbers in this table for "Emery," the year "2000," in the Mobile section, do not match Table 4-54.

90. Page 286: The "Education, Health, and Law Enforcement" impacts to Emery County in the table for Alternative 2 are greater than those of Alternative 1. These numbers need to be reevaluated.

91. Page 290: Table 4-56, The "Total Impact" for Ferron, in Alternative 2, is greater than Alternative 1. These numbers need to be reevaluated.

92. Page 309: In the "Trail Mountain, Ferron Canyon, etc." tracts in the "percent Increases Over Present" section, the value should be 150 to 400.

93. Page 310: Add the following:
The extent of surface effect of subsidence could range up to 168 to 170 percent of the mined area. Subsidence usually does not exceed 50% of the thickness of the seam extracted. Geologic conditions and/or mining methods could increase or decrease this percentage. The effects of subsidence can be identified geologically in the area directly above the coal extracted and the area within the limit angle. Though 16° is the representative limit angle for the coal field, this angle can increase or decrease with varying geologic conditions. Though the effects of subsidence can be identified topographically within the area of the limit angle, those effects may be considerably less than that area above the extracted coal.

94. Page 311, Table 4-64: Comparisons of sediment yield and water use should be made at critical points along the affected streams. The points shown in this table are for downstream and should only be minimally affected by the proposed actions. See comment 74 for page 266.

66. Page 163, paragraph 3, comment: There are several sandstones with higher permeability.

69. Page 163, paragraph 3, last sentence: Delete "as yet unmapped."

70. Page 167, paragraph 4, sentence 1: Substitute "would" for "could."

71. Page 168, Table 4-8: The figures are inconsistent, i.e.,
North Trough Springs 58.1 acres HP Summer Effects 28 deer
Quitchupah 155.1 acres C Winter Effects 11 deer

72. Page 176, paragraph 5, sentence 3: Include "The Pines, Trail Mountain" after "Ridge."

73. Page 177: The following February 28, 1983, telefax comment was not included:

"State water quality laws prohibit the issuing of new NPDES permits within the National Forest boundaries. (Title 30 paragraph 717.7(a) (3), Utah Water Quality Standards paragraph 2.3-2 and Appendix C.)

74. Page 180: The population numbers for Emery County are less for the maximum alternative than the other alternatives. Are these numbers correct?

75. Page 181: The "Total Population Numbers" do not match Tables 4-13 and 4-81.

76. Page 181: Check "603,967 figure for Carbon County, 1990."

77. Page 182: This table (Table 4-15) does not correspond with the expected population increases from Table 4-13.

78. Page 185: "Education," "Emery County," in the year "2000." Why would "Total Need With Impact" be less than Alternative 3? (Table 4-74)

79. Page 193, paragraph 4: It should be stated that State Road 29 is not adequate for the present use. What additional impacts will coal activity have to SR 29?

80. Page 197, paragraph 4: Reword to say that roads constructed/improved may be available for recreation use, depending on management decisions. There are numerous reasons (wildlife, fire, trespass) why some of these roads may be closed to public use.

81. Page 210, sentence 1: Change the sentence to the following: "As discussed for Central Utah, the effects of subsidence can be identified topographically within the area of the limit angle; however, subsidence may be considerably less than that area above the extracted coal."

82. Page 253, paragraph 1: Add at the end of the paragraph, "but locally is a significant impact."

83. Page 257, paragraph 2, sentence 1: Insert "between price and south of Castle Dale."

110. Page 402, paragraph 5, sentence 1: After the word "resources" insert "and treatment structures."

111. Page 402, paragraph 5, sentence 4: Change the word "would" to "may" and insert "and may need to be" after the word "destroyed" replacing the word "or."

112. Page 403, paragraph 4, sentence 1: Substitute the word "all" for "coal."

Appendix

113. Pages A3-1 to A3-14.

The 14 standard stipulations to be included on all new leases have been rewritten in this Appendix. It was agreed at the February 22, 1983, meeting at the Manti-LaSal National Forest Supervisor's Office that the wording would not be changed in these stipulations. Two of the stipulations have been excluded. The stipulations are as follows:

a. The Lessee shall reclaim all areas disturbed as a result of mining and exploration operations to a land use capable of supporting the premining levels of livestock grazing, big game winter range, and other wildlife habitats.

b. At the conclusion of the mining operation or at the request of the Authorized Officer of the Surface Managing Agency, all damaged, disturbed, or displaced land monuments, accessories, and appendages shall be replaced.

114. Appendix 3, page 6, paragraph 2: Add "soil" as one of the major surface resources.

115. Page A3-4, sentence 3: The statement "The cost of any required salvage of such fossils or cultural artifacts during mining operations will be borne by the United States Government" is incorrect. The cost is borne by the Lessee.

116. Map: Tract 18: Portion not colored and not referenced in legend.

95. Page 325, paragraph 2, sentence 1: Add "The Pines" after "Castle Valley Ridge."

96. Page 327: Why are most of these numbers greater than Alternative 1, yet equal to Alternative 2? These numbers need to be reevaluated.

97. Page 328: The figures for the "Total Population" for Emery County do not match Table 4-71.

98. Page 329: The figures for "Emery County," the year "2000," "Single Family and Multi-Family" are greater than Alternative 2 (Table 4-54). These numbers need to be reevaluated.

99. Page 332, Table 4-74: Emery County, "1995" and "2000" section: Why is the impact in Alternative 3 greater than Alternative 1?

100. Page 335, Table 4-75, 1987 Impact, Ferron Canyon: Why is the impact in Alternative 3 greater than Alternative 1?

101. Page 350: The unleased North Horn and Emery Tracts should be mentioned as included in the "Baseline" Assessment.

102. Page 354, paragraph 5: The last sentence is incorrect. Federal mining regulations do not provide for monitoring subsidence.

103. Page 368: Under Cultural Resources, include the following: Significant sites would be mitigated. Mitigations are varied and include collection, mapping, testing, photography, and excavation.

104. Chapter 6: Have the impacts of the surface facilities and access roads for Dugout-Pace, Graves Tract, Hoffman Creek, Whitmore Park Tract been analyzed in a previous EIS? If not, these impacts should be addressed in this EIS.

105. Pages 392 and 393: Implies that Coal Search could use existing Levan Loadout owned by Coastal States Energy. This may not be practical. Suggest that another loadout facility be constructed.

106. Page 395: Quitchupah Tract: (Does not say exactly the same thing we sent to the BLM on February 28, 1983, by telefax.)

107. Page 395: After paragraph three, the following should be inserted: "Access is very limited, which will result in conflicts with livestock. A secondary driveway will be necessary or hauling will be delayed during the trailing periods."

108. Page 396, paragraph 5: Sentence 3 is incorrect. The following sentence should be used: "Coal would be trucked about 3.8 miles on Corner Canyon Road, 10.2 miles on Bob Wright Road, and 6 miles on Utah 139 to the existing Wildcat siding loadout on Consumer's Wash."

109. Page 400, paragraph 3, sentence 6: The sentence should be changed to the following: "Coal would be trucked on Forest Development Roads to Utah Highway 96 at Clear Creek Canyon then 4.6 miles on U-96 to an existing loadout in Eccles Canyon."

Forest Service

Letter Response 38-1

Your comment is noted and will be considered. The Secretary of Agriculture has consent authority for tracts on National Forest Service System lands.

Letter Response 38-2

See Response 26-2.

Letter Response 38-3

The comment does not explain why the Ferron Canyon and Pines tracts should not be given priority for leasing. It is assumed, however, that as the coal leasing process carries forward specific information can be brought out that might possibly document and indicate why these two tracts should be given more priority. The Regional Coal Team can take this into consideration when they make their final recommendations and the Secretary of the Interior can have this information available when he makes his final decision on the leasing.

Letter Response 38-4

In their present configuration the unsold Federal coal lease tracts from the Round One leasing effort have been considered in the context of a leasing situation and have been analyzed under NEPA. Therefore, they qualified for leasing as part of Round One or at a later date. The EIS states that they may be put up for lease and may contribute to the projected baseline production level that was considered in the calculation of the target and in the analysis in the Round Two environmental impact statement.

Letter Response 38-5

The 21.6 million tons of coal expected to be produced annually by the year 2000 under the No Action Alternative does include the four unsold tracts from Round One. These tracts were adequately analyzed in the Round One UIntra-Southwestern Utah Coal Region EIS.

Letter Response 38-6

Castle Dale and Mt. Pleasant have been added to the areas predicted to exceed the primary NAAQS.

Letter Response 38-7

The Summary discusses cumulative impacts only. In the body of the document it is made clear that Carbon, Emery, Sevier, Sanpete, and Kane Counties in Utah and Delta County in Colorado are the affected counties. It is shown that there is no significant difference in anticipated impacts in central Utah resulting from any of the three leasing alternatives.

Letter Response 38-8

Your comment is noted.

Letter Response 38-9

The change has been made as requested.

Letter Response 38-10

The paragraph referred to has been changed by the addition of one sentence stating that "One tract (North Trough Springs) contains approximately 40 acres of private surface overlying state owned coal, but the coal would not be leased as part of the tract."

About 80 acres of state owned surface and coal previously included in the Qultchupah tract has been eliminated from the tract through a boundary modification. Estimates of recoverable coal will not change as the estimates were made only for Federal coal. The reference to 80 acres of state land in the Qultchupah tract found on page 394 has been deleted and the tract acreage has been adjusted.

Letter Response 38-11

The text has been revised to read that the unsuitability criteria were applied to the Wasatch-KCRRA which covers a portion of the existing Salina Planning Unit.

Letter Response 38-12

The date for completion of Forest Plans was revised as directed by the comment.

Letter Response 38-13

The appropriate text changes have been made indicating that new Forest Plans could identify areas with a management decision in conflict with existing land use plan direction.

Letter Response 38-14
See Public Hearing CDH Response 2-2 and Response 37-10.

Letter Response 38-15
See Response 38-10.

Letter Response 38-16
Comment noted. The change has been made as suggested.

Letter Response 38-17
BLM's copy of the PDEIS, Chapter 2, page 12, paragraph 2, sentence 4, reviewed with the Mantle-LaSal National Forest reads, "Approximately 59.9 miles of existing access roads would be improved and 201.1 miles of new road construction would be needed in the region." This is verbatim with the description provided on page 20 of the Draft EIS.

Letter Response 38-18
See Response 38-10.

Letter Response 38-19
The suggested changes have been made.

Letter Response 38-20
Text clarification has been made.

Letter Response 38-21
Comment noted. The reference to the correct alternatives rather than "Alternative One" has been made for Alternatives Two and Three.

Letter Response 38-22
See Response 38-7.

Letter Response 38-23
Text has been revised as requested.

Letter Response 38-24
Page 45 of the DEIS notes that the chance of finding significant fossils in the Emery coal field is small. Page 210 of the DEIS notes that the coal bearing Dakota Sandstone Formation has the potential for yielding scientifically important vertebrate and plant fossils. About 700 acres would be disturbed as a result of surface mining. The text has been changed to include the Dakota Sandstone Formation.

Letter Response 38-25
The Comparative Summary of Major Impacts Table is designed to summarize impacts on a regional basis. Impacts to vegetation was not a major issue or major impact and, therefore, received less detail than some of the other resources. Areas that received the majority of disturbance are identified in Chapter Four.

Letter Response 38-26
The significance of wildlife impacts in the Ferron Canyon and Quitchupah are noted in Chapter Four of the EIS and individual tract profiles.

Letter Response 38-27
We assume that the comment meant Alternative Four, sentence 2. Text has been changed to reflect the comment.

Letter Response 38-28
See Public Hearing CDH Response 2-2 and Response 38-14.

Letter Response 38-29
The text has been revised as requested.

Letter Response 38-30
Change made as suggested.

Letter Response 38-31
The change has been made as suggested for paragraph 5. There is not a discrepancy in displacement figures as the 3000 foot figure is for the Wasatch Plateau and the 2000 foot figure is for the Emery Coal Field.

Letter Response 38-32
Table 3-5 was changed to show the Price River as the principal tributary subbasin associated with the Castle Valley Ridge tract.

Letter Response 38-33
"Plick" has been replaced by "pink".

Letter Response 38-34
The word unappropriated has been inserted in place of unapproved as requested.

Letter Response 38-35
The riparian areas in central Utah are not large enough to appear on a map of this scale. Location of riparian areas is discussed on page 56 of DEIS.

Letter Response 38-36
Text has been corrected.

Letter Response 38-37
The map has been corrected.

Letter Response 38-38
Elk use of lower elevations during heavy snow years is mentioned on page 63 of the DEIS. However, UDWR data do not list this area as critical or high priority range.

Letter Response 38-39
Your comment is appreciated. When the data become available, it can be used in future leasing efforts.

Letter Response 38-40
The suggested change is not consistent with UDWR ratings and, therefore, has not been utilized in the EIS.

Letter Response 38-41
Text has been revised as requested.

Letter Response 38-42
The text as presently written states essentially the same thing as suggested by the commentor, therefore, no revision is necessary.

Letter Response 38-43
The extended range was incorporated into the text.

Letter Response 38-44
Text has been revised as requested.

Letter Response 38-45
The species mentioned in the text were meant only to be a partial listing of predators in the area. Bears and mountain lions are discussed in paragraph 4 on page 63 in the DEIS.

Letter Response 38-46
The level of information presented provided in Chapter 3 is directly related to the anticipated level of impact. Figure 3-10 shows the major fisheries in the region and the analysis on page 172 of the DEIS identifies the miles of stream that would be directly affected. The recreation analysis identifies the increase in number of fishermen and demand for fish.

Letter Response 38-47
The words "... or proposed access routes" has been added to the text.

Letter Response 38-48
Text has been revised as requested.

Letter Response 38-49
Text has been revised as requested.

Letter Response 38-50
Additional text has been added to the central Utah Energy and Minerals Development section of Chapter Three. The text states that oil and gas exploration work has taken place to the north of the Trall Mountain tract in Cottonwood Creek Canyon, and that production activities could involve pipeline installations on the northeast portion of the tract.

Letter Response 38-51
A paragraph has been added to the Chapter Four section on Land Use Plans, Controls, and Constraints. Additional wording is added to give recognition to county responsibilities and authorities for land uses off of Federal lands and to indicate that coordination with local governments was carried out in the development of the coal leasing proposals.

Letter Response 38-52

Text has been changed stating that the Ferron Canyon tract is located in Sanpete County.

Letter Response 38-53

Citation added to first paragraph under "Socioeconomics" to read as follows:

Socioeconomics

The socioeconomic material presented in this EIS including the various tables used, was provided by the State of Utah, Office of the State Planning Coordinator and Department of Community and Economic Development, in "Social and Economic Impact Analysis - Uinta-Southwestern Utah Coal Environmental Impact Statement," July 1983.

Letter Response 38-54

Additional information on the types and significance of sites has been included in the Final EIS.

Letter Response 38-55

The effects of the Thistle slide are temporary and the railroad was rebuilt and opened in July of 1983; therefore, no reference to the slide is necessary.

Letter Response 38-56

The following has been added to the text: "... potential. Despite the low potential, however, a number of these sites such as Nawthls at Gooseberry are extremely important in part because they are in areas of low site densities."

Letter Response 38-57

The paragraph you refer to has been strengthened and revised to better define "sites of extreme value" and "stratified sites with dry deposits."

Letter Response 38-58

As noted in the DEIS, Fremont habitation sites are usually of National Register quality.

Letter Response 38-59

Text has been revised as suggested.

Letter Response 38-60

Comment noted. Change made as requested.

Letter Response 38-61

The text has been changed to reflect your concern.

Letter Response 38-62

The text has been corrected.

Letter Response 38-63

The text has been revised as requested.

Letter Response 38-64

The text has been changed to reflect your concern.

Letter Response 38-65

See Public Hearing CDH Response 2-2 and Response 37-11.

Letter Response 38-66

Table 4-3 has been changed as per the comment.

Letter Response 38-67

The differences attributed to tract developments for the Emery tracts are shown as 0 for water erosion during exploration activities. These activities would occur on approximately 3.4 acres located on flat to gently sloping terrain. Due to the limited acres involved, the flat terrain and field evidence showing no surface water runoff problems, estimated soil losses from water erosion would be considered negligible during exploration. Field evidence of wind erosion led to an evaluation of potential soil losses, and the results of the evaluation are shown as a wind-induced soil loss for both exploration and production activities.

Water and wind-induced erosion is shown for production activities on the Blue Trail Canyon tract only. The surface mining proposed for this tract would alter existing terrain, increasing slope percents and modifying soil profiles.

Letter Response 38-67 (cont'd.)

Surface water runoff and wind actions would increase soil losses over present conditions. Walker Flat tract would not experience new soil loss increases because the tract would be mined from an existing portal.

Letter Response 38-68

Tables 4-3 (Alternative One) and 4-62 (Alternative Three) have been changed as per the comment.

Letter Response 38-69

The "1980" reference has been inserted and "of the coal field" has been inserted after "representative."

Letter Response 38-70

The change has been made as suggested.

Letter Response 38-71

The preceding sentences in paragraph 2, page 159 of the DEIS, define where the rate of sediment deposition would occur and already infers that locally impacts could be significant. Therefore, no text change is necessary.

Letter Response 38-72

The estimates in Table 4-5 are intended to show the total impact in the respective drainage subbasins. More site specific information about mining and reclamation plans would be required to determine the impact on a given stream reach or "critical point". The text (page 159, paragraph 2) does, however, indicate that local impacts could be more significant than the estimated regional impacts listed in Table 4-5.

Letter Response 38-73

The word "generally" was inserted in the parenthetical phrase in sentence 3, paragraph 3, page 161 because of such exceptions as SUFCO. Because of the regional nature of this EIS, evaluations of potential hydrologic impacts are related to regional drainages including those listed in Table 3-5. The ratio of mine drainage to natural runoff in some small intermittent tributary stream doubtless could be large.

Letter Response 38-74

The strata considered in this section are those that would most likely be affected by mining on the tracts under consideration.

Letter Response 38-75

Deletion made as suggested.

Letter Response 38-76

The word "could" has been left in the paragraph referred to because it cannot be assumed that riparian areas would automatically be damaged by portal and road construction.

Letter Response 38-77

Footnote b explains this as the deer herd lands are based upon habitat acres available and optimum deer numbers. Thus, deer/acres could vary depending upon habitat type and quality for each herd. The losses are based on habitat acres lost. Footnote b to Table 4-8 on page 168 of the DEIS has been revised to reflect this fact.

Letter Response 38-78

Text has been revised as requested.

Letter Response 38-79

The statement referred to is found on page 161 of the DEIS.

Letter Response 38-80

The impacts for Emery County are essentially the same for all of the leasing alternatives. The Alternative One impacts were not rounded as in the other alternatives which results in a net difference of about 0.3 percent in the year 2000 estimates. In order to maintain consistency with the remainder of the Alternative One analysis and because the difference is so slight, the Emery County estimates for Alternative One have not been changed.

Letter Response 38-81

The population in Table 4-13 represent the impact projection while total population in Table 4-14 reflects the sum of the impact projection and the baseline population projection.

Letter Response 38-82

The personal income figure is not correct. It has been changed to read \$403,937 for Carbon County in 1990.

Letter Response 38-83

Table 4-13 depicts population while Table 4-15 depicts housing projections.

Letter Response 38-84

The impacts are similar for all three alternatives for Emery County. The data in Table 4-74 is incorrect and has been corrected in the Final EIS.

Letter Response 38-85

The traffic model developed for this study shows a projection of 1,155 vpd for a daily average on U-29 west of Orangeville in AD 2000, of which 384 would be truck traffic, which appears to be the area of concern. This level of traffic would not require major rebuilding of U-29. Assumption No. 14 (page 145) notes that shortfalls in capacity would be accommodated through upgrading of specific overloaded elements in the State Highway system.

Letter Response 38-86

Text has been revised as requested.

Letter Response 38-87

The sentence has been rewritten as follows:

As discussed for central Utah, the area of subsidence can be identified topographically within the area of the limit angle; however, the area of subsidence may be considerably less than the area above the extracted coal.

Letter Response 38-88

The comment was revised and included in the text.

Letter Response 38-89

The sentence is correct as stated on pages 193, 257, 293, 304, 338, and 349 of the DEIS.

Letter Response 38-90

Table 4-43 has been changed to show correct percent increases in soil losses.

Letter Response 38-91

The change has been made as suggested.

Letter Response 38-92

The estimates given in Table 4-45 are intended to show the total impact within the respective drainage basin. The text (page 159, paragraph 2) does, however, indicate that local impacts could be more significant than the regional impact shown in Table 4-45.

Letter Response 38-93

The reference to possible subsidence-caused damage to the Eccles-Fairview Highway has been removed from the text. The same reference has also been removed in the appropriate Alternative One and Three sections.

Letter Response 38-94

The data in Tables 4-52 and 4-81 are rounded. The sum of these data in Table 4-53 are not rounded but represent no significant difference.

Letter Response 38-95

If this comment refers to the data cited in the narrative (page 285), the number of mobile homes cited is the increase shown in Table 4-54.

Letter Response 38-96

The data in Table 4-16 (page 184) and Table 4-55 (page 286) for Emery County should be the same. Table 4-55 has been corrected.

Letter Response 38-97

Corrections have been made and the data are now consistent.

Letter Response 38-98

Tables 4-3 (Alternative One), 4-43 (Alternative Two), and 4-62 (Alternative Three) have been changed to note a 150 to 400 percent soil loss increase over present conditions on the Trail Mountain, Ferron Canyon, The Pines, Quitchupah, and the Emery area tracts, if coal lease developments occur.

Letter Response 38-99

The discussion suggested in the comment is found on page 158 in the Alternative One Central Utah analysis of the DEIS. The Alternative Three analysis found on page 310 states that "The sub-sidence impacts described for central Utah under Alternative One would also result under Alternative Three..." Therefore, the inclusion of this information in the Alternative Three analysis would be unnecessarily redundant. The word "lateral" has been inserted before "extent" in sentence 3 of paragraph 5 as suggested for Alternative Two in comment 38-91.

Letter Response 38-100

The estimated increases in fluvial sediment are based on the assumption that sediment yields would increase tenfold on land disturbed by mining activities (Kilpatrick, 1979). Streams and reservoirs nearest the disturbed area could be expected to receive most of the increased sediment. The impact could better be evaluated on a case by case basis as more information becomes available regarding mining and reclamation plans for each tract.

Letter Response 38-101

The text has been changed to include potential oil and gas exploration and development conflicts on The Pines tract. The Alternative Two writeup was also changed to include The Pines tract.

Letter Response 38-102

Apparently the comment has reversed its reference to Alternative One and Two. The population projections for Alternative One are similar to those of Alternative One or slightly lower. Alternative Three population projections for the central region counties are higher than those for

Alternative Two. This is as it should be since the work force requirements are larger under Alternative Three than Alternative One. The reduction in work force requirements is primarily in Kane County.

Letter Response 38-103

See Response 38-81.

Letter Response 38-104

See Response 38-102.

Letter Response 38-105

See Response 38-84.

Letter Response 38-106

Same Response 38-97.

Letter Response 38-107

It is made clear on page 23 of the DEIS that the four unleased tracts from Round One are included in the baseline (Alternative Four).

Letter Response 38-108

Federal mining regulations do provide for monitoring of subsidence although they do not specifically require that monitoring systems be set up in all situations. The Surface Mining Control and Reclamation Act and the regulations such as CFR 30 Part 784.20 mention the importance of considering setting up monitoring systems to control subsidence. Again, however, the regulations do not specifically require the establishment of monitoring systems. It can be implied, however, that such systems are necessary for the protection of the surface from the impacts of subsidence.

Letter Response 38-109

The text has been changed to address mitigation of significant cultural resource sites, the types and kinds of mitigation has been mentioned in the new text language. These changes have also been applied to the Cultural Resource section of Alternatives One, Two, and Three for central Utah tracts.

Letter Response 38-110

The facilities and access for mining of these tracts would be built independently of Round II leasing and are considered as part of the baseline disturbance projected for Alternative Four. The construction of these facilities will proceed whether or not Round II tracts are leased.

Letter Response 38-111

The Levan loadout was projected as the coal haul destination for the Skumpah tract because it is currently the loadout for the Consolidation coal mine. The haul distance to the Levan loadout is approximately 83.4 miles. If the Levan loadout could not be used for the Skumpah tract, coal could be hauled about 35 miles to the new loadout which has been projected for the Emery area.

Letter Response 38-112

We found it necessary to revise and edit the material sent to us regarding the Qultchupah tract. The EIS core team reserved the right to determine the final wording of the EIS.

Letter Response 38-113

The text has been changed to reflect the access difficulties and conflicts with livestock use on the Qultchupah tract.

Letter Response 38-114

Site A from the site specific analysis was the assumed portal location. The mine tipple would likely be located 1/4 mile downslope from the mine because of terrain features. The overall haul distance as measured on USGS Quads (Scofield, Pinnacle Peak, and Standardville) is 13.9 miles as recorded on Table 2-1. Therefore, the sentence has been rewritten to read "Coal would be trucked about 13.9 miles via Corner Canyon and U-139 to the existing Wildcat siding loadout on Consumer's Wash."

Letter Response 38-115

The sentence has been changed to read:

Coal would be trucked about 4.6 miles on forest development roads and Utah Highway 96 through Clear Creek Canyon to an existing loadout in Eccles Canyon.

Letter Response 38-116

The text has been changed to reflect existence of watershed treatment structures in the Ferron Canyon tract area.

Letter Response 38-117

The text has been changed as requested.

Letter Response 38-118

The sentence has been changed to read:

The Cottonwood Road would be a safety hazard because of increased coal traffic.

Letter Response 38-119

The standard stipulations have essentially been unchanged except to avoid duplication of stipulations containing the same requirements for cultural and paleontological resources. The requirement remains the same and eliminates an extra unneeded stipulation and duplicate verbage.

The exclusion of the post-mining land use stipulation from the standard stipulations was intentional. The post-mining land use objectives are usually stated to reflect site specific conditions of the lease and rehabilitation potentials. The post-mining land use stipulation will be that contained in the Forest Service site specific analysis (SSA). If the post-mining land use objectives in the SSA's remain unchanged from tract to tract. This in a sense makes it a standard Forest Service stipulation.

The requirement for replacement of survey monuments was omitted as a duplication of requirements. The requirement to replace such monuments can be imposed at any time during or after mining. However, if the Forest Service wishes to make this a condition to the concurrence in leasing the tract, the following stipulation should be used which is legally, technically, and administratively more correct.

Letter Response 38-119 (cont'd.)

"All survey monuments, witness corners, reference monuments, and bearing trees must be protected against destruction, obliteration, or damage. At the conclusion of the mining operations, or upon the request of the authorized officer, surface management agency, any displaced, damaged, or obliterated markers must be re-established, at the lessee's expense, in accordance with accepted Bureau of Land Management (BLM) survey practices as set forth in the Manual of Surveying Instructions. A complete record of the monumentation and the methods used in re-establishment will be furnished to the Chief, Branch of Cadastral Survey, at the appropriate State Director's Office (BLM).

Letter Response 38-120

Text has been revised as requested.

Letter Response 38-121

Text has been revised as requested.

Letter Response 38-122

This oversight has been corrected. A revised map has been placed in the Final EIS.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
AREA OFFICE, COLORADO, UTAH
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84136

July 7, 1983

IN REPLY REFER TO

39

Page 2

We concur with your assessment of no effect for the other threatened and endangered species in the area so long as the coal leasing program proceeds as outlined in the EIS. If additional information on endangered species becomes available or if the proposed project is altered, the BLM should reinstate Section 7 consultation with our Endangered Species Office.

39 4

MEMORANDUM

To: State Director
Bureau of Land Management
Salt Lake City, Utah
Attention: Ron Bolander

From: Acting
Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service
Salt Lake City, Utah

Subject: Review of Draft Environmental Impact Statement, Uinta -
Southwestern Utah Coal Region

39 5

The impacts to terrestrial wildlife were considered by the DEIS to be tolerable with the finding that only locally, such as pheasants in Carbon County and deer highway mortality, would impacts approach even local significance. We question this determination. Furthermore, the demands for consumptive and nonconsumptive use of these wildlife resources were projected to be increasing as a result of a large growth in human populations.

Mitigation of these impacts (or needs) was not addressed adequately. Similarly, wildlife resource losses occurring from previous Federal leasing actions have not been mitigated. There will be an unmitigated loss to the public unless positive steps are taken to insure funding to address these needs. Other social impacts, police protection, hospitals, schools, recreational needs all get pre-development monetary recognition. The added burden of maintaining a quality fishery, wildlife law enforcement, opportunities to go deer hunting with a reasonable chance of success, viewing western bluebirds, etc. are placed solely on the people who participate in these activities and agencies who possibly will suffer declining revenues due to the need to control participation. The responsibility for mitigation should be borne by those companies and agencies deserving revenues from the leasing of coal as a cost of doing business, and discussed in this DEIS. Methods to mitigate these impacts should be either stipulated or funding provided to alleviate these impacts as a part of the leasing program. Though not significant nationwide, or perhaps by individual species of wildlife, the cumulative effect of reduced carrying capacity on perhaps hundreds of species combined with secondary impacts such as RV users, picnickers, target shooters, firewood cutters, etc. will be significant unless planned for and mitigated, not just minimized.

39 6

The stipulations presented in this DEIS would benefit from consolidating those from Colorado BLM, Utah BLM, and Forest Service into a standard set of stipulations. An apparent oversight is the omission of a stipulation requiring replacement of water sources for livestock and wildlife disrupted through mining activities. If stipulations derived from application of unsuitability criteria are addressed for Colorado, they should be treated in a similar fashion for Utah.

39 7

The application of the unsuitability criteria to the Southwest Utah tracts needs to be updated to reflect raptor inventories conducted in 1982 by the Fish and Wildlife Service.

39 8

We recommend yet another alternative be discussed. This proposed alternative would cover only those tracts that could be accessed from existing coal mining facilities. This would provide a high return of coal per acre of new surface disturbance.

39-1

The possible impacts to the Colorado squawfish (*Ptychocheilus lucius*) and humpback chub (*Gila cypha*) from water depletions on the upper Colorado River basin as well as the woundfin (*Plagopterus argentissimus*) on the lower Colorado River basin should be addressed in this environmental impact statement.

39-2

Water depletions, both directly by diversion and indirectly by consumption and evaporation from the Colorado River Basin, have drastically altered flow patterns, water quality parameters, and river channel characteristics, and have contributed to the elimination and alteration of the backwater nursery areas of the endemic Colorado River fish species.

39-3

In addition, the Bureau of Land Management should enter into informal Section 7 consultation with the Salt Lake Endangered Species Office on these species. Our office has only recently been made aware of the anticipated depletion of water by the proposed coal development in this area.

Specific comments:

Page 63 - No discussion is presented concerning most species of migratory birds of high Federal interest other than for eagles. This is true also in virtually all subsequent discussions of wildlife.

Page 64 - The data for bald eagle roost sites and wintering areas needs to be updated where new data exists.

Table 4-10 - We recommend use of another term besides "territories" such as nest sites.

Page 215 - If 490 acres of the Ford tract are not reclaimable, they should be rejected from consideration since SMCPA prohibits development of coal lands where reclamation is not feasible technologically or economically.

Page 216 - Conflicts with golden eagle nests should be discussed. Some rewording of the 6th paragraph appears needed for clarity. The report minimized the significance of the loss of 4 percent of irrigated cropland to community development. These areas (especially if associated with riparian areas) are invaluable to wildlife and should be treated with the same tone as applied to agricultural lands (less than 2 percent) on page 221.

Page 256 - Should estimated highway mortality, poaching, and carrying capacity losses of big game be quantified here? The Service believes these problems are cumulatively significant and needing appropriate discussion.

cc: DWR, SLC,

39-9
39-10
39-11
39-12
39-13
39-14

U.S. Fish and Wildlife Service

Letter Response 39-1

See Response 26-3

Letter Response 39-2

Depletions of water from the Colorado system are projected to be extremely small in relation to total flows. Under the maximum leasing alternative only about 3,500 acre feet of water that could reach the Colorado River would be consumptively used and only one-half would come from tributaries upstream of Lake Powell. Therefore, no significant impacts were projected for fish in the Upper Colorado River Basin.

The roundfin minnow is found only in the Virgin River from LaVerkin Springs in Utah to Lake Mead in Nevada. Because the Virgin River is tributary to the Colorado River, depletions on the mainstem of the Colorado River could not affect the roundfin minnow. No depletion or sediment increase would result in the Virgin River.

Letter Response 39-3

BLM has initiated informal consultation to comply with the request made in the comment.

Letter Response 39-4

Comment noted.

Letter Response 39-5

Comment noted. Portions of the wildlife section have been revised in response to other specific comments.

Letter Response 39-6

Standard stipulations which would be a part of any lease issuance, and possible stipulations are listed in Appendix Three. Impact mitigation for individual tracts were listed in the tract profiles. These measures are in addition to those items covered by existing laws and regulations. Utah Senate Bill 171 will also provide help to communities to cope with population increase demands you have identified and are discussed in the EIS.

The EIS notes the fact that certain anticipated impacts to wildlife could not be mitigated.

Letter Response 39-7

See response 39-6

Letter Response 39-8

The Colorado BLM personnel agreed with the involved persons in that area to list all of the mitigating measures under consideration for the two Colorado leases in the DEIS (Appendix Three). These mitigating measures were revised for the Final EIS.

Because 25 of the 27 tracts under consideration are in Utah individual or special mitigating measures for each tract could not be listed due to a constraint on page numbers. Therefore, the standard stipulations which will be part of any lease issuance are listed as well as what constitutes special stipulations as stated in Appendix Three. The reader is referred to the tract profiles for specific or special stipulations. Replacement of water is required by SMCRA and will be a special stipulation to lease issuance as necessary. Certain other special stipulations not included in the tract profiles are also listed in Appendix Three.

Letter Response 39-9

Available data used by the wildlife resource specialist includes the 1982 raptor inventory mentioned. No conflicts with projected portal sites or access roads were found.

Letter Response 39-10

See Public Hearing SLCH Response 1-3.

Letter Response 39-11

The 1982 survey recorded very low bald eagle wintering population in Carbon and Emery Counties. This is consistent with winter surveys taken in 1977 and represents the best available data.

Letter Response 39-12

The term "nest sites" has been substituted in the text for territories as suggested.

Letter Response 39-13

The lessee in the presentation of the mining plan would have to be able to show that the area could be reclaimed to its original productivity or a surface mining permit could not be obtained. If this condition could not be met the lessee may consider underground mining in this area.

Letter Response 39-14

No conflicts with golden eagle nests are anticipated. Paragraph has been revised to note that the four percent habitat loss occurs in productive lands.

Letter Response 39-15

These impacts were quantified and analyzed on pages 167- 172 of the DEIS. The section referred to is a summary which identifies what the most significant anticipated impacts are.



colorado
open
space
council

2239 E. Colfax Ave. Denver, CO 80206 393-0466

Ron Bolerander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolerander:

I appreciate the opportunity to submit these comments on the Uinta DEIS on behalf of the organizations identified below. We are grateful for your assurance that they will be considered and placed in the administrative record if postmarked by July 6, 1983 and received by the BLM shortly thereafter.

Attached are the comments of the Colorado Open Space Council, Western Colorado Congress, and the Western Slope Energy Research Center on the Uinta-Southwestern Utah Coal Region Draft Environmental Impact Statement (DEIS). Our comments focus primarily on the DEIS's treatment of the two Colorado tracts and particularly about impacts on water and water rights. Our comments demonstrate that the DEIS fails to satisfy the requirements of the National Environmental Policy Act (NEPA) and that the proposed lease stipulations do not mitigate potential impacts or meet the requirements of the BLM's North Fork Amendment.

In addition, the DEIS treatment of the Utah tracts is totally inadequate and does not assess the full range of alternatives, demonstrate need, recognize the sensitive problems in Utah including impacts on municipal water supplies. We are opposed to the wholesale leasing of public coal reserves and the preferred alternative identified in the DEIS of the alternatives presented in the DEIS. We favor the no-action alternative with leasing to be limited to only those areas genuinely needed to maintain existing operations.

In our view, the DEIS is so defective that the BLM should accept our comments and prepare a revised draft before proceeding any further.

We would also like to take this opportunity to discuss public participation and community support for protective lease stipulations. With regard to the manner in which the BLM views public involvement, we must say it has been less than enlightening. First, the BLM and the Department refused to release to the public a copy of the preliminary draft for the DEIS. It is our understanding that this document contained a more complete assessment of impacts and additional data which was deleted from the DEIS. Second, the BLM decided not to grant an extension of the public comment period for the DEIS even though one was completely justified and necessary. Third, we find it highly unusual that the

Ron Bolerander
July 6, 1983
Page two

BLM expects to assess and develop responses to the public comments by the 14th of July, just one week after the close of the public comment period.

As you may be aware, the issue of water protection has long been a concern of our organization and residents of the North Fork Valley. In December 1981 the Colorado State Director recognized the risks of mining on water and associated water rights and incorporated water protection objectives into the local land use plan.

Since that time conservation organizations, local landowners and water users, and representatives of the coal industry have worked together in an attempt to resolve this issue. We have met with government officials, collected data, filed reports, and in general monitored the BLM's efforts to implement what we believe to be a very good decision by the Colorado State Director. Unfortunately, the BLM has not done a good job as evidenced by the proposed lease stipulations in the DEIS.

There is a broad base of support for detailed specific lease stipulations. At the June 6, 1983 hearing on the DEIS the vast majority of people who testified criticized the BLM stipulations and recommended that the BLM develop adequate protection measures. The Delta County government, members of our organizations, representatives of our organizations and affected water users, as well as representatives of the coal industry gave the same message to the BLM. Editorials in both the local papers reiterated our concerns and criticized the BLM's effort to mitigate impacts.

We have worked together for a long time to ensure protection for water and associated water rights and are willing to continue. We strongly urge the BLM to develop adequate and enforceable lease stipulations.

Thank you in advance for considering our comments. If you or members of the DEIS Team have any questions about them, please do not hesitate to contact me at (303) 321-6588.

Sincerely,

Mark Welsh

Mark Welsh
Mining Project
Colorado Open Space Council

MW:km

Enclosure

40-1



2239 E. Colfax Ave. Denver, CO 80206 393-0466

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COMMENTS ON
THE DRAFT UINTA-SOUTHWESTERN UTAH COAL
REGION ENVIRONMENTAL IMPACT STATEMENT

Submitted by
The Colorado Open Space Council,
Western Colorado Congress, and
The Western Slope Energy Research Center

1. INTRODUCTION AND GENERAL COMMENTS

These comments are submitted on behalf of the Colorado Open Space Council, Inc. (COSC), the West Slope Energy Research Center (WSERC), and the Western Colorado Congress (WCC). COSC is a statewide conservation coalition with forty-five member groups and approximately 1,200 individual members. Many COSC members are residents of Delta County, Colorado which is included in the west-central Colorado portion of the Draft EIS. These members include land owners and water users who will be affected by any future coal leasing of the Paonia and Cedaredge lease tracts. WSERC is a local organization based in Hotchkiss, Colorado and has a long history of interest and participation in federal coal leasing decisions and BLM land use planning in the North Fork of the Gunnison Valley. The WCC is a coalition of ranchers, farmers, the elderly, conservationists, utility rate payers and general residents of the west slope of Colorado. In addition to our individual members WCC represents thirteen citizen organizations located from Bondad to Steamboat Springs. The purpose of WCC is to ensure that the common people of western Colorado are actively involved in the decision-making that affects their lives, including federal leasing decisions.

The coal development proposed in the Draft Uinta-Southwestern Utah Coal Region Environmental Impact Statement (EIS) is part of the new federal coal leasing program which was finalized in July 1982. The cumulative and site-specific impacts of different leasing levels for both Colorado and Utah are poorly analyzed in the DEIS. While these comments focus primarily on transportation and water impacts in Colorado, COSC, WCC, and WSERC must go on record in opposition to the level and location of proposed leasing in Utah and to a certain extent in Colorado.

The "preferred alternative" proposed in the DEIS is to issue competitive leases on twenty-five tracts which total 72,894.91 acres involving over 1.6 million tons. In addition, existing leases are projected to increase production and impacts in the same area.

We believe that the Department's proposal to lease on such a large scale is totally irresponsible because of the lack of real need or demand and the overwhelming environmental consequences. The preferred alternative clearly illustrates the difference between the Department's current coal program and the 1979 program. Although the DEIS discusses the need issue, it is unable to justify the extensive leasing levels proposed in the alternatives. Detailed comments prepared by the Sierra Club are included in these comments as Attachment "A". The Sierra Club testimony deals specifically with the Uinta-Southwestern Utah lease sales and is fully supported by our organizations.

The DEIS fails to consider the full range of reasonable alternatives. While the DEIS attempts to analyze the impacts of the "No-Action" alternative the two other alternatives other than the "preferred alternative" contain leasing levels very close to the preferred alternatives. The DEIS fails to comply with NEPA and CEQ regulations (40 C.F.R. 1502.14) because it does not consider any alternative leasing levels substantially less than the "preferred" alternative.

These and other issues are also discussed in the comments on the DEIS which were submitted by the Utah Chapter of the Sierra Club and the Natural Resources Defense Council and its Public Lands Institute. We incorporate these comments by reference and will focus the following comments on the treatment in the DEIS of water and transportation impacts related to the Colorado tracts.

11. WATER PROTECTION

A. Summary

Our major concerns about water protection can be summarized as follows. The DEIS does not adequately document or verify that the proposed sales are consistent with the federal land use plans. Second, the DEIS is severely lacking in base-line data necessary to determine impacts. Third, the DEIS does not adequately analyze site-specific impacts and the "environmental analysis" that is included is insufficient and often misleading or inaccurate. Fourth, the DEIS fails to mitigate potential impacts by developing adequate protective lease stipulations. Our comments include a Memorandum Brief In Support of Recommended Lease Stipulations.

Included as comments on the DEIS are 1) updated Report on Water Protection Requirements for the Leasing of Federal Coal in the North Fork of the Gunnison River Valley, and 2) a separate Memorandum In Support of Lease Stipulations to Protect Water. This report and memorandum address the portions of the DEIS which treat land use plans, controls and constraints, mitigation measures and the proposed lease stipulations.

B. Memorandum Brief in Support of Recommended Lease Stipulations

Introduction

The Colorado Open Space Council (COSC) and others commend the Bureau of Land Management on its recent land use planning decisions issued in regard to the leasing of federal coal lands in the North Fork of the Gunnison River Valley region. Among the stated goals of the BLM land use plan is the implementation of specific water objectives "to guide the activity planning process and subsequent [BLM] actions prior to any actual mining," including

this DEIS. The BLM has determined that, through "an effective combination" of certain lease stipulations, surface and groundwater flows as well as established water rights of area users will be protected. We wholeheartedly support the position of the BLM and its recommended objective of water and water rights protection. Our concern, however, is that the BLM's recommended mitigating measures (i.e. proposed lease stipulations) are woefully inadequate to promote the policies of water and water rights protection pronounced in the BLM land use plan. The purpose of this memorandum is to establish that not only is the BLM committed to the protection measures stated in the land use plan, but that a series of specific lease stipulations is the most sound form of mitigating measure available to the BLM.

The Land Use Plan

Established federal policy mandates that the BLM carry out the activity planning, DEIS and lease sale phases of North Fork of the Gunnison project in accordance with the land use plan:

"The activity plans . . . conform to the guidelines and restrictions established in the land use plan. . . . The range of alternatives with respect to a specific resource activity or program is constrained by the decisions made in the land use plan. . . . From a policy perspective, the land use plan is thus the major action affecting alternatives or options."/>

Moreover, the Federal Coal Leasing Amendments Act states: "No lease sale shall be held unless the lands containing the coal deposits have been included in a comprehensive land use plan and such sale is compatible with such a plan" (30 U.S.C. § 201(a)(3)(A)(1976)). Further, Section 302(a) of the Federal Land Policy and Management Act requires the Secretary of the Interior to "manage the public lands. . . in accordance with the land use plans developed by him."

The lease stipulations offered by the BLM in the Uinta-Southwestern Coal Region Draft Environmental Impact Statement (the DEIS) are not in accord with the land use plan, contrary to federal policy and law. (See detailed comments at Section C, Part II accompanying this memorandum). Our proposed lease stipulations concerning mining restrictions, water insurance, and water replacement are in harmony with the BLM land use plan, and afford adequate enforcement of BLM policy objectives.

Specific Lease Stipulations

Congress has given the Secretary of the Interior broad power to regulate and impose conditions on the use of federal lands. The Federal Land Policy and Management Act of 1976 (FLPMA)^{2/}, The Mining and Mineral Policy Act of 1970^{3/}, The Mineral Leasing Act of 1920 (MLA)^{4/}, The Surface Mining Control and Reclamation Act of 1977 (SMCRA)^{5/}, and The National Environmental Policy Act (NEPA)^{6/}, all serve as broad statutory bases of power for the Secretary to impose stipulations on federal coal leases.

The Secretary's power to condition leases has enjoyed sound judicial authority as well. Boeshe v. Udall, 373 U.S. 472, 83 S.Ct. 1373 (1963), Environmental Defense Fund v. Andrus, 619 F.2d 1368 (10th Cir. 1980); Utah International, Inc. v. Andrus, 488 F.Supp. 962 (D. Utah 1979); Peterson v. Department of Interior, 510 F. Supp. 777 (d. Utah 1980); Alaska v. Andrus, 580 F.2d 465 (D.C. Cir. 1978).

Not only does the Secretary have broad statutory and judicial authority to condition federal coal leases, he has the duty to impose effective stipulations to protect existing water flows and quality:

"... [W]e think it clear that the Secretary had a legal duty to avoid unreasonable risks to the fisheries in the waters over the Outer Continental Shelf, even to the point of refusing

to lease particular areas where the risks would be unreasonable. . . . [T]he Secretary is required to minimize or eliminate any conflict associated with the exploitation of mineral resources."^{7/}

Indeed, "lease stipulations are an important mechanism for minimizing the environmental impacts" of coal development. North Slope Borough v. Andrus, 486 F. Supp. 332 (D.D.C. 1979). Moreover, the Secretary may choose "stringent lease requirements which will prescribe the detailed methods for mitigation of exceptional and special harms." Natural Resources Defense Council v. Berkland, 458 F. Supp. 925 (D.D.C. 1978). The court in Berkland held that the Secretary should "exercise his authority to safeguard society and prevent irreparable damage to the environment through a careful and complete formulation of lease terms."

Our recommended lease stipulations are clearly within the scope of the Secretary's power of implementation. Further, the implementation of these lease stipulations before the lease sale is essential for the Secretary to meet NEPA's mitigation requirements to "the fullest extent possible." HRNC v. Berkland, 609 F.2d 553 (D.C. Cir. 1979).

"Although the Secretary of the Interior has practically unlimited discretion to issue or refuse permits or leases under the various mineral leasing acts, his control over mineral activities is greatly reduced once a permit or lease has actually been issued. At that point, the explorer or miner has legal rights under the leasing laws, which can be restricted only in accordance with the provisions in the particular permit or lease. . . ."^{8/}

Thus, for the Secretary to carry out his duty of damage mitigation and water protection, site-specific lease stipulations, such as those recommended by us, must be employed.

40-7
40-8

Although the non-mineral resource damages that we seek to prevent by way of specific lease stipulations cannot be predicted with 100 percent accuracy, the Secretary is under a legal duty to prevent even a risk of damage where possible. See Commonwealth of Massachusetts, fn. 8, *supra*, which held that "[i]t is thus left to the Secretary to develop policies that will result in the extraction of [minerals] without unreasonable risks and damage to renewable resources" such as water (emphasis added).

Site-specific lease stipulations such as those recommended by our organizations "represent a balancing approach toward the conflict between mineral and non-mineral resource activities on a tract of land, as opposed to the all-or-nothing, open-or-closed withdrawal approach traditionally used."^{9/} With the degree of specificity offered by the COSC proposed stipulations, not only will area water resources and lawful users be protected, mineral leases will benefit as well:

"Mineral explorers and developers under the leasing laws face substantial uncertainty as a result of the vague and general wording of almost all the lease provisions and regulations concerning non-mineral resource protection. . . . [which] are subject to ad hoc and unpredictable interpretation and implementation."^{10/}

Our proposed lease stipulations offer mineral lessees relief from such ambiguity. Indeed, the current trend in mineral leasing is to precisely condition each lease to the needs and special problems of a given lease tract.^{11/}

Conclusion

The lease stipulations offered in these comments are clearly legally superior to those issued by the BLM in the North Fork of the Gunnison DEIS. The DEIS stipulations fall short of the objectives of the BLM land use plan, and are ill-suited to protect the region's water and water users. The more specific and effective lease stipulations offered by us afford precise mitigating

measures as prescribed by law, and lie squarely within the Secretary's authority and duty to impose them. Not only are our proposals conducive to superior resource and rights protection within the impact region, the mineral lessees stand to benefit as well. Clarity, precision, and legal necessity mandate adoption by the BLM of these lease stipulations to protect water and water rights in the North Fork of the Gunnison River Valley.

Footnotes

1. U.S. Office of Technology Assessment, Management of Fuel and Non-Fuel Minerals In Federal Lands, 210 (1979).
2. E.g. 43 U.S.C. 1732(b).
3. E.g. 30 U.S.C. 21(a).
4. E.g. 30 U.S.C. 187, 189, 201(b)(1), 207(a).
5. E.g. 30 U.S.C. 1202(m), 1291(b).
6. E.g. 42 U.S.C. 4331(a), (b)(3), (b)(4), 4332.
7. Commonwealth of Massachusetts v. Andrus, 594 F.2d 872 (1st Cir. 1979).
8. U.S. Office of Technology Assessment, 208.
9. Id., 211.
10. Id., 210.
11. See generally, Burton, Federal Leasing-Restrictions and Extensions, 28 Rocky Mountain Law Institute, at 1134-48.

C. Proposed Colorado Lease Sales Conflict with BLM Land Use Plan

Introduction

Coal leasing EISs are important for a number of reasons which are well known to you. From both a practical and legal perspective they act to implement decisions in federal land use plans. The land use plans incorporate decisions regarding coal and other resources and restrictions and controls on development. The DEIS carries lands suitable for further leasing consideration into lease sales. Lease sales must conform to the guidelines and restrictions established in land use plans. Mitigation of impacts by lease stipulations in the DEIS are directly connected to completed land use plans. Consequently, a DEIS reveals if it has been clearly and specifically guided by land use plan requirements.

The Uinta DEIS discusses land use planning covering the coal lease tracts in Colorado and Utah (p. 4, 6-7, 69-75, 113-114, 137-138, 178, 222-223, 280-281, 325-326, 358). Based on the DEIS it was difficult to determine if the proposed lease sales are consistent with either BLM or Forest Service land use plans. Specific requirements of the completed plans (Table 1-1) are not identified and unsupported statements that sales are not in conflict with land use plans appear frequently. Consistency with plans is assumed "if" mitigation measures are directed. Such consistency, which is required by law must be substantiated by tying mitigation measures to specific objectives of land use plans. The DEIS is faulty because it considers lease tracts in areas where the land use plans are not finished and where litigation is ongoing.

While the DEIS does not contain sufficient information to determine if the proposed lease sales in either Colorado or Utah are consistent with completed land use plans we are able to address this issue regarding the

Colorado tracts because of our past involvement with land use and activity planning concerning the North Fork area and access to additional documents other than the DEIS.

After reviewing the DEIS, BLM land use plan, and giving careful review to the proposed Lease stipulations we have concluded that the two proposed lease sales are not consistent or compatible with the land use plan. (Final Planning Amendment for the North Fork Planning Unit Management Framework Plan including specific objectives which were incorporated into the North Fork Amendment by the Colorado State Director on December 30, 1981). The proposed lease stipulations fail to protect "surface and ground water flows" and associated water rights. The DEIS eliminates "water insurance" as a stipulation. The water replacement stipulation lacks enforcement, disregards Colorado water law (plan of augmentation) relies on another agency's regulation and is so severely deficient that it does not ensure water replacement. It appears that stipulations Numbers 1, 5, 14 attempt to deal with "mining restrictions." These stipulations contain unsatisfactory language, include unacceptable loopholes, encourage interruption of water supplies and do not provide protection to "areas containing surface water resources".

These major deficiencies must be cured before any future Colorado lease sales can be compatible with the North Fork Amendment as required under Section (3)(A)(i) of the Federal Coal Leasing Amendments Act (FCLAA). As part of our comments we have recommended lease stipulations which will ensure compliance with FCLAA and many other statutes discussed in our comments.

The discussion of required authorizations is very limited and ignores mitigation and compatibility requirements of the statutes discussed (i.e. pp. 2-4). The protest of the North Fork Amendment is briefly mentioned (p. 6) as affecting the schedule of the issuance of calls for expressions of industry

40-11

40-12

interest. The objectives to protect water and water rights with specific lease stipulations are missing. The DEIS states that the Colorado lease tracts "were found acceptable for further leasing consideration through application of the unsuitability criteria in 43 CFR 4361." (p. 138). This is incomplete and misleading because the tracts are also acceptable because of the water protection objectives of the North Fork Amendment. Also, the table on page 7 states that the Amendment was completed in October 1981 when (under ELFPA regulations in existence at the time) it was not completed until December 1981).

Additionally, there is no treatment of Land Use Plans, Controls and Constraints in any of the leasing alternatives for the Colorado tracts. This is inconsistent with the treatment given this subject for Utah tracts. Many of the deficiencies should be cured by incorporating our comments in such a chapter.

D. Base-Line Data is Deficient

The base-line data included in the description of the affected environment is extremely superficial and is so limited and general that analysis of the impacts is done in an information vacuum. Inclusion of site-specific information is also essential for the development of lease stipulations.

The DEIS contains very little water resource data in either the regional or site-specific chapters. The description of the Gunnison Basin Drainage (pp. 133-134) seems to imply that lower elevation watersheds and streams are of limited value. The lower watersheds and streams produce water and in many instances act as conveyance systems for water produced at higher elevations. Such discussion of water resources fails to recognize the value of water in semi-arid regions, such as the North Fork.

Only a very general description of the surface and ground water region is included. The discussion of water quantity and distribution gives numbers

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of ditches, springs, stockpounds and classifies streams. Actual water quantity figures are nonexistent. Also missing is data concerning recharge areas, and ground water resources. While faults are mentioned the DEIS does not recognize that faults are quite extensive at the Paonia tract and subsidence impacts are more severe in faulted areas.

The treatment given water rights is totally inadequate, misleading and inaccurate (p. 135). The DEIS is totally lacking in a water rights assessment needed to determine the location, quantities, sources and ownership of water in and near the lease tracts. This assessment is necessary to determine who can be affected and the quantity of water which can be affected by mining.

The DEIS states: "There are several water decrees in or adjacent to the coal lease tracts". This statement is inaccurate. Existing data identifying water rights which can be affected document many rights. This data is available from the State Engineer's Office (Denver, Colorado, Water Division No. 4, Montrose and Cedaredge, District 40).

The treatment of water flows is limited to the 1981 total for Water District 40. Instead of identifying direct flow figures, for affected watersheds connected with the lease tracts, the DEIS estimates the direct flow for the entire area.

The description of land use in the North Fork Valley is also in need of improvement (p. 137). The statement that the Cedaredge farms and orchards are owned primarily by retired persons is questionable and implies that these operations may not be serious farming operations. The Cedaredge area is a major fruit growing region with many large and small scale operations which are heavily dependent on water from higher elevations. Additionally, the DEIS states where coal operations obtain their water. This statement is not quantified with specifics such as actual water sources, availability or legal constraints.

In order for future NEPA documents to properly examine the potential impacts of mining on water and associated water rights the BLM must collect the following:

1. Determination of the recharge area for East Roatcap, Terror Steven Gulch, Coal Gulch and other streams. Location and monitoring of springs, alluvial aquifers and total water quantity tied to these water sources is necessary.
2. Determination of the ground water resources of the coal lease tracts and surrounding areas. Sources of springs and seeps should be included.
3. Complete water rights assessment and inventory. The location, quantity, source, and ownership of water within lease tracts and affected downstream areas.
4. Data collection and analysis in the form of a cumulative hydrologic impact statement associated with mining of the lease tracts and other anticipated and existing mines.

E. The DEIS Fails to Adequately Assess the Impacts of Mining on Water and Associated Water Rights

This treatment of farming and water sources results in a complete failure by the DEIS to provide any sense of the tremendous importance of agriculture and water and water rights in the North Fork Valley.

The DEIS claims to analyze the impacts of coal development arising from the implementation of any one of four alternatives. While the analysis does reveal that the impacts and risks of subsidence on water and water rights could be substantial, it is inadequate for a number of reasons. First, the DEIS includes an extremely limited discussion of site-specific impacts. Second, the general discussion that is provided is vague, superficial and in many instances unsubstantiated, misleading and inaccurate. As a result of

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these deficiencies, the Secretary will not have the type of information he needs to decide whether or not to hold a lease sale.

The DEIS even admits the deficiency of its site-specific analysis by stating that information is often unavailable and additional site-specific analysis will occur during the permitting process for individual tracts (p. 143).

Postponement of adequate environmental analysis until the mine plan stage is a serious departure from the Department's 1979 program. The approach raises serious questions concerning the BLM's willingness and ability to fully implement the water protection objectives of the North Fork Amendment and contradicts the BLM's NEPA obligations. These obligations were explained by the District Court in Berklund:

"[The] contention that NEPA will be best served by deferring an EIS to the mining plan approval stage conflicts sharply with EPA's reasonable policy requiring an EIS prior to the 'irreversible and irretrievable commitment of resources.'" Berklund at 938-39.

The decision to hold lease sales constitutes such a commitment especially as it relates to water. As the DEIS points out, impacts on water resources resulting from subsidence are irreversible (p. 255).

The DEIS provides only a very sketchy discussion of the existing resources or the consequences of mining to them. The DEIS does not include any meaningful information of the water resources or water rights connected with the specific tracts. It does not even convey the fact that surface water resources on the coal lease tracts are extremely valuable, especially to the downstream water owners with adjudicated water rights.

The description of surface and ground water resources and quantity is so general as to be virtually useless. No description of existing uses is provided. The discussion of environmental consequences admits that water resources "would be lost" or disrupted, but does not specify where or how much.

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The DEIS gives no treatment to the impacts on either specific springs or stockpounds on or near the lease tracts. While the DEIS states that streams, irrigation ditches and pipelines could be ruptured and water flows diverted and diminished, it does not tie those potential impacts to the discussion on water rights. The DEIS does not identify which water rights may be affected or even acknowledge that these impacts would severely damage valuable water rights. If water is lost, irrigated lands and domestic lands will be adversely affected. The DEIS must be changed to reflect actual water loss, impacts on agriculture and domestic users. Acreage figures need to be adjusted to show the real number of acres which may be taken out of production because of mining impacts.

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In an arid region, such as the North Fork Valley, protection of surface and ground water flows and associated water rights is vital. The DEIS indicates that mining of the Colorado tracts "could" or "may" affect water resources adversely, but it does not identify the precise nature and extent of the impacts. The DEIS attempts to negate water impacts caused by subsidence by 1) implying that subsidence will probably not affect the surface where there is 500 feet or more of overburden; 2) stating that it is not anticipated that water systems would be significantly affected; 3) limits water loss to additional consumptive use and change of use and compares the percentage change to the total annual discharge of the Gunnison River instead of affected drainages; 4) stating that water flows affected by subsidence would result only in mine inflow and consequently could be pumped out of the mine and diverted back into water sources; and 5) assumes that the proposed lease stipulations will protect water and owners of water rights.

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While the DEIS states that subsidence "could occur on any portion of the 6,845 acres in the two tracts" it assumes that subsidence is likely to occur

only where the overburden is 500 feet or less and that about 25 percent of the lease tract acreage has this amount of overburden. The OEIS makes no attempt to identify acreage with 500 feet or less of overburden and compare these areas with water resources. This is particularly important because many of the drainages are in areas on the tracts that have less overburden.

Additionally, we question the use of the 500 foot figure. The 1980 Report by Dunrud and Osterward is given as a source for this conclusion. The BLM may have misinterpreted this report. Other reports and studies, specific mine plans and monitoring of actual mining operations, as well as conversations between COSC staff and hydrologists and geologists question the 500 foot figure in determining subsidence probability.

The OEIS does not explain why it is not anticipated that water systems would be significantly affected or why mine inflows are expected to be low.

The OEIS recognizes that water and water distribution systems could be disrupted but it does not estimate the magnitude of the impacts, or quantify water loss in terms of quantity. Water loss and acreage taken out of agricultural production is limited to an increase of consumptive use related to mine use and population increases. The OEIS attempts to dilute the impacts by ignoring specific drainages and assessing water use change for the entire basin.

The OEIS assumes that pumping water from mines because of inflows caused by subsidence is a solution to protecting water. However, it does not explain why the BLM believes that all water flows which can be affected will end up in the mine.

The BLM projects that there will be changes and disturbances in aquifers and distribution of surface water but the OEIS fails completely to quantify impacts on specific water sources, including springs and stockpounds, pipelines, ditches and owners of water rights.

At approximately the same time the BLM released the OEIS, the U. S. Geological Survey released a report on hydrology and subsidence potential of the two Colorado tracts included in the OEIS. To a limited extent, this report contains some of the information which we identified as data that needs to be in the OEIS. We found the USGS Report useful in reviewing the OEIS and have some observations to make.

The Report recognizes the value of water essential for irrigation, domestic and other users and states that subsidence could "affect water users in the surrounding areas."

The most important finding of the report is that underground mining of the lease tracts can interrupt flows of springs and streams and such disturbances on the water resources may have significant impacts (emphasis added). This seems to be in direct conflict with certain statements in the OEIS.

The OEIS states:

"It is not anticipated that water systems... would be significantly affected..." (p. 245).

and

"The quantity of water... lost... is expected to be low" (p. 245).

Also the discussion of potential water loss with regard to some specific water sources (i.e. Stevens Gulch and East Boatcap) was more detailed than the OEIS, but still short of what NEPA requires.

The discussion of the elements which contribute to subsidence and the ways subsidence can effect water resources reveal that the amount of overburden thickness is but one factor to consider when assessing subsidence potential. The assumption, in the OEIS, that subsidence is unlikely in areas with 500 feet or more of overburden is unsubstantiated by the USGS Report.

The BLM needs to recognize the significance of water loss and disruption

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of water resources and resolve this contradiction. Future NEPA documents prepared by the BLM need to respond to the USGS Report and include and expand on the data and impact assessment contained in this report.

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F. The DEIS Fails to Mitigate Potential Impacts with Protective Lease Stipulations

In general, NEPA requires a DEIS to contain effective mitigation measures so that the environmental impacts of government decisions (such as holding a federal coal lease sale) will be prevented or minimized. In the case of the two North Fork Valley Coal lease tracts detailed mitigation measures are required in addition for the more specific purpose of providing protection of surface and ground water flows and associated water rights. This protection must include an effective combination of water insurance, water replacement and restriction of mining from areas containing surface water resources.

The requirement for water protection stipulations is based on the "compatibility" section of FCLAA, Department Regulations (43 CFR 3420.1-5), additional statutes, and judicial decisions as discussed in our detailed comments.

The duty to include specific water protection stipulations is based on the "compatibility" requirement of FCLAA, the mitigation mandates of NEPA, additional statutes and judicial decisions (discussed in detail in these comments) Department regulations (i.e. 43 CFR 3420.1-5) and the relevant stipulation objectives (guidelines, standards, controls and constraints) established in the North Fork Amendment.

The mitigation measures proposed as lease stipulations are grossly insufficient, both to prevent and minimize impacts on water resources and associated water rights and to provide compliance with numerous statutes and

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Department regulations. The proposed lease stipulations do not mitigate the impacts discussed in the DEIS. Additionally, the text of the DEIS which treats land use planning and mitigation is insufficient and incomplete. The DEIS does not analyze the effectiveness of the proposed stipulations, as is required under NEPA. If the DEIS had done this the analysis would undoubtedly find that few, if any, of the proposed stipulations fulfill the purpose for which they are intended.

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Our observations are demonstrated by the following review of the proposed measures which relate to subsidence impacts on water and water rights. Since the DEIS does not clearly identify the basis for specific stipulations (i.e. objectives in a particular BLM land use plan) we have made certain assumptions after comparing the stipulation language and water protection objectives of the North Fork Amendment. Other stipulations affect or have a bearing on water protection and are also discussed.

Water Insurance

The DEIS states "the BLM would not require that the lessee purchase water insurance" because it is "the less desirable option[s]" and not needed because the mitigation measures in the DEIS are sufficient and "will eliminate any major foreseeable risk." (No. 17, pp. A3-13 to A3-24). The treatment of insurance in the DEIS is not an objective analysis of a water insurance stipulation and falsely assumes that other stipulations supposedly effecting mining restrictions and water replacement requirement negate the need for insurance. The DEIS should have included alternative water resource stipulations for the public to review and comment on.

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It may have been the BLM's thinking that stipulations No. 5 and 14 would alleviate any need for property protection and liability requirements because subsidence would occur sooner rather than later. The assumption is that "water

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supply interruptions" would not "emerge beyond the mines life expectancy" and damaged water owners could receive compensation from the mine operator. The language in No. 5 and 14 encourages, or at least condones water supply interruptions. This is preposterous because this is what lease stipulations are to prevent.

The question of liability and a mechanism to assure damages for water loss is not even mentioned in the discussion of mitigation or hinted at in what appears to be Stipulation No. 17. This is an important issue because 1) water loss resulting from subsidence can occur many years after a mine has ceased operations, 2) no existing procedure with bonds exists at the permitting stage, and 3) unknown or questionable effect of standard language in numerous times and conditions of the coal lease form.

Subsidence can manifest on the surface above mined-out areas many years after mining has ceased and the lease, permit and standard bonds are no longer in effect. If no separate water loss insurance policy or bond, which would be required in a lease, is in effect, the likelihood for compensation is greatly reduced. Transfer or relinquishment of the lease, corporate changes by the lessee (purchase of lease by another company, bankruptcy could further exasperate compensation to water users.

Neither the standard coal lease nor the permitting process includes bonds for water loss. Section 4 of the standard coal lease form includes bonds which may protect only the interests of surface owners. The bond may indemnify the federal government from liability for water loss. If that is the case, the lessee should be liable and a provision in the lease should clearly require acceptance of liability by the lessee and an institutional procedure to deal with damages and compensation.

Also, sections of the standard lease form concerning cancellation and non-compliance (Sections 2 and 21), protection of surface resources (Section 13),

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waiver rights of lessee (Section 22) and readjustment of terms and conditions (Section 33) may affect the effectiveness of any water protection requirements, including an insurance policy or separate bond for water rights.

The DEIS should have included the standard lease form, and possible modification so the public could review and assess their impact on stipulations, such as an insurance policy.

The DEIS is defective because it dismisses the use of a water insurance stipulation and is totally lacking of any description of alternative methods to guarantee compensation or even place liability.

We believe that a water insurance or bond is required and as a matter of law and policy is reasonable and practical. A Congressional report published in 1979 discusses and examines the management of mineral resources on federal lands (Management of Fuel and Nonfuel Minerals In Federal Lands, Current Status and Issues, Office of Technology Assessment -- referred to as OTA Report). The OTA Report assessment is inadequate of existing management and the possibility that mining will occur without compensation for non-mineral resources.

The OTA Report supports compensation as a way to achieve environmental protection, criticizes current lease provisions concerning payment for damages as "usually insufficiently" limited. It identifies inadequate protection for non-mineral resources as a major issue, in part, because of lack of compensation for damage to non-mineral resources including dams and watersheds. The Report concludes:

"Miners could be required to pay for damage to some publicly owned as well as privately owned surface resources and facilities. . . these [requirements] could provide for better balancing of mineral and non-mineral resource values than occurs under the existing systems."

We believe that the discussion of compensation in the OTA Report has merit and that the BLM should reconsider its position on water insurance in

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the DEIS. We continue to recommend the water insurance stipulation as it appears in our following comments. We are open to a bond with similar standards and provisions as those in our recommended lease stipulation.

Enclosed with our comments are copies of documents from insurance companies concerning liability coverage for subsidence, adjacent support, and water rights. It can be done!

Water Replacement

The DEIS developed numerous "tract-specific" stipulations that appear to be in response to the water protection objectives which were incorporated into the North Fork Amendment in December 1981. Since the text of the DEIS does not identify which proposed stipulations are based on specific planning requirements we can only assume that Stipulation No. 16 (p. A3-13) is an attempt to comply with the water replacement requirement of the North Fork Amendment.

Certainly Stipulation No. 16 deals with water replacement but it is inconceivable that such a measure is considered mitigation. It is overly vague and general, contains no real standards which insure protection of the adjudicated water right holders, is not enforceable, disregards Colorado water law requirements and references another agency's regulation which is of little value. Also, the stipulation is broadly worded and can be applied in an ad hoc manner and create considerable uncertainty with respect to the requirements that will actually be imposed on the lessee.

In sum, this proposed stipulation is a facade of water replacement and does not protect surface and ground water flows and associated water rights.

The stipulation uses the word "injured" but does not specify what constitutes injury. Injury would include contamination, elimination, diminution or interception of a water supply affected by mining activities.

Although the stipulation ties water replacement to the mine plan permitting stage, it leaves it up to the lessee to choose "a water right replacement

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plan that is both workable and reasonable." To leave this to the discretion of the lessee ignores the water replacement provisions of state law as set forth in SS 37-92-101 et seq., CRS 1973. The only method to legally assure that replacement water is available is an adjudicated plan of augmentation. In this regard, the stipulation is inconsistent with the text of the DEIS.

The DEIS states:

"The mine company would need to develop water on-site and replace any lost water with an augmentation plan using off-site water sources." (DEIS at p. 414).

The discussion of on and off-site water is a strong indication that replacement water should come from sources outside any portion of drainages included in the Colorado lease tracts. Obviously substitute, replacement, or re-routed water must come from areas which will not be undermined by coal operations. The stipulation has no such requirement.

While the stipulation would require approval by the BLM of the water replacement plan, enforcement is extremely questionable. The permitting process and its public participation requirements rely heavily on completeness and compliance reviews which the permit must satisfy before subsequent decisions and approvals are made. Because of the way the permitting system works, water replacement must be adequately enforced by conditioning and scheduling delivery of an augmentation plan to the completeness and compliance decisions. Without this requirement it is impossible to ensure that mining will not occur before the lessee has verified that water replacement is physically and legally available.

It is improper and inadequate for the BLM to reference 30 CFR 783.17 as a method to protect water. This is not an adequate performance standard and does not mitigate special environmental harms or risks. It is questionable, at this time, to determine for sure the requirements of 783.17 because the

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Office of Surface Mining Reclamation and Enforcement (OSM) is totally revising its regulatory program. In June OSM published proposed rule changes regarding hydrology and geology including 783.17. This proposed regulation concerns alternative water supply information and has been renumbered 784.14(f). Proposed 784.14(f) only requires that mining plans include information on water availability and alternative water sources. It does not require replacement of water, or even that the mine operator have legal rights to water that can be used as replacement water. 784.14(f) relates to the hydrologic balance requirements of 784.14(i) and other regulations which do not include water rights and are limited to avoiding acid and toxic drainages, prevention of contributing suspended solids into streamflows, maintenance and removal of water-treatment facilities.

The proposed lease stipulation has additional deficiencies. The language "with equal or higher quality water" would allow the lessee to use more junior rights to replace senior rights and is thus inconsistent with Colorado water law. Also it contains no provision to encourage the affected water owners and the lessee to work together and reach agreements on water replacement before the lessee submits a proposed augmentation plan in District Court. Additionally, our comments, in part, on the reliance on OSM regulation 817.54, apply equally to the BLM's misguided reliance on 783.17.

We believe that the water replacement recommendation represents a reasonable, effective and enforceable method to ensure water replacement and compliance with the North Fork Amendment. We would like to modify our recommended lease stipulation with the following:

Any unquantifiable water loss in an affected watershed that can be neither proven or disproven because of statistical uncertainties of the water monitoring program can result in loss of water to owners of vested water rights.

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There shall be a prima facie presumption that this water loss is caused by mining.

Mining Restrictions

The DEIS includes a number of lease stipulations which appear to be related to the mining restriction objective in the North Fork Amendment as well as the mitigation measures identified in the tract profile (No. 2, p. A3-1; No. 1, p. A3-9; No. 5, p. A3-10; No. 8, 9, p. A3-11; No. 14, p. A3-12). The primary focus of our comments is on proposed lease Stipulations No. 5 and 14.

The major flaw of the purported mining restriction stipulations is that they do not establish underground buffer zones under and adjacent to water resources. They do not correspond with the description of impacts in the text of the DEIS and they do not resolve the water protection issue from either the point of view of the water users or potential lessees.

Stipulation No. 2 states:

"The United States government does not warrant that the entire tract will be susceptible to mining."

It is unclear exactly what this means. Does it mean that future lessees will not be able to mine all of the recoverable coal because of mining restrictions or does it mean that all of the coal is not minable for other reasons. Or is it an implication that the BLM does not know what coal resources are actually in a given tract. This provision raises serious questions concerning whether the lessor is a knowledgeable seller and therefore unable to determine fair market value. On the other hand if this stipulation is a way of telling prospective bidders that mining restrictions can or may limit the amount of recoverable reserves it is an inefficient way of doing it. As with all the standard and special stipulations there is no explanation, description, or

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analysis of them. This is a major failure of the OEIS.

Stipulations No. 8 and 9 concern state-of-the-art mining techniques and angle of draw and are tied to stipulations or mitigation measures identified in the tract profile and are based on mitigation measures of the North Fork Amendment which existed prior to December 1981. We continue to question the usefulness of these stipulations for reasons explained elsewhere in these comments. We still must ask what is the state-of-the-art and who determines this, and when will they determine this. The same questions hold true for Stipulation No. 9 -- what is the appropriate angle of draw and who determines this and when. It seems that the stipulations have not been further developed with greater specificity since the land use planning process. Our questions remain unanswered. There is no discussion in the OEIS as to how this language prevents subsidence and protects certain resources from subsidence.

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All stipulations, No. 1, 5, and 14 are severely deficient and inadequate for purposes of establishing a restriction of mining from areas containing surface water resources.

Stipulation No. 1 merely requires the lessee to avoid surface disturbances within a buffer zone which has not yet been defined. A maximum width of 100 feet is prescribed but there is no rationale for this figure and no comparison with the riparian zones established when the lands unsuitability criteria was applied during land use planning. The purpose of the stipulation is to avoid disturbance within riparian areas yet the last sentence is an unexplainable loop-hole. This exception defeats the whole purpose of the stipulation. Also, the word "would" is used throughout, instead of shall.

In no way is a stipulation with a major exception, which only seeks to avoid disturbance, a mining restriction which is able to protect water and associated water rights.

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Stipulations No. 5 and 14 have serious problems and unfortunately fail to protect either surface or ground water supplies needed to satisfy adjudicated water rights. The stipulation language does not match up with the description of impacts, appears to emphasize only water supplies for alluvial valley floors and prime and unique farmland and allows for loss of water and consequently damage to adjudicated water rights.

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While coal extraction needs to be prohibited in certain water resource areas, these stipulations make no real attempt to achieve this goal. The stipulation prohibits mining where subsidence would disrupt water supplies.

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Since the text of the OEIS states that "subsidence could offset pipelines, ditches, or roads, disrupt ground and surface water systems, and cause or activate the geologic hazards" and "could divert portions of the flow of surface and ground water systems", the use of would is in conflict with the environmental analyses in the OEIS.

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The stipulation does not protect all on-site and downstream adjudicated water rights. Pipelines, ditches, other water conveyance systems, streams need to be specified. The stipulations' main failure is that they do not establish in the lease an underground buffer zone under and adjacent to specific water sources. If this is not done the lease sale will not include bonafide mining restrictions.

Additionally, the requirement that subsidence be engineered to induce subsidence and fracturing is in conflict with environmental protection requirements of many statutes including the Surface Mining Control and Reclamation Act. The reasoning behind this to cause water supply interruptions sooner, rather than later, violates the concept, spirit, intent, of many statutes, the North Fork Amendment and plain common sense.

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In another section of our comments we recommend a mining restriction stipulation. With regard to buffer zones under perennial or intermittent

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streams, irrigation ditches, pipelines or other water conveyance systems, the prohibition of mining would not be complete. Limited access to the other side of the above water systems could be permitted but only by limited access through entryways. Limited access does not mean a recoverability limitation on recoverable reserves. The buffer zone for irrigation ditches, pipelines or any man-made conveyance systems should be of a specified width and measured from the center of the respective systems. The buffer zones for streams (including East Roatcap) should also be of a specified width but should be measured from the edge of the valley fill not the center of the stream.

The DEIS has failed to mitigate subsidence by developing inadequate lease stipulations, containing no underground buffer zones. Consequently the DEIS states that the Paonia tract contains 40 million tons of recoverable coal. Future NEPA documents must establish buffer zones, include a stipulation that accomplishes this and lower the reserve figure for the Paonia and Cedaredge tracts.

The following are general comments regarding mitigation and the treatment of stipulations in the DEIS.

The introduction to the site-specific stipulations for the Paonia and Cedaredge tracts leaves open whether or not the special stipulations will apply to both tracts. We believe that the BLM does not have that discretion and must apply stipulations to both tracts in order to avoid conflict with the land use plan. This does not apply to Stipulation No. 10 (p. A3-11).

The DEIS also states the following:

"These measures may be modified as deemed necessary by the BLMs, Uncompahgre Resource Area Office in Montrose, Colorado."

The meaning of this is unclear. Is the DEIS is talking about the writing of

lease stipulations for the next NEPA document, or modification of lease terms after the lease is issued. Stipulations may be added (under 43 CFR 3475.1) but they cannot be modified, waived, or changed after the lease sale. If this statement refers to preparing stipulations in the continuing NEPA process, substantial involvement by both the Montrose District and Colorado State Office is appropriate.

One last comment on lease stipulations. The introduction (p. A3-7) states that the lease "stipulations are based on the mitigating measures contained in the individual site-specific tract profiles." No mention is made of requirements of completed land use plans or whether the tract profiles are consistent with these plans. Again, the DEIS does not contain documentation showing consistency between BLM land use plans and proposed lease sales.

In addition to impacts on water, transportation problems also exist with both the Paonia and Cedaredge lease tracts. The treatment in the DEIS is extremely limited and inadequate. The description of the existing environment does not even describe the existing trucking from the Orchard Valley Mine, or recognize the access problems for the Cedaredge tract. Also, there is no description of the cumulative trucking and railroad operations in the North Fork Valley. The assessment of impacts (p. 249-50) is extremely limited and assumes a questionable goal of getting the trucks off only Highway 133. The DEIS is void of any description or discussion of alternative transportation route or methods for either of the tracts. There is no treatment given to new load-out facilities. The mitigation measure for the Paonia tract (Stipulation No. 13, p. A3-12), does not mitigate impacts and could increase them by allowing construction of a private haul road across Garvin Mesa. The stipulation needs to be changed to prevent this from happening.

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Colorado Open Space Council

Letter Response 40-11
See Responses 3-1 and 40-10. Conclusion noted. "Proposed Lease Stipulations" are actually proposed mitigation measures.

Letter Response 40-12
See Response 3-1. A section has been added for the Colorado portion of the Affected Environment and Environmental Consequences chapters detailing Federal land use and county plans.

Letter Response 40-13
This section has been revised. See Response 40-12.

Letter Response 40-14
See Response 40-12.

Letter Response 40-15
See Public Hearing DH Response 17-6.

Letter Response 40-16
The EIS does not imply that the lower elevation watersheds in the Gunnison River Basin are of limited value. It states that the lower elevation watersheds are hydrologically different than higher elevation watersheds, in terms of precipitation, runoff, and ground water. The watersheds comprising the Paonla D Seam tract are not considered low elevation watersheds since they receive more than 12 inches of precipitation annually.

Letter Response 40-17
See Public Hearing DH Response 20-1.

Letter Response 40-18
See Response 3-1 and Public Hearing DH Response 20-1.

Letter Response 40-19
See Public Hearing DH Response 20-1.

Letter Response 40-1
See Response 26-3.

Letter Response 40-2
See Response 26-3.

Letter Response 40-3
See revised mitigation in Appendix 3 for water and Response 3-1.

Letter Response 40-4
The analysis in the EIS incorporated and referenced baseline data from several sources. Due to the large amount of baseline data collected over the past years, and because of the regional nature of the EIS, very little of the information was specifically identified in the EIS.

Letter Response 40-5
See Public Hearing DH Response 17-6.

Letter Response 40-6
See Response 3-1.

Letter Response 40-7
See Response 3-1.

Letter Response 40-8
See Response 3-1.

Letter Response 40-9
See Response 3-1.

Letter Response 40-10
It is required by law that BLM be consistent with the land use plan and these plans are available for review at the appropriate district offices. All land use plans considered in the EIS are complete and adequate for consideration of coal leasing. None of the related land use plans are in litigation.

Letter Response 40-20

Since the EIS is written to be regional in scope, the Gunnison River at Delta was the selected site for assessing changes in water quality and quantity, so both the Cedaredge and Paonia D lease tracts could be analyzed collectively. Also, the assumptions used to predict hydrologic impacts were not specific enough to assess impacts on individual tributaries to the Gunnison or the North Fork of the Gunnison River.

Letter Response 40-21

The reference that retired persons own the majority of Cedaredge farms and orchards has been changed.

Letter Response 40-22

The DEIS states, generally, how future coal operations will have to obtain additional waters since all waters in the study area are presently appropriated by the State of Colorado. It is strictly up to the future lessee, and the State of Colorado, as to how the lessee will obtain the legal rights to specific waters needed for future coal mining operations.

Letter Response 40-23

The BLM has obtained some of this data via the GS Water Resources Investigation Report 83-4069, which is referenced in the FEIS. Additional data will be collected by the lessee in accordance with rules and regulations enforced by the Colorado Mined Land Reclamation Division.

Letter Response 40-24

See Public Hearing DH Response 17-6.

Letter Response 40-25

See Public Hearing DH Response 1-8 and Response 3-1.

Letter Response 40-26

See Public Hearing DH Response 20-1. Page 245 of the DEIS states that any water lost to mine inflows, if not recovered, would be lost to the Gunnison Basin River system and could result in injury to adjudicated water rights.

Letter Response 40-27

See Public Hearing DH Response 9-2. Without a plan of operation, it is not possible to quantify expected water losses and where the losses would occur. Revised mitigation measures in Appendix Three are designed to protect the hydrologic balance which should prevent the loss of any water.

Letter Response 40-28

See Public Hearing DH Response 20-1.

Letter Response 40-29

See Public Hearing DH Response 20-1 and Response 40-26. At this stage in the coal lease process and with little existing data and the lack of a mine plan, no determination can be made as to how much, or even if, any water will be lost as a result of mining activities. The possibility does exist, however, as the DEIS states on page 245. Revised mitigation in the Final EIS was developed to provide protection to the hydrologic balance in and adjacent to the lease tract which would in essence protect all downstream water users, and prevent an actual water loss.

Letter Response 40-30

See Public Hearing DH Response 20-1 and Response 40-29. The North Fork Valley is not classified as an arid region (arid is defined as "A climate in which the rainfall is insufficient to support vegetation.").

Letter Response 40-31

Statement number 2 has been deleted from the Final EIS. The remaining assumptions made by the commentator have been analyzed and text revisions made.

Letter Response 40-32

There are three drainages within the 25 percent area; these are East Roatcap Creek, Steven's Gulch, and Oak Creek. It is not anticipated that these water systems would be impacted after the mitigation measures are applied.

Letter Response 40-33

The 500 foot figure was obtained from Dunrud (1976).

Letter Response 40-34

This statement has been deleted in the Final EIS.

Letter Response 40-35

See Public Hearing DH Response 20-1 and Responses 40-20 and 40-29.

Letter Response 40-36

The EIS states that if any mine inflows are not pumped from the mine, the water could proceed down dip and would be lost to the Gunnison Basin River system. It was not BLM's intention to assume pumping water from any mine is a solution to protecting water.

Letter Response 40-37

BLM projects that there could or may be changes in aquifers, etc., and since BLM presently doesn't have the data needed to determine if there will be changes to the hydrologic system, the DEIS cannot accurately quantify impacts on specific water sources. See Public Hearing DH Response 20-1.

Letter Response 40-38

These statements have been deleted in the Final EIS.

Letter Response 40-39

The DEIS states on page 244 that the surface effects of subsidence are more likely to occur where the overburden is 500 feet or less. This is consistent with the GS Water Resources Investigations Report 83-4069, page 22, that estimates if the coal bed thickness were 12 feet, an overburden thickness of greater than 500 feet is necessary to attenuate surface subsidence effects.

Letter Response 40-40

BLM has utilized the GS Water Resources Investigations Report 83-4069 in the assessment of impacts for both the Cedarredge and Paonia D Seam tracts in the Final EIS.

Letter Response 40-41

See Response 3-1.

Letter Response 40-42

The proposed stipulations have been revised in the Final EIS. See Response 3-1.

Letter Response 40-43

See Response 3-1.

Letter Response 40-44

See Public Hearing DH Response 8-1.

Letter Response 40-45

See Response 40-42.

Letter Response 40-46

See Response 3-1.

Letter Response 40-47

The analysis in the EIS assumed the application of these standard stipulations.

Letter Response 40-48

It has not been the practice to attach the stipulations in the standard lease form to EIS's and there are no anticipated changes to the standard stipulations.

Letter Response 40-49

See Response 3-1.

Letter Response 40-50

See Response 3-1.

Letter Response 40-51

See Response 3-1.

Letter Response 40-52

See Response 40-42.

Letter Response 40-53

This stipulation has been revised in the Final EIS. See Response 3-1.

Letter Response 40-54
See Response 3-1.

Letter Response 40-55
See Response 40-53.

Letter Response 40-56
See Response 40-53.

Letter Response 40-57
See Public Hearing DH Response 15-3.

Letter Response 40-58
See Response 3-1.

Letter Response 40-59
This is a standard lease stipulation and is part of all coal leases. The stipulation means that the lessee does not have the right to mine all the coal within the boundaries of the lease. Restrictions will be imposed on the lessee by mining methods, geologic factors, and mitigating measures.

Letter Response 40-60
Refer to the DEIS, pages A1-1, A1-2, A1-3, and A1-4 for usefulness of referenced mitigation measures. See page A3-11 for examples of state-of-the-art and how appropriate angle of draw will be dictated. These determinations are usually made by the lessee and Colorado Mined Land Reclamation Division, with assistance, if needed, from a variety of state and Federal agencies, during mine plan formulation, and mine plan application, review, and approval.

Letter Response 40-61
See Response 3-1.

Letter Response 40-62
See Response 3-1.

Letter Response 40-63
See Response 3-1. Without a plan of operation, which would provide more site specific data and details of the coal

extraction process, quantified impacts to the water resource are not possible. Therefore, the DEIS was prepared acknowledging the fact that impacts to the water resource could occur but not necessarily "will" or "would" occur. Mitigation, on the other hand, should always use "would" or "will" and never use the word "could", since mitigation is only needed where impacts will occur.

Letter Response 40-64
See Response 3-1.

Letter Response 40-65
See Response 3-1.

Letter Response 40-66
The revised mitigation in the Final EIS will incorporate the concerns expressed by this comment.

Letter Response 40-67
The mitigation measures have been revised to eliminate mining where the overburden thickness is less than 600 feet, within an established buffer zone. As a result, the reserve figure will be lowered by an amount that will be determined prior to lease sale.

Letter Response 40-68
The mitigation measures apply to both tracts unless otherwise noted.

Letter Response 40-69
This statement has been removed.

Letter Response 40-70
The tract profiles are consistent with the land use plan and any amendments made to the land use plan. Therefore, it is not necessary to mention the previous steps to the tract profiles. See Chapter 1 and the Land Use Plans, Controls, and Constraints section, in Chapters 3 and 4 for the completed land use plans in the FEIS.

Letter Response 40-71

See Public Hearing DH Responses 1-2 and 24-1 and Response 302. Text has been revised to include coal truck traffic occurring on State Highway 133 from the Orchard Valley Mine. Access problems relative to the Cedaredge and Paonia tracts will be analyzed when the alternative transportation routes and methods are analyzed.



STUCKER MESA
P.O. BOX 251
PAONIA, CO 81428
(303) 527-4586

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander:

Enclosed are comments by the Roberts-Stucker Ditch Association on the Uinta-Southwestern Utah Coal Region Round II Draft EIS prepared by the BLM State Office.

Individual members of the Association testified at the Public Hearing June 6, 1983 in Delta. However, the 5 minute limitation on speaking prevented a thorough examination of the issues and elaboration of specific recommendations for remedying the EIS. Therefore, we offer the comments on the following pages as a more complete compilation of our collective response to the EIS.

The Roberts-Stucker Ditch Association has a vital interest in the handling of the Paonia D Coal Seam tract which is proposed for lease by the BLM. The Roberts-Stucker Ditch holds decrees for early runoff water out of Roatcap creek dating from 1896 and totalling 6.15 cfs. Approximately 220 acres are irrigated out of the Roberts-Stucker Ditch.

Roatcap Creek, a tributary of the North Fork of the Gunnison, also serves as the conduit for Overland Ditch water to Association members on Stucker Mesa. Limousine cattle, Belgian horses, natural colored wool sheep, and specialty crops such as flowers are raised on the mesa, in addition to the traditional North Fork crops (fruit, hay and small grains). This represents quite an investment, which association members are anxious to protect.

Roatcap creek lies within the proposed boundaries of the Paonia lease tract and we (and other parties with decrees out of Roatcap and the Overland reservoir) are very concerned about the effects mining could have on our water. Residents of Stucker Mesa are also concerned about possible injury to our domestic water, which derives from springs lying just outside the tract. Any loss, pollution, diminution, or interruption of our water flows could result in considerable damage and hardship to association members.

Of course, we would prefer to see no mining at all under our water source and conveyance system. If the BLM finds it imperative to lease coal in the Roatcap Creek drainage, then the BLM must own up to its responsibility to protect water and water rights, as promised by the State Director in his response to the Protest against the North Fork YFP.

While the Draft EIS does go so far as to include proposed lease stipulations regarding protection of water and water rights, those stipulations are not detailed enough to provide real protection and contain many ambiguities or "loopholes" that we would like to see plugged.

Below are our comments on the "Mitigating Measures" relating to water found in Appendix 3 of the EIS draft. We are indebted to the Colorado Open Space Council for help in developing specific recommendations for improving the proposed stipulations.

Sincerely yours,

Steve Wolcott
Steve Wolcott

Felix I. Belmont
Felix I. Belmont

Linda Lindsey
Linda Lindsey

Claire Moore
Claire Moore

Paul Murrill
Paul Murrill

Cullen E. Thompson
Cullen E. Thompson

Robert S. Kirby
Robert S. Kirby

Thad S. Fouk
Thad S. Fouk

COMMENTS ON "MITIGATING MEASURES"--PROPOSED LEASE STIPULATIONS

2. P. A3-1. As we understand it, recent court decisions have indicated that the "Surface Mining Control and Reclamation Act of 1977" does not apply to underground mining. As any mining in the Paonia D Seam Coal Tract will be carried out underground, provisions of this act cannot be relied on to protect water or any other resources. This is one reason why lease stipulations must be detailed and specific.

P. A3-5 "The following stipulations will be included in addition to the standard stipulations on all leases issued on Forest Service land." This statement is ambiguous. It is not clear whether the stipulations will apply to leases on Forest Service land only, or to BLM land as well. We assume that they will apply to BLM land.

7. P. A3-6. Should read: Underground mining operations shall be conducted in such a manner as to prevent surface subsidence that would... (3) damage or alter the flow of perennial streams and streams carrying water legally appropriated by adjudication in the courts of the State of Colorado.

8. P. A3-7. When must existing surface improvements be restored or replaced if damaged? Who shall pay for damages or injury suffered in the meantime?

P. A3-9 Paragraph in middle of page should read: The following measures would be made stipulations to both of the Colorado tracts. (Delete the second sentence.)

1. P. A3-9. Should read: In order to avoid surface disturbance, including subsidence and fracturing, underground buffer zones shall be delineated on all perennial streams, all streams carrying appropriated water, and other areas supporting riparian vegetation (e.g., some intermittent streams, stockponds, springs, seeps, etc.). This pertains to areas in and adjacent to the lease tract. A minimum width equal to the depth of mining shall be maintained as the buffer zone on each side of the center of the stream, spring, etc. Where the riparian vegetation is more than that width, the entire riparian zone will be protected. Underground mining activities shall not be conducted in the buffer zone.

Note: it cannot be assumed that a standard 100 foot buffer zone used for protecting riparian habitat is appropriate for protecting water.

3. P. A3-10. Add the sentence: Lessee shall be responsible for all corrective steps necessary to prevent and remove accidental pollution.

4. P. A3-10. Should read: Coal extraction shall be prohibited where overburden subsidence or fracturing may disrupt the quantity or quality of a surface or ground water supply needed to satisfy an adjudicated water right (including irrigation water supplies to farmland. (Delete the following 2 sentences.) In order to remove the risk of damage due to water supply interruption emerging after the mine is closed, lessee will be required to purchase a bond or insurance policy to cover a period of 50 years beyond the life expectancy of the mine.

Note: The proposed effort to induce subsidence as soon as possible is in direct conflict with the attempt elsewhere to prevent subsidence. Also, as nothing can assure absolutely that subsidence will not occur after the mine is closed, someone must take responsibility for protecting holders of vested water rights in that eventuality. Perhaps the BLM would prefer to say: "The Bureau of Land Management will assume the responsibility of indemnifying holders of vested water rights for any damage or injury resulting from any loss, pollution, diminution, or interruption of water flows occurring after the mine is closed, the lease is terminated, or the lessee declares bankruptcy, etc."

14. P. A3-12 This is an apparent repetition of the above paragraph (4, p. A3-10). Was something else intended?

15. P. A3-13. Add the sentence: Also included will be an inventory of adjudicated water rights that might be affected by mining activities.

16. P. A3-13. Should read as follows:

The lessee shall be required to replace the water supply, with equal or higher quality water, of any owner of a vested water right where the water supply has been affected by contamination, elimination, diminution or interruption resulting from underground mining activities. Any unidentifiable water loss shall be assumed to be a result of mining activities. To ensure the protection of the adjudicated water right holders, in and adjacent to the lease tracts, the lessee shall submit to the permitting regulatory authorities an adjudicated plan of augmentation and replacement in accordance with state law as set forth in SS 37-92-101 et seq., CRS 1973. Neither the lessee, nor any succeeding operator of the coal lease and reserves shall be permitted to mine any of the coal reserves contained in the lease until the permitting regulatory agency has received a copy of an adjudicated plan of augmentation. Receipt of an adjudicated plan of augmentation by the permitting regulatory authorities is necessary prior to a finding of completeness and compliance on any future permit applications made by the authorities.

Replacement water shall come from sources outside any portion of drainages included in the lease tract and which will at no time be undermined by the lessee or any other coal mine operator. The replacement water shall be of sufficient quantity and quality, and of sufficient seniority to protect the historical and continued use of all vested water rights wherever those rights are legally in priority.

The augmentation plan shall be subject to review and approval by the BLM (at a minimum, this plan shall conform to Federal Regulation 30 CFR 193.16, "Alternative Water Supply Information.")

Note: Any plan of augmentation in the State of Colorado must conform to the laws of the State of Colorado and this plan needs to be adjudicated before any mining occurs if water is to be adequately protected.

17. P. A3-13. The BLM must provide some sort of protection for holders of water rights in case water loss, etc., occurs after the lessee no longer has fiscal responsibility. Protection of the rights of surface owners is covered by a bond--why not water rights? See COSEC recommended stipulation.

In addition to the above changes, the Roberts-Stucker Ditch Association would like to request an extension of the comment period for the Draft EIS so that the data collected on water resources and other resources by Colorado Westmoreland can be incorporated into the EIS. This would greatly improve the document and would also provide more time for interested parties to assess the EIS and comment on it.

41-15

Roberts-Stucker Ditch Association

Letter Response 41-1

See Public Hearing DH Response 1-8 and Response 3-1.

Letter Response 41-2

The recent court ruling has stated that so far as water replacement is concerned, SMCRA does not apply to underground mining. The mitigating measures section for the Colorado tracts have been revised to clarify water related stipulations and provide for water replacement.

Letter Response 41-3

The stipulations referred to apply only to tracts on Forest Service administered lands in Utah. They were not incorporated in the EIS for tracts on BLM administered lands in Utah or Colorado as they are a reiteration of SMCRA.

Letter Response 41-4

This is a Forest Service stipulation for the tracts in Utah and does not apply to the Colorado tracts. It is, however, similar to subsidence stipulations used for tracts on BLM administered lands.

Letter Response 41-5

The mitigation identified in the Final EIS should prevent damages to existing surface improvements. If through an unforeseen development damages do occur, the determination of injury and award of compensation would be decided through the Colorado State court system.

Letter Response 41-6

This paragraph has been revised. See Public Hearing DH Response 10-2.

Letter Response 41-7

See Response 3-1.

Letter Response 41-8

The impact referred to by the commentor is mitigated by mitigating measure number 1 on page A3-1 of the DEIS, which requires the lessee to comply with all applicable federal, state, and local laws and regulations. The mitigation referred to is redundant as it is covered by state regulation and has been deleted.

Letter Response 41-9

The buffer strip mitigation has been changed. See Appendix Three for changes.

Letter Response 41-10

See Public Hearing DH Responses 8-1 and 15-6.

Letter Response 41-11

This mitigation measure (14 page A3-12) was a repetition of mitigation measure 4 page A3-10. Both have been deleted from the text.

Letter Response 41-12

See Response 3-1.

Letter Response 41-13

See Response 3-1.

Letter Response 41-14

BLM has incorporated mitigating measures in the Final EIS that will protect the hydrologic balance of the lease tract and adjacent areas, which will in essence protect downstream water right holders. However, if through an unforeseen development, damage to water rights, large or small, do occur, the determination of injury and award of compensation would be decided through the Colorado State court system. Also see Public Hearing DH Response 15-6.

Letter Response 41-15

See Public Hearing DH Response 7-9.



STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114

SCOTT M. MATTHESON
GOVERNOR

July 6, 1983

Mr. Ron Bolander
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander:

The state of Utah's Minerals Leasing Task Force has reviewed the Draft Environmental Impact Statement (DEIS) for the round two leasing effort in the Uinta-Southwestern Utah Coal Region. I concur with the task force recommendations and endorse the following as the state of Utah's position.

A brief review of our prior correspondence on this round of leasing will furnish the proper context for our comments on the DEIS. In a February 16, 1982 letter to State Director Roland Robison, I supported the Regional Coal Team's leasing level ranges of 1.16 to 1.87 billion tons of coal and stated my concern that

...the high range of the leasing level may be beyond both the ability of the Interior Department and the Forest Service to properly clear tracts for leasing, and beyond the state's ability to adequately address potential socio-economic impacts.

The Secretary of the Interior overrode this recommendation and pressed the RCT to adopt a higher range of leasing levels, despite my concerns. In a subsequent letter of July 19, 1982, the RCT and the state made a request for consideration of seven alternatives ranging from no leasing through a series of incrementally higher alternatives to the excessive 2.127 billion tons insisted upon by Washington. Within this wide range, we endorsed a relatively moderate alternative IV for the purposes of study in the DEIS. This was not an endorsement of this aggregate level of leasing but rather an identification of a useful midpoint for reference in study between significantly higher and lower alternatives.

In view of the fact that Washington insisted on focusing on alternatives only in the higher range of leasing, designation of a preferred alternative for study purposes was misleading.

Mr. Ron Bolander
July 6, 1983
Page Two

In fact, analysis contained in the DEIS supports the wisdom of our two separate efforts to seek a study that included true low, medium and high alternatives. The three active leasing levels in the DEIS examine levels of development and associated impacts which are not meaningfully different from each other. Inclusion of a much lower leasing alternative would have provided useful and necessary analysis, data, and perspective in making a judgement about an appropriate level to be offered for sale in the next round. Consequently, we cannot fully endorse any of the alternatives, but can only make several observations which BLM should consider in structuring the upcoming lease offering.

1. The statement of purpose and need for additional leasing contained in the DEIS is totally inadequate.

2. The adoption of the no leasing alternative (4) would be unacceptable. Additional lease sales are needed to improve both the economic and environmental pattern of coal development statewide. For example, sales of federal leases are frequently necessary to combine with adjoining private and state blocks of coal to form logical mining units.

3. Air quality and wildlife analysis in the DEIS must be re-examined. Please refer to the attached comments.

4. Use of the state's Technical Report on Socio-Economics was incomplete with regard to specific information on individual communities and counties. We will work with BLM to correct these oversights and deficiencies before the final EIS is published.

4. The aggregate level of leasing identified in Alternative III is closest to the state's originally preferred range of lease offerings. Existing market conditions, however, suggest that the aggregate level of Alternative III may in fact be unrealistically high. We believe that level III can serve as a useful target for offerings, but only if tracts are offered in a phased approach. A series of sales, spaced over six month periods, would provide the opportunity to measure the fluctuating market conditions and assure sale of resources at true market value.

5. Support for the Alternative III leasing level does not represent support for the specific combinations of tracts BLM uses to arrive at that level. Unfortunately, this level does not include any Southern Utah (Alton) tracts which could be offered at this time. Several of the Alton tracts should receive consideration in one of the phases of our suggested staged lease sale to reach the

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DIVISION OF ENVIRONMENTAL HEALTH
150 West North Temple, P.O. Box 2500, Salt Lake City, Utah 84110-2500

Scott M. Matheson
Governor



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Community Health Nursing
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533-6108

June 20, 1983

JUN 20 1983

MEMORANDUM TO: Bill Dinehart, Health Planner

FROM: Brent C. Bradford, Director, Bureau of Air Quality

SUBJECT: Comments on the Air Quality Analysis for the Uintah-Southwest Utah Coal Region D.E.I.S.

There are several comments that the Bureau of Air Quality has with regards to the modeling analysis methodology and final impact results. They are:

1. The assumption of level terrain for use in Annual runs of ISCLT can lead to underconservative results. Most terrain in the Bryce Canyon area is complex and elevated above the main areas of coal mine development. By including a level terrain assumption, impacts against elevated terrain will be underestimated, thus impacts in Class I areas may be worse than predicted.

2. With regards to the Alton Coal lease area specifically, there are several faults in the input meteorology used in the computer modeling analysis, they are:

(a) The annual TSP impact analysis used a STAR data set collected at Bald Hill. This data set is bias towards wind directions from the northwest & north-northwest because of a strong influence from local drainage flows coming out of the small canyons northwest of the monitor site. When this data set is applied to the coal mine sources which are southwest of Bryce Canyon, most pollution is calculated as being transported to the southeast and away from Bryce. This data set may therefore underestimate the frequency of winds that blow towards Bryce Canyon, which in turn may underestimate pollution impacts in the Bryce Canyon area.

(b) The worst case 24 hour conditions in combination with PALDS showed associated impacts that were large near the mines and very small in the underlying areas. There is probably a condition that shows higher impacts at Bryce Canyon National Park. By trying more neutral or unstable meteorological conditions, impacts could be expected to be larger than those predicted using stable conditions because of the source-terrain configuration.

Mr. Ron Bolander
July 6, 1983
Page Three

aggregate level of Alternative III. The alternatives analyzed in the DEIS represent an all or nothing approach to Alton lease sales and are a simplified approach dictated by an unnecessarily tight EIS schedule. BLM should consult with state and local governments to achieve our stated objective of prudently developing coal resources in all areas of our state.

6. The final selection of the tracts for inclusion in the phased sales should be made with full consideration of the desires of state and local governments to select tract combinations reflecting both industry's need for specific leases and local government's desire to protect environmentally sensitive areas. For example, accommodation of both of these objectives should be achievable in the Carbon-Emercy area because of the number of possible tract combinations from which to select.

The BLM should be commended for producing a coal document representing a significant improvement over previous efforts, particularly in the face of significant budgetary and time constraints. Unfortunately, the lack of a meaningful low range of alternatives deprives the study of needed realism and perspective. The resulting analysis produces a series of potential scenarios with socio-economic and environmental impacts which appear to be very difficult to mitigate. By relying on the informed knowledge and expertise of the RCT members in developing future leasing alternatives, the Department will provide credible and useful decision documents essential to vigorous coal development in Utah.

Sincerely,

Scott M. Matheson
Governor

SM:jc



STATE OF UTAH
NATURAL RESOURCES & ENERGY
Wildlife Resources

1596 West North Temple - Salt Lake City, UT 84116 • 801-533-9333

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Douglas F. Doy, Division Director

3. The use of specific plume path coefficients is only valid in the original modeling analysis of SO₂ concentrations near Pittsburgh, Pennsylvania. These coefficients were developed from a best fit of local source-terrain-meteorological situations. Use of these coefficients for other source-terrain-meteorological situations will most likely give false prediction of plume behavior

42-10

4. In the visibility analysis, it is not clear what the worst one percent meteorological condition used are. Also, it is not clear how these conditions were determined.

42-11

5. With regard to the Wasatch Plateau area, the background Air Quality may be more precisely calculated by including the major coal mines as point sources at their actual locations, since current permitting shows that areas such as near Scofield & Hiawatha are greatly impacted by the coal mine fugitive dust.

42-12

6. The 24 hour senaria obviously did not show a worst case TSP impact. Measured values in the Price area occur during days of high wind. Fugitive dust from coal mine operations is the greatest during windy days. The Utah Bureau of Air Quality suggests using a high wind day (with associated emission factors) and try to calculate observed values in the Price area of around 300 ug/m³. Wintertime buildup of pollutants during prolonged inversions is an important mechanism in the impact of any pollution source within that local drainage area. Mountain and valley winds during the day and night respectively tend to slosh the pollutants back and forth, causing an accumulation of pollutants within the lower layer. The models used do not account for this physical process, which is considerably more important a mechanism than other process involved in the model calculations.

42-13

7. There were no mitigation procedures analyzed in this DEIS for TSP impacts showing violation of the primary and secondary NAAQS. With an increase of total TSP emissions from 111,981 T/Yr in 1982 to 204,273 T/Yr in 2000, areas that are already up to the secondary NAAQS will no doubt exceed the NAAQS (maybe even TWICE the NAAQS if one simply scales the impacts by the emission rate ratio of the year 2000 to the year 1982).

42-14

June 27, 1983

Mr. Ron Daniels, Chairman
Mineral Leasing Task Force
Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, UT 84114

Dear Ron:

We have reviewed the Draft Environmental Impact Statement for Round Two leasing of coal in the Uinta-Southwestern Utah coal region (SPCO Ref. UT 83506-010), and provide the following comments and recommendations for consideration in adopting a state response.

Generally speaking the leasing process does not impact wildlife except as it entails exploration activities that disturb wildlife habitat. However, emphasis should be placed on leasing those tracts that would have low impacts on the wildlife resource when developed. We particularly support leasing tracts accessible from existing portals and surface facilities.

We encourage an approach to leasing that minimizes opening new mines, and one that provides for orderly, dispersed development.

The EIS is generally satisfactory as it relates to wildlife. Our specific review comments are:

Page 28 through 34 (table 2-8). Neither the table nor the narrative are clear concerning why impacts under the no action alternative are greater or very similar to the production scenarios, e.g., soils, water, vegetation and land use. Analysis of the data suggests that many impacts identified for alternatives 1, 2 and 3 should be increased by the level described for the no action alternative.

42-15

Page 84, paragraph 2 (recreation). The inference by the draft that none of the lease tracts in Utah provide exceptional wildlife oriented outdoor activity is in error. Most, if not all, provide excellent opportunity.

42-16

Page 108, fig. 3-17. There is no key aid; therefore, the figure has no meaning.

42-17

Pages 108 and 216. The report indicates that sage grouse leks would not be affected by coal mining. However, Russo (1982) reported the occurrence of a lek within the Alton Coal Lease and it appears that it will be affected (see attached map).

42-18

Mr. Ron Daniels
June 27, 1983
Page Two


42-19
Page 111, 1st paragraph, 4th sentence should be changed to read, "Bald eagles occur only as winter visitors concentrating in the upper Virgin River and Sevier River Valleys. Lesser numbers occur throughout the Alton Coal lease and surrounding areas where they hunt for food."

42-20
Page 167. The discussions of wildlife impacts on a regional basis tends to rank potentially significant local impacts; losses appear to be only slight due to the immensity of the area. For example, on page 300, the latter half of paragraph 2 reports, "The loss of wildlife due to occupation, disturbance of habitat, and illegal killing would increase. Highway mortality, mostly in central Utah, would be in excess of 160 deer and elk annually and would be unavoidable; however, vitality of the various herds should not be significantly affected. An unquantified amount of big game habitat including winter range and calving ground would be lost. Region wide, the loss would be insignificant; however, in some areas, big game populations would be reduced as a result." The cursory summary of wildlife impacts in Table 2-8 appears to substantiate the concern for local losses. The overriding statements indicate that losses are expected to be slight and that overall populations would not be significantly reduced when in fact local populations may be seriously affected.

42-21
Page 194, paragraph 5 (recreation). Although it is true that our Division would have to increase fish stocking to maintain harvest success rates, increased stocking will be difficult to achieve with the existing hatchery system. Thus, fishing success may decline.

Literature Cited: Russo, W. 1982. Report on the sage grouse lek survey at the Alton Coal leasehold. Utah International, Inc. Environmental Quality Department.

We appreciate the opportunity to review and comment on this document.

Sincerely,

Douglas F. Day
Director

Attachment

State of Utah

Letter Response 42-1

See Response 26-3

Letter Response 42-2

Within the leasing target range the Regional Coal Team identified one alternative which is below the leasing target range. See Responses 26-2 and 27-4.

Letter Response 42-3

The analysis focused on regional impacts and data was accumulated by County or region. The purpose of the EIS is to inform the decision maker of significant issues rather than provide complete data by community. Information on a community level has been gathered and is available in a technical report from the State Planning Office.

Letter Response 42-4

The phased approach to conduct lease sales was used in the first round of the Uinta Southwestern Utah Coal Region and appears to be a possibility for the second round. The Regional Coal Team will make its recommendation on the lease sale in October of 1983 and the Secretary of the Interior will make the final decisions based on factors including this recommendation and the recommendations of the Governors of Utah and Colorado.

Letter Response 42-5

The final decision on coal leasing by the Secretary of the Interior could be on any of the alternatives or a variation of any of the alternatives (See Response 26-3). The State of Utah appears to favor a combination of tracts which is acceptable under the coal leasing process. This information should be sent forward at the time the final recommendations on coal leasing are made by the Regional Coal Team and the Governor can further confer with the Secretary in the consultation process.

Letter Response 42-6

The question of combination of alternatives as a recommendation is covered in Response 42-5.

Letter Response 42-7

The applicability of ISC for calculated impacts at Bryce Canyon from emissions at the Alton coal field is discussed in detail in the Southern Utah Petition Evaluation Document (OSM, 1980). EPA performed an air quality analysis for the SUPED and concluded that "little or no particulate matter would reach Yovimpa Point (or other high park receptors) because the mine plumes have not diffused enough vertically at these downwind distances." Because elevations at the southeast portion of the Park below Yovimpa Point are closer to the elevations of the proposed lease areas. Some particulate matter could reach this portion of the Park. EPA concluded that the ISC flat terrain model results at the southeast corner of the Park may be high by a factor of two. In summary, the SUPED analysis showed that use of ISC would overestimate, rather than underestimate, impacts at Bryce Canyon National Park. In addition, the ISC analysis done for the Uinta-Southwestern Utah EIS did not include deposition, which becomes highly conservative (overestimates impacts) at distances greater than a few kilometers downwind.

Letter Response 42-8

The meteorological data collected at the tower near Bald Knoll does show a high frequency of north-northwest (19 percent) and northwest (16 percent) winds, especially when wind speeds are low. This is the result of nighttime cold air drainage from the Paunsagunt Plateau. The tower is located in close proximity to the Mill Creek Canyon, Fisher Canyon, and Ford Pasture tracts, which are the most likely to affect Bryce Canyon. BLM considers the Bald Knoll data to be representative of conditions that would occur on the proposed Alton coal field lease tracts. It should be noted that southwest winds, which would transport pollutants toward Bryce Canyon are not uncommon and occurred about 7 percent of the time.

Letter Response 42-9

The reason that impacts are large near the mines and less for outlying areas is because the coal particles are large and fall out rapidly, thus few particles are transported more than a few kilometers. The short-term modeling using PALDS included particulate deposition, whereas annual modeling with ISCLT did not. The meteorological conditions used were generally neutral or unstable (stabilities C and D) with persistent flow toward Bryce Canyon. BLM considers the conditions used to most likely be the worst-case conditions from the Bald Knoll data set because of the long persistence of wind flows toward Bryce Canyon.

Letter Response 42-10

The plume path coefficients based upon Hoffnagle, et. al (1977) were used because of theoretical considerations. Even though the factors were developed for complex terrain in western Pennsylvania and have not been validated for complex terrain in eastern Utah, the scheme, which assumes the terrain correction factor is a function of stability and the ratio of terrain height to plume height is more theoretically sound than other schemes such as a half-height correction factor which does not account for the effect of stability. In order to obtain plume path coefficients validated for eastern Utah, a large scale validation study would be necessary. In this absence of such a study BLM feels the scheme used is the most physically realistic one available.

Letter Response 42-11

To determine the 1 percent worst meteorological conditions, first STAR summaries were used to rank dispersion by stability and wind speed. Sigma Z multiplied by U was used to rank dispersion. Because some wind directions occur more than others, the one percent worst-case condition is different for different wind directions and also varies depending on the location at which the meteorological data was collected.

Letter Response 42-12

BLM agrees that including existing coal mines as point

sources would more precisely calculate the background air quality. However, because final locations of the potential mining facilities are not known and because of the increased modeling costs associated with adding these point sources, it was decided to distribute the emissions from the existing mines to sub-county areas.

Letter Response 42-13

The 24-hour analysis was intended to realistically predict regional scale concentrations, including potential impacts to Class I areas. The MESOPUFF model was used for a period in which a prolonged inversion with low windspeeds occurred over central Utah. While MESOPUFF is appropriate for calculating regional scale impacts, it is not applicable in close proximity to emission sources, especially low level fugitive emissions that are most associated with mining activities. At the longer downwind distances analyzed for regional scale impacts, high windspeeds would cause additional dispersion and result in lower concentrations. We agree that fugitive dust impacts near mines would be greatest during windy days.

Letter Response 42-14

Mitigating measures have been added to the EIS (see Appendix Three). These include paving all long-term haul and access roads as well as other measures. However, general population growth will cause increased travel on other unpaved roads not associated with mines. It is the county or the States responsibility to pave these roads. We concur, and the EIS analysis predicts that the NAAQS will be exceeded, even with the additional mitigation.

Letter Response 42-15

The Table referred to examines each alternative separately. Alternative Four is the No Action Alternative which analyzes a projected expansion of coal activity even if no additional Federal coal is leased. Alternatives One, Two and Three consider anticipated impacts from development of the tracts under consideration.

Letter Response 42-16

The text has been changed to reflect your concern.

Letter Response 42-17

A key indicating the deer winter range symbol has been added to Figure 3-17.

Letter Response 42-18

Road, portals and facilities would not directly affect any lek on the Alton tract.

Letter Response 42-19

The text has been changed to read as suggested.

Letter Response 42-20

Table 2-8 has been changed to improve the summary description of impacts to wildlife.

Letter Response 42-21

The text has been revised to reflect your concern.

R. LAVANCOX
CHAIRMAN
WAYNE S. WINTERS
VICE CHAIRMAN
GEM H. CHURCH
SAMUEL J. TAYLOR
CHARLES C. CLARBOUGH
SECRETARY



43
Director
William D. Hurley, P.E.
Assistant Director
C.V. Anderson, P.E.

Don Hook
July 1, 1983
Page 2

UTAH DEPARTMENT OF TRANSPORTATION

4501 South 2700 West
Salt Lake City, Utah 84119

July 1, 1983

Mr. Don Hook
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Don:

This letter is intended to document those comments we have discussed by telephone regarding the Uintah-Southern Utah Coal Region, Round II draft EIS, to add additional specific comments, and to offer some general comments for your consideration.

I will begin with the general comments. As pointed out at a recent meeting of the State's Mineral Leasing Task Force, an advisory body to the Governor, by the representative of the State's Bureau of Health Planning and Facilities, the document does not address airports nor the potential for public transportation nor mine worker transit. These are also items that I feel should be at least mentioned if not addressed, specifically mine worker transit. The availability of worker transit today would mean less traffic on roads such as SR-10. The airport issue should be addressed because of the increased demand for air service as the result of industrial growth.

The list of specific comments which includes those previously discussed with you are as follows:

Page(s)	Change
257, 304, 349 & 368	200-year design traffic volume to 20-year design traffic volume.
122	Figure 3-18 shows a State Route 136; the State does not have an SR-136. The route shown is a county highway.
231	The fourth paragraph also refers to Highway U-136. See previous comment.
293	The seventh paragraph dealing with transportation needs clarification. It appears to place the Blue Trail Canyon and Walker Flat tracts in the Scofield-Clear Creek vicinity rather than in the Emery vicinity.

If you should have any questions or if we can be of further assistance, please feel free to call.

Sincerely,

Kenneth W. Riddle

Kenneth W. Riddle
Transportation Engineer

Utah Department of Transportation

Letter Response 43-1

Comment noted. The 200-year design traffic volume reference has been changed to 20-year design traffic volume on pages 257, 304, 349, and 368.

The designation of Highway 136 has been deleted from Figure 3-18 and Figure 4-7 has been deleted as it was a duplicate of 3-18. The references to Highway 136 on pages 121 and 231 have been replaced by reference to the paved county road to Alton.

Comment noted. The reference to Blue Trail Canyon and Walker Flat has been changed to Mud Creek and North Trough Springs.

SOUTHEASTERN UTAH ASSOCIATION OF LOCAL GOVERNMENTS

LEE SEMKEN
Chairman
P.O. Drawer A1 • Pirc, Utah 84501-0881 • Telephone (801) 637-5444
WILLIAM D. HOWELL
Executive Director

July 5, 1983

Mr. Ron Bolander
Regional Coal EIS Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander:

At the present time we are opposed to any new coal leases. With the present market conditions it seems that the new coal leases would be for speculative purposes only and the regulations are not strict enough (allowing 10 years for coal production) to require immediate development of the coal leases. We also feel that the resources should not be used for speculative purposes.

The EIS states that, at present, only 30 of the existing 117 coal leases are actually producing. We could produce more than twice the present production if most of the nonproducing leases would start mining. The Association suggests that the actual leasing of coal tracts be postponed for two to five years. At that time one could have a more realistic picture of the coal market and know more about negative impacts on the environment.

If present leasing is still an option, then we highly suggest that less environmentally sensitive areas be leased and those tracts, such as: Mud Creek, Trough Springs and Gooseberry be eliminated from the present alternatives.

The specific environmental concern is water quality. In an arid, high plateau region, such as ours, water is the most valuable resource. No measure is too extensive to guarantee the quality of this resource for the residents of this area now and in the future.

Also, to help protect undisturbed areas where possible, coal leases should be let in areas where access is available through existing mine portals.

The socioeconomic sections seem, in all, too general for use by any public entity. What is an environmental impact statement for if not to assist the decision makers (local government) on what kinds of effects developments will have on their cities and counties?

We hope that you will keep the local residents and governments in mind when these decisions are made.

Sincerely,

Lester E. Prall
Lester E. Prall
Economic Planner

LEP:mvw

Southeastern Utah Association of Local Governments

Letter Response 44-1

The Southeastern Utah Association of Local Governments clarified in oral statement at the Salt Lake City Public Hearing that they are not opposed to all new Federal coal leasing as it would indicate in their written statement. The Federal Government is not able to determine which potential bidders or lessees of coal are speculating or are in the business for speculative purposes. Leases are made available for bidding by any company or individual interested in a Federal coal lease. The high bidder on a specific tract, if they are a qualified bidder, will be offered the lease assuming the bid is equal to or in excess of the fair market value. Due to the complicated nature of bringing a new mine into production, the mining industry in general supports the ten-year period to achieve production at the diligence level.

Letter Response 44-2

The fact that 30 of 117 existing leases in central Utah or 25 percent actually had production in 1982 is not necessarily an indication that production in this area could be doubled without additional leasing. Many of the leases are small being as low as 40 acres in size, and the larger operations tend to have a large number of leases which form a logical mining unit. Some operations do not hold sufficient reserves to stay in business at the present rates of production for any extended period of time. Whether production could be doubled from the existing leases at this time would depend on many factors. Postponement of further leasing would not make Federal coal available for development in a free market situation.

Letter Response 44-3

The Mud Creek and North Trough Springs tracts were eliminated from the Preferred Alternative and given lower priority for leasing by the Regional Coal Team. The Gooseberry tract is in the Preferred Alternative and is being recommended for leasing by Sanpete County, in which it exists.

The Gooseberry tract has been selected by the State of Utah as a part of the Indemnity selection process. However, it is still a part of the Final EIS as it will be offered for lease by the State in the near future.

Letter Response 44-4

We have addressed the potential impacts on water quality consistent with available data. Increased fluvial sediment is of concern in both the central and southern Utah tracts (pages 161 and 210 of the DEIS). Chemical quality of water used for public supply is also of considerable concern (page 161 of the DEIS).

Letter Response 44-5

Many of the tracts being considered for leasing can be accessed through existing mines, and generally these tracts have been given high priority for leasing.

Letter Response 44-6

Copies of the technical report, "Social and Economic Impact Analysis - Uinta-Southwestern Utah Coal Environmental Impact Statement," are available for review at the BLM Utah State Office. These contain a detailed impact analysis for communities which were summarized in the EIS. The decision-maker in the case of coal leasing is the Secretary of the Interior rather than the local governments and the EIS summarizes data pertinent to his decision.

Letter Response 44-7

As required by 43 CFR 3420.3-4 the Regional Coal Team shall recommend specific tracts for lease sale and a lease sale schedule and the Director of the BLM will submit the Final EIS and the Regional Coal Team recommendations to the Secretary of the Interior for a decision. The findings of the EIS and concerns of local residents and governments will be brought to the attention of the Secretary in a Secretarial Issue Document that will be prepared for the Secretary's decision.

FRIENDS OF THE EARTH

530 7TH STREET, S.E., WASHINGTON, D.C. 20003
(202) 543-4312

Mr. Ron Bolander
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Comments of Friends of the Earth
Round Two Draft Environmental Impact Statement
Uinta-Southwestern Utah Coal Region

By Gordon Anderson, Colorado Plateau Representative and
L. Geoffrey Webb, Washington Representative
July 6, 1983

Preface

Friends of the Earth is a national conservation organization committed to the preservation and rational use of our natural environment and resources. We have a longstanding interest in the Uinta/SW Utah coal region and in the Federal Coal Management Program.

We believe that the current set of politically appointed land managers within the Department of Interior are systematically divesting the American public of its energy and mineral holdings without regard for fair market value remuneration, environmental protection, or any defensible energy policy.

The Bureau of Land Management is not on the payroll of Amax, Utah International, or any other private entity. You are charged with looking out for the public interest, not the selfish interests of a few former employers of the Interior Secretary.

*Committed to the preservation, restoration, and rational use of the biosphere
100% Recycled Paper*

The repeated, gross abuses of the public trust are well documented in the Federal coal program, both in years past and particularly during the tenure of Secretary James Watt. If you continue to ignore the clear mandates of Congress as expressed by the National Environmental Policy Act, the Federal Lands Management and Policy Act and the Federal Coal Leasing Amendments Act, the public controversy which had subsided will be guaranteed to tie up this program in the courts and in Congress for years to come.

We have monitored the implementation of the coal program in the other coal regions and have found a disturbing consistency to the deficiencies found in your program as compared to those of the other coal regions.

- Failure to institute Resource Management Planning. Although it has been seven years since the passage of FLPMA, it does not appear that you plan to produce an RMP until after the major resource management decisions have already been made for the region. This is not what Congress had in mind.

- Inexplicable or indefensible procedures for setting coal leasing targets. The State of Utah Energy Office, assuming that the IPP project would be built and the Utah Power and Light Hunter 4 Complex would be completed, and allowing for an increase in coal exports, still finds that existing leases can produce 2-3x what that new demand is likely to be. (See Utah Energy Development 1981-1990: A Summary of Existing and Proposed Activity, June 1981.) Add up the

numbers honestly and you won't have a justification for holding a huge Uinta/SW Utah sale next February. We request a complete explanation of the procedures and figures used to justify the target level.

- Extreme environmental conflicts. FOE associates itself with the comments of the Sierra Club and the Utah Wilderness Association on the subject of environmental problems. The Department seems to be taking a "maximum possible provocation" policy with regard to leasing in environmentally sensitive areas. Much more on this later.

- Inability to get along with other agencies of government. The House of Representatives recently voted to cut off Secretary Watt's authority to hold OCS leases off the coast of Florida. One reason was that NASA had implored Interior not to issue leases in the rocket path but Secretary Watt refused to answer their letters, let alone accommodate a reasonable request. It seems that you are having similar problems in Utah. Why are you ignoring the valid concerns of the U.S. Forest Service? We're sure you could get the Secretary to get Mr. Block to bully the Forest Service people into submission, but why?

- Consideration of a narrow range of alternatives. The only choice you set up for yourselves was whether to hold the largest coal sale in Utah history (of 1.9, 1.6, or 1.3 billion tons) or to hold no sale at all. We have no objection to the adoption of the "no action alternative",

but how about others, like 200 million tons, or 500 million tons? These might be more defensible from a market-orientation (remember that we're the property owners).

- Budgetary reassignments, the MBO schedule, and decisionmaking in Washington. For all of the problems, perhaps State BLM's are helpless to execute a responsible management policy. The budget process has been used to spend more money on selling resources and less on assessing them. Contrary to the pious utterances of the Interior Secretary and his subordinates, decisionmaking has not been decentralized and is not being done by career professionals. Rather it has become more centralized in Washington and done according to ideological purity and corporate demands rather than common sense and strict adherence to legal mandates.

For all of the above reasons, we request that you go back and do the process over correctly, according to your legal mandate. Need must be established, reasonable alternatives articulated, and proper analysis of impacts and mitigation conducted. Your failure to do so has produced a legally deficient document and any sale conducted on the basis of such analysis will be seriously jeopardized.

Friends of the Earth

Letter Response 45-1

As shown on pages 69, 70, 113, and 138 of the DEIS, all of the coal tracts are located in areas covered by BLM and Forest Service land use plans and amendments. All tracts were found acceptable for further leasing consideration through application of the unsuitability criteria in 43 CFR 4361.

Letter Response 45-2

The Intermountain Power Project Phase 1 is being built at one-half the original planned capacity and five separate coal contracts have been signed to meet the coal needs from central Utah. The Hunter four-unit construction was delayed indefinitely due to reduced power needs. It is anticipated, however, that the Phase 2 of the IPP and the Hunter 4 Unit do provide potential new markets of coal from those tracts being considered for leasing at this time with production between 1990 and 1995 which is within the scope of this EIS.

Letter Response 45-3

See Response 26-3.





United States Department of the Interior
 OFFICE OF SURFACE MINING
 Reclamation and Enforcement
 BROOKS TOWERS
 1020 15TH STREET
 DENVER, COLORADO 80202

July 6, 1983

MEMORANDUM

TO: Mr. Ron Bolander, Team Leader, Bureau of Land Management (BLM)

FROM: Allen D. Klein, Administrator, Western Technical Center, Office of Surface Mining Reclamation and Enforcement (OSM)

SUBJECT: Comments on the Uinta-Southwestern Utah Coal Region Round Two Draft environmental impact statement (EIS)

Thank you for the opportunity to comment on this EIS and to participate in its preparation. The EIS preparation team should be commended for a fine analysis of the areas considered, despite a limited amount of site-specific data. We feel that the document might be strengthened by consideration and inclusion of the following information.

General

1. To avoid confusion, the references to the "Regional Director" should be changed to references to the "Office of Surface Mining," since OSM no longer has regions or regional offices (appendix 3).
2. References to Utah coal lease numbers 13, 14, 15, 16, 17, 18, 20, 21, and 23 (and maybe others) should be included on the insert plate legend.
 A number of mines were not listed on the plate and should be added. They include the following:

Aletha	T. 12 S., R. 8 E.	non-Federal
UCO	near Scofield	proposed, non-Federal
Crandall Canyon	T. 16 N., R. 7 E.	Federal
C & W	T. 13 S., R. 8 E.	Federal
Geneva	T. 16 S., R. 14 E.	Federal
Sage Point	east of Soldier Canyon	proposed Federal
Wilberg	T. 17 S., R. 8 E.	Federal

Knights near Emery non-Federal
 JA King near Scofield (?) non-Federal
 Blazon No. 1 near Scofield non-Federal

The Pinnacle (No. 4) and Apex (No. 5) mines are now combined, permitted, and operating as the Centennial mine.

The Beehive, Deseret, and (unlisted) Little Dove mines have been combined as the Des-Bee-Dove mine, which is operating.

These large plates of the coal regions receive wide use by a variety of Federal and State agencies as well as the public and it would be extremely helpful if all the Federal and non-Federal mines in the area were included.

It would also be useful to include a separate category of proposed mines which would include those noted above plus the Rilda Canyon, Emery Surface, Kaiser South Lease, and Alton mines.

The locations of the Mt. Gunnison and Bear mines in Colorado appear to be in error.

Cultural Resources

1. A definition of "cultural resources" should be added to the glossary.
2. Cultural resource inventory requirements for subsurface versus surface strip mining as well as the potential effects of each type mining (including subsurface) on cultural resources should be expounded upon, in the environmental consequences chapter.
3. The potential importance of historic sites, other than trails, is not given adequate discussion. Some estimate as to the types and numbers of historic sites likely to be encountered should be presented. Historic mines, homesteads, and so on should be included in the affected environment discussion.

Hydrology

1. The topic of alluvial valley floors (AVFs) should be discussed in the document. At a minimum, the EIS should state that no reconnaissance studies have been conducted for AVFs (if that is the case) but that the possibility exists for AVFs on or adjacent to the lease tracts which could have an effect on mining potential.

Revegetation

1. The summary of alternatives section indicates that all disturbed lands can be reclaimed (pages S-3, S-4, and S-6). The description of the affected environment-reclamation potential (page 58) and environmental consequences (page 166) sections indicate that reclamation potential on the Book Cliffs coal field (central Utah) is fair to good (50- to 80-percent

46-2

46-3

46-4

46-5

46-6

46-7

46-1

46-2

success); on the Wasatch Plateau (central Utah), it is generally good, but only fair (less than 30-percent success anticipated) on canyon escarpments where most mine support facilities would be located. The Emery coal field (central Utah) has a severely limited reclamation potential owing to low precipitation, limited topsoil, and often toxic overburden. Intensive reclamation efforts would be necessary.

The Alton coal field (southern Utah) has a fair to good reclamation potential with an estimated 70-percent success rate. Limitations include topsoil depth, high rock volume, and sediment-producing saline shales.

2. The reclamation potential of the Utah tracts is well documented by recognized scientific literature; the reclamation potential of the west-central Colorado tracts is rated fair (page 132), but is not substantiated by any scientific studies or references. These should be added.
3. The summary section states that agriculturally productive lands which were used for community development would not be reclaimed. While it is true that they would not be revegetated for agricultural use, they will, in fact, be reclaimed and stabilized to a higher use which will, of necessity, involve high levels of management by homeowners and local government agencies in terms of lawn and street maintenance, etc. This same notion of unreclaimed community development lands is found throughout the EIS (pages 215, 246, 252, 299, and 344).

Wildlife

1. On page 137, under the wildlife description of west-central Colorado, the bald eagle is mentioned but other species such as the peregrine falcon are not even listed. The EIS should list the potential threatened and endangered species for the entire west-central Colorado region and briefly discuss their associated habitats.
2. In chapter 4, there is not evidence that BLM initiated consultation with the U.S. Fish and Wildlife Service regarding impacts on threatened and endangered species. The west-central Colorado analysis failed to address impacts on threatened and endangered species altogether. For an action of this scope and duration, BLM should request a list, perform a biological assessment, and receive U.S. Fish and Wildlife Service concurrence with any no-effect determinations.

Once again, thank you for the opportunity to comment. When the final EIS is available, we would appreciate receiving six copies. If you have any questions on the comments, please direct them to either Walter Swain or Charles Albrecht of my staff at FTS 327-5421.

Office of Surface Mining

Letter Response 46-1

The references to the Regional Director have been replaced by reference to OSM.

Letter Response 46-2

The omission of certain lease numbers on the map has been noted and the map is being revised. Also, the mine list will be revised as noted. The map is listing, however, only the active coal mines in the region. The other points brought up concerning the map are also being corrected and the map revised.

Letter Response 46-3

The definition has been added to Glossary as requested.

Letter Response 46-4

Most cultural resources are unidentified, irreplaceable, and highly sensitive to ground disturbance. It is necessary that the resources be properly identified, evaluated, and reported prior to any proposed impacting action. Inventory requirements conform to "Procedures for Cultural Resource Professionals Performing Inventory and Mitigation Services in Utah."

Letter Response 46-5

The discussion of historic sites is limited because data are lacking. With further inventories additional information will be available in the future. Historic sites will be protected by the measures used to protect other cultural resources. Detailed mitigation will be determined at the mine plan stage.

Letter Response 46-6

"Alluvial valley floors" are considered in the general discussions of the potential effects of mining and associated activities on fluvial sediment and stream discharge. Since completion of the DEIS, the Geological Survey released a report (Thomas and Lindskov, 1983) that described methods for estimating peak discharge and flood boundaries of streams in Utah. There is little question that peak recorded discharges and estimated peak discharges should be considered when con-

structing mine portal facilities, roads, bridges, culverts, and so forth on "alluvial valley floors".

Letter Response 46-7

On each page, the word "would" has been changed to "could" to reflect your concern. The details on reclamation potential are in the body of the DEIS on pages 58, 59, 107, 164, 166, 246, 271, and 316.

Letter Response 46-8

This information has been added to the text.

Letter Response 46-9

The text on the referenced pages has been modified to state that "... agricultural lands converted to community uses would be stabilized and reclaimed as part of community development programs."

Letter Response 46-10

The acreage covered by the Colorado portion of the EIS is relatively small and the available habitat types are well documented. For the sake of brevity we do not feel that it is necessary to discuss potential threatened and endangered species for the region when the habitat types needed by those species are not present on or adjacent to the tracts being analyzed.

Letter Response 46-11

The process of analyzing the coal tracts in the west-central Colorado portion of the EIS began in 1981 with application of coal unsuitability criteria. A list of known and potential species was supplied to USFWS on March 5, 1981, and concurred with on March 11, 1981. USFWS was contacted again on August 13 and 16, 1982, concerning possible occurrence of and downstream impacts to endangered Colorado River fishes. There have been numerous other contacts with Grand Junction and Salt Lake City offices of the Service during the writing of the EIS, records of which are available at the Uncompahgre Basin Resource Area of the Montrose District.

Indication that the appropriate consultations had been conducted and that no impacts to listed species were expected has been included in the Final EIS.

BOARD OF COUNTY COMMISSIONERS

FIFTH AND PALMER
DELTA COUNTY, COLORADO 81416
303-874-7595

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5 July 1983

Bureau of Land Management
136 E. South Temple
Salt Lake City, Utah 84111

ATTENTION: Mr. Ron Bolander
Team Leader

Dear Mr. Bolander,

The Delta County Board of Commissioners has reviewed the Draft Environmental Impact Statement for Round Two Leases. The following written comments serve to supplement and clarify the County's verbal comments made on 6 June 1983.

Delta County is very supportive of coal mining. Over the last century the coal industry has become an important economic sector, helping to diversify the local economy, increasing the area's tax base and improving job opportunities. The importance of a stable coal industry in Delta County cannot be overestimated. Within the last decade the area's vulnerability to the whims of world energy markets has been realized. In March, 1981, unemployment rates equaled 5.5% in Delta County. Today, two years later, the unemployment rate is 16.3% - the direct result of coal mine layoffs due to a soft coal market.

Delta County recognizes that the determination to lease additional coal is the responsibility of the federal government. Because Delta County does not directly participate in the decision as to which Federal coal deposits will be leased and when, it is important that Federal leases include stipulations which insure protection of natural and community resources which leases may impact in Delta County. These conditions should not be deferred to the permitting process. Specifically, Delta County is concerned with impact to transportation, water, air quality and socioeconomics.

First, transportation. Coal mining in Delta County has had an adverse impact on transportation systems in the County. Specific stipulations which are enforceable should, therefore, be developed to mitigate any foreseen impacts resulting from new coal production as conditions of the lease and not deferred to the permit stage. Delta County recommends the following: On the Paonia Tract, an alternative transportation system should be developed to reduce additional coal truck traffic on Colorado Highway 133. As of this

Mr. Ron Bolander
7/5/83
page 2

time no acceptable method has been determined by concerned interests. 47-3

It is important that a conveyor, pneumatic tube, new access road, or another acceptable alternative be settled upon and made part of the lease contingencies. Likewise, specific stipulations for the development of a coal transportation system for the Cedaredge tract is necessary. The DEIS has identified the inadequacy of present roads to handle new coal production capacities. The lease should detail that the lessee must construct a new road or upgrade existing county roads to a level capable of handling heavy coal traffic. The loadout facility identified in the DEIS to be utilized by the Cedaredge Tract is also not adequate. Located adjacent to the City of Delta, the facility is an incompatible land use and the stockpiling of coal in the past has led to the degradation of air quality in the area. Trucks using the loadout facility have severely damaged county roads and city streets, and water mains. For these reasons the coal lease issued by BLM should require relocation of this loadout prior to the beginning of mining the Cedaredge Tract.

Water. The County has a high priority to protect adjudicated water rights which may be affected by the development of the Round Two lease tracts. Agriculture continues to be an important economic base as it has been for the last 100 years. The best way to insure continuation of these rights is through specific lease stipulations which are enforceable rather than deferring the protection of water to the permitting stage. The County supports an approved comprehensive water augmentation plan which includes "no mine" areas under critical streams and ditches unless protective measures are provided and the development of an adjudicated water augmentation plan.

Because the BLM has conceded that there is a risk that some areas of the lease tracts could suffer from events such as subsidence and a subsequent loss of water many years after the mine is abandoned, Delta County recommends that BLM give further consideration to water insurance in these critical areas.

Air Quality. Because Total Suspended Particulates (TSP) levels are expected to exceed NAAQS if these tracts are leased and developed, Delta County feels BLM should include specific mitigation measures. These include the construction of paved roads and a new loadout facility for the Cedaredge Tract to help reduce TSP.

Socioeconomics. As stated above, coal mining activity in Delta County is largely influenced by national policy and world trends. Because these decisions clearly influence the level of coal production and coal employment, they also directly influence the demand for community services. Local governments are faced with a great deal of uncertainty as to what levels of services should be provided and planned for energy-related populations. Political jurisdictions have been especially concerned with the cumulative impacts of energy development. For this reason, energy-rich areas in the western United States have begun to receive assistance from energy firms to ensure necessary housing, capital infrastructure and human services are provided. This assistance has taken many

forms, but has been most often brought about under the powers of local land use policies. Delta County supports this "private/public partnership" but feels the appropriate time to address socioeconomic concerns is during the coal leasing period. Community service shortfalls identified in the DEIS should be palliated with specific lease stipulations for the mitigation of socioeconomic concerns. These stipulations should be enforceable. By dealing with socioeconomic problems at the Federal level, companies will have a full understanding of coal lease tract costs at the time of sale.

On the Paonia Tract, Delta County feels socioeconomic impacts can be minimized if Colorado Westmoreland, Inc., (CWI) successfully obtains the lease. This is for two reasons. First, because CWI is an existing mine, no or few new operational employees will be hired. Secondly, it is our understanding that CWI will close their facility if new coal reserves are not acquired. This would result in a major coal labor lay-off exacerbating unemployment rates in the County. If this scenario holds, only construction workers and/or increased employment associated with increased production would likely require mitigation measures.

The DEIS identifies the lack of infrastructure in the Surface Creek area to support new populations associated with development of the Cedaredge Tract. These shortfalls should be addressed through lease stipulations.

Delta County feels that socioeconomic impacts can be assessed best through the establishment of a monitoring program supported by coal lease recipients. It is only through continuous assessment that negative impacts can be measured against the benefits of coal development. Delta County does not expect mitigation except when necessary. A binding contract outlining a mitigation process for negative impacts should be developed between the lessee and affected political jurisdictions prior to coal production.

Finally, in reviewing the DEIS the baseline projections appear to be unjustifiably low for Delta County based upon historical growth for nonmining economic sectors. We are defining "baseline" to mean population growth associated with existing industries exempting population growth expected from the Round Two lease tract sales. Baseline estimates for agriculture, manufacturing, retirement, etc., should be reviewed in the final EIS for accuracy and adjusted where necessary.

To summarize, Delta County has benefitted from an expanding coal market. The County is willing to have new coal lease tract sales in order to implement a national energy policy. However, the County feels certain protections are necessary for existing and expected populations in terms of water, air quality, transportation and socioeconomic. These protections should be developed as enforceable stipulations of the coal lease and not deferred to the permit process.

If you have any questions please call or write.
Sincerely,

Ben O. Sheldon

Ben O. Sheldon, Chairman

John W. Hawkins

John W. Hawkins

Fred Galhoun

Fred Galhoun

cc: Ron Stucki
Don Lotvedt
Chris Seglem

/gda

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Delta County Commissioners

Letter Response 47-1
Comment noted.

Letter Response 47-2
See Public Hearing DH Response 1-1.

Letter Response 47-3
See Public Hearing DH Response 1-2. The transportation mitigation measures in Appendix Three have been revised to require an alternative to truck haulage on Highway 133 and an assessment of alternatives by the future lessee.

Letter Response 47-4
See Public Hearing DH Response 1-1.

Letter Response 47-5
See Public Hearing DH Response 1-4.

Letter Response 47-6
See Response 3-1.

Letter Response 47-7
See Public Hearing DH Response 1-9.

Letter Response 47-8
See Public Hearing DH Response 1-12.

Letter Response 47-9
BLM is required by law to allow competitive leasing for its coal tracts. CWI can successfully obtain the lease only through this process.

Letter Response 47-10
See Public Hearing DH Response 1-12.

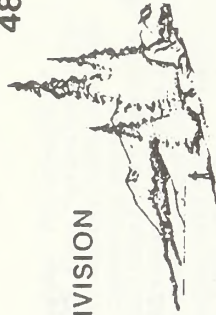
Letter Response 47-11
See Public Hearing DH Response 1-12.

Letter Response 47-12
See Public Hearing DH Response 1-10.



DEPARTMENT OF NATURAL RESOURCES
D. Monte Pascoe, Executive Director
MINED LAND RECLAMATION DIVISION
DAVID C. SHELTON, Director

48



July 5, 1983

Mr. Ron Bolander
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Re: Comment on Uinta SW-Utah Draft Environmental Impact Statement

Dear Mr. Bolander:

Attached to this letter are the comments of the Colorado Department of Natural Resources' Mined Land Reclamation Division on the above referenced DEIS. Your full consideration of these comments is appreciated.

Sincerely,


Fred K. Banta, Coal Supervisor

F8/fb

Doc. No. 3553

COMMENTS ON UINTA-SOUTHWESTERN UTAH COAL REGION
ROUND TABLE DRAFT ENVIRONMENTAL IMPACT STATEMENT
CEDAREGGE AND PAUNIA D LEASE TRACTS

SUBMITTED BY

COLORADO MINED LAND RECLAMATION DIVISION
JUNE 16, 1983

When reading these comments it is important to understand that Colorado's Coal Mining and Reclamation program (referred to as the State Coal Program) is fully approved by the Secretary of the Interior and authorizes the state to implement this program on federal lands in lieu of the Office of Surface Mining. All the requirements in the state's program are based on the Surface Mining Control and Reclamation Act of 1977, but are administered under state law and regulations.

COMMENTS ON MITIGATION MEASURES

U.S.F.S. Measure No. 3, Appendix 3, Page A3-5: This mitigation measure requires the suppression and control of fugitive dust. These requirements are regulated by the Colorado Department of Health's Air Pollution Control Division and therefore, may not be appropriate as lease stipulations.

U.S.F.S. Measure No. 5, Appendix 3, Page A3-6: This measure requires the collection of baseline environmental data prior to mining, which is a requirement of the State Coal Program. This measure, since covered by the state permitting process, may not be appropriate as a lease stipulation.

U.S.F.S. Measure No. 6, Appendix 3, Page A3-6: An ongoing environmental monitoring plan is required by this measure which is a State Coal Program requirement. This measure may not be appropriate as a lease stipulation.

Measure No. 1, Appendix 3, Page A3-9: This measure concerns the establishment of buffer zones around riparian lands. Since this is required by the State Coal Program (MLRD Rule 4.05.18 - Stream Buffer Zones and Rule 4.20.4 - Buffer Zones for Subsidence) this mitigation measure should not be included as a lease stipulation. As written, this stipulation has the same purpose as the state rules and is duplicative.

Measure No. 2, Appendix 3, Page A3-10: This measure concerns the protection of streamflow velocities. The measure states "mining...will be conducted in a fashion that will prevent changes to natural streamflow velocities".

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Using "velocity" may not be the most appropriate indicator of an impact to a stream since it changes in magnitude along stream length, stream cross-section, and through time. Velocity is a function of streamflow, channel slope, channel cross-sectional area, channel shape, and channel roughness coefficient. Even at a constant stream flow the velocity will change from point to point along any stream reach. Also, at any given point on the stream the velocity will change over time due to stream flow, debris, erosion of the stream channel, and movement of bedload. In addition the velocity of a channel cross-section is not uniform. The deeper central areas of the stream move faster whereas the shallow areas and edges of the stream move slower. Finally, current state-of-the-art flow meters may show normal errors of up to 10% during measurement and in some cases even higher, making related impact correlation difficult.

Our main concern is that it would be infeasible to demonstrate an impact to a stream, water user, or riparian community based on monitoring of velocities. Since stream velocities will vary even on undisturbed watersheds, a correlation to a mining related impact would be difficult.

Monitoring water yields or stream flow might be used in lieu of monitoring velocities however, this indicator also exhibits similar fluctuations and measurement errors. Also, other factors such as rainfall amount, rainfall intensity, rainfall duration, ground (antecedent) moisture conditions, grazing, and non-mining water use would make it difficult to correlate a change in stream flow with a mining impact. However, in lieu of a better monitoring parameter, measuring water yield or stream flow is preferable to measuring stream velocities.

Measure No. 3, Appendix 3, Page A3-10: This measure concerns water management to minimize contact with pollution-forming materials. This is required by the State Coal Program (HLRD Rule 4.05 - Hydrologic balance) and should not be required as a lease stipulation.

Measure No. 4, Appendix 3, Page A3-10: This measure requires certain specific items concerning spill prevention to be included within the mine plan. The Colorado Department of Health administers the EPA's Spill Prevention Requirements (SPCC Plans) and has specific regulatory requirements that may conflict with this measure. For this reason this mitigation measure should be not be included as a lease stipulation.

Measure No. 5, Appendix 3, Page A3-10: This stipulation is ambiguous and confusing. The first sentence prohibits coal extraction where subsidence or fracturing would disrupt the quantity or quality of water needed to satisfy an adjudicated water right. Within any watershed all the water is needed to satisfy an adjudicated water right, therefore, this first sentence prohibits mining. The second sentence then seems to contradict the first sentence by requiring subsidence.

It appears that the intent behind this stipulation is to protect water rights by eliminating the possibility that water will escape the surface

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water system through cracks and crevices caused by the mining. BLM simply wants to reduce or eliminate a variable that may cause a depletion in the amount of water available for agricultural and other uses during and after mining. The State Coal Program fully addresses this issue. Rule 4.20, Subsidence Control, fully addresses the requirement that underground mining be conducted in manner to protect the surface and subsurface resources. For example, 4.20.1 - General Requirement, the statement of purpose of the subsidence rule, states:

Underground mining activities shall be planned and conducted so as to prevent subsidence from causing material damage to the surface, to the extent technologically and economically feasible, so as to maintain the value and reasonably foreseeable use of surface lands. This may be accomplished by leaving adequate coal in place, backfilling, or other measures to support the surface, or by conducting underground mining in a manner that provides for planned and controlled subsidence.

This rule addresses the same concern that the proposed stipulation appears to address. The state must assure measures are taken to protect surface resources during and after mining. Incidentally, as a matter of record the state has required operators to have a plan that can be immediately implemented to assure the continued full flow of water across the surface overlying the workings and within the angle of draw.

In addition, measure 16 on page A3-13 fully addresses the concern that water rights holders be protected during the mining activity. The state believes that measure 5 is not only unnecessary, but adds confusion to the issue of steps that should be taken to protect surface water and water rights holders.

Measure No. 6, Appendix 3, Page A3-11: This measure requires geotechnical studies prior to the construction of portal facilities. This is a State Coal Program requirement (HLRD Rules 4.12 and 4.14) and therefore would not be appropriate as a lease stipulation.

Measure No. 8 and No. 9, Appendix 3, Page A3-11: As stated previously under No. 5, the State Coal Program fully addresses issues concerning subsidence prevention and control. In addition, Rule 2.07.6(2) addresses the issue of protecting lands that have been declared unsuitable for mining. These proposed measures are unnecessary because they are duplicative and, moreover, add confusion to the overall federal coal management process.

Measure No. 10 Appendix 3, Page A3-11: Requires protection of occupied dwellings. This is required by the State Coal Program (HLRD Rule 2.07.6) and therefore would not be appropriate as a lease stipulation.

Measure No. 11, Appendix 3, Page A3-12: It is stated that no "permanent" surface facilities or disturbances are to be located within a buffer zone around each golden eagle nest site. Does this mean that temporary disturbances and facilities will be allowed?

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Also, is a 1/4 mile buffer zone justified (or required) if the "disturbance" consists only of subsidence effects from underground coal extraction.?

Measure No. 14, Appendix 3, Page A3-12: This measure is a duplicate No. 5. Measure No. 15, Appendix 3, Page A3-13: This measure requires the collection of at least five years of baseline water quality and quantity data.

The collection of five years of water quality data may not be necessary. One would not expect water quality to vary greatly year to year unless there is some activity that is already impacting the watershed such as grazing. Even so, ground water quality should remain fairly consistent. Also since these tracts will be mined using underground mining methods, one would not expect large scale impacts to water quality that would warrant such an extensive monitoring program.

Water quantity data will be more variable year to year especially surface water. However, five years of data is no guarantee that mean, low, and high flows will be experienced (although it is possible that a full range of data could be collected in as little as three years.). The EIS should include a justification as to why five years of data is needed. It is not clear what the goal or intent is in obtaining data for this many years. Also, what if the data collected over the five year study period consists primarily of below normal flows (or above normal) due to unusual weather conditions, such that data is lacking for normal or above normal flows. Will the operation be restricted from mining until the full range of data is collected? What if external factors such as land use change the "baseline" water characteristics during the study period? A final point to consider here is that even after an extensive and expensive five year data collection period by the operator, data may not be sufficient to prove a correlation with a mine related impact.

We recommend the measure be reworded to allow more flexibility. It might be appropriate to review the data collected on a yearly basis to determine what if any remaining data gaps need to be filled. Perhaps most important the mitigation measure and/or EIS should indicate what specific goals are trying to be met through this data collection.

Measure No. 16, Appendix 3, Page A3-13: This measure requires protection of downstream water users and requires a "water right replacement plan". Protection of downstream water users is governed by Colorado water Law. The stipulation adopted by BLH must fully acknowledge that fact.

GENERAL COMMENTS

- 1. Chapter 3, Page 139, 3rd Paragraph: The EIS states that the Stevens Gulch road is paved. It is important to note that it is only paved a short distance to the mine. From there it is gravel. 48 18
- 2. Chapter 4, Page 144, Paragraph 1: One of the assumptions of the DEIS is that the first year of impacts is 1987. This assumption is invalid if the BLH requires the five years of baseline hydrology data in committed Mitigating Measure No. 15. 48 19
- 3. Chapter 4, Page 245, Paragraph 2: It is stated that "impacts (from mine inflows) usually decrease with time as the fractures fill with sediment from surface water inflow". The Division believes that the statement needs further support and appropriate documentation presented. 48 20
- 4. Chapter 4, Page 246, Paragraph 1: A statement is made that increased water consumption from mining would cause less than a one percent reduction in discharge of the Gunnison River. First, the EIS should present the percent depletion to the North Fork of the Gunnison and second, the depletion percent should be calculated for the low flow months when water availability is more critical (See Comment 7.). 48 21
- 5. Chapter 4, Page 245, Paragraph 5: It is stated that "regulations (30 CFR 817.42) limits off site transport of total suspended solids to 35 mg/l...". It should be noted that the TSS standard has been changed and in some circumstances has been replaced by settleable solids (SS). The EPA adopted these changes effective November 26, 1982 (see F.R. Vol. 47, No. 198, October 13, 1982). The OSM adopted these changes effective November 22, 1982 (see F.R. Vol. 47, No. 205, October 22, 1982). The Colorado Department of Health, Water Quality Control Division and State Coal Program subsequently adopted these same standards. 48 22
- It should also be pointed out that not "all land surface disturbances directly associated with the mining operation" are subject to these effluent limits. Certain areas such as roads are exempt from meeting effluent limits. Roads can be a significant contributor to sediment. 48 23
- 6. Chapter 4, Page 245, Paragraph 2: The increased potential for accidental spill of chemicals, petroleum etc. is mentioned. However it would be fair to note that all mines are required to design, have approved, and implement a Spill Prevention Control and Countermeasure Plan (SPCC) as required by EPA and enforced by the 48 24

Colorado Dept. of Health (see F.R. Vol. 43, No. 171, September 1, 1978). This SPC Plan requires, in part, that all liquid pollutants be stored and distributed in areas that are designed to contain accidental spills. Containment is usually accomplished by berms, pits, or ponds.

48-24

- 7. Chapter 4, Page 245, Paragraph 7: The salinity (salt loading) discussion is presented on an annual basis. It would be appropriate to indicate the salt load during a low flow period and/or during the late summer when irrigation is at a maximum and water quality is more critical. Presenting stream related impacts on a mean annual basis tends to bias the results and hide short term impacts due to the averaging effects. The Division can provide specific examples where a significant impact has occurred at a mine for a short period (usually during low flows) but when looked at on a yearly basis the impact appears insignificant. The analysis should include predictions that take into account the seasonal variations in water characteristics.

48-25

It might also be appropriate to indicate the salt load on the North Fork of the Gunnison River.

It should be also mentioned that any underground mine discharges (which are generally high in salts) would tend to increase receiving stream levels as would disturbed surface runoff and leachate from refuse and waste rock piles. Some mines within the North Fork Valley mining downip have generated mine inflows and associated discharges to surface waters that are high in salts (Examples are U.S. Steel - Somerset Mine and Blue Ribbon Coal Company - Blue Ribbon mine). The magnitude of any increases from the lease areas may be impossible to predict but a discussion would at least point out that the potential for salinity increases exists.

48-26

Mined Land Reclamation Division

Letter Response 48-1

Neither proposed tract in Colorado involves Forest Service administered lands, therefore, the cited mitigation measure is not applicable.

Letter Response 48-2

This measure deals with Forest Service lands in Utah and is not applicable to Colorado.

Letter Response 48-3

See Response 48-2.

Letter Response 48-4

While the State regulations (MLRD Rule 4.05.18; a buffer zone of 100 feet or more from a stream with a biological community) appears to serve the same purpose as the BLM mitigation measure, the scope and intent are not the same. The Draft EIS omitted a measure requiring a wildlife based riparian habitat buffer zone that had been established during application of the coal unsuitability criteria. That mitigation, which has been added to the Final EIS, establishes a buffer zone of 1/8 mile on each side of the stream. This mitigation, developed in consultation with the U.S. Fish and Wildlife Service and Colorado Division of Wildlife, is for protection of big game migration corridors, migratory bird species of high federal interest (Criteria numbers 14 and 15), and habitat values for other wildlife species not protected by a specific criteria or law. In some cases these streams may be ephemeral and would not meet the criteria for a stream with a biological community as defined by MLRD regulations.

The intent is to reduce development within the riparian communities and adjacent upland habitats. In some cases there may be no other practical location for a needed facility and the action may be approved after consultation with the U.S. Fish and Wildlife Service and Colorado Division of Wildlife.

Surface impacts caused by subsidence within this buffer zone are not expected to be crucial and state regulations would be adequate to protect habitat values.

The 100 foot or more buffer zone which appears in the Draft EIS has been substantially revised to include only the bankful stream channels and alluvial fill associated with them.

Letter Response 48-5

The mitigation measure has been deleted.

Letter Response 48-6

The mitigation measure has been deleted.

Letter Response 48-7

The mitigation measure has been deleted.

Letter Response 48-8

See Response 3-1.

Letter Response 48-9

See Response 3-1.

Letter Response 48-10

MLRD Rules 4.12 and 4.14 do not specifically require geotechnical studies prior to the construction of portal facilities. Therefore, the mitigation measure is necessary because of the geologic hazards within the proposed portal location.

Letter Response 48-11

These mitigation measures are a direct result of the application of the coal unsuitability criteria required by 43 CFR 3461. The tracts were found suitable for coal leasing provided the referenced mitigation is included as lease stipulations.

Letter Response 48-12

See Response 48-11.

Letter Response 48-13

Temporary disturbances may be permitted during other than nesting/brooding periods or if the nests are unoccupied. Such disturbances may be permitted by BLM after consultation with U.S. Fish and Wildlife Service. The nest sites themselves and immediate surroundings will be protected from any alteration.

Letter Response 48-14

This buffer zone was intended to include subsidence as a surface disturbance. It was BLM's opinion that subsidence of cliff face areas may pose a threat to the cliff nests and cause destruction of suitable nesting ledges.

Letter Response 48-15

See Response 41-11.

Letter Response 48-16

This mitigation has been deleted.

Letter Response 48-17

The revised mitigation incorporates this comment.

Letter Response 48-18

Text has been revised as requested.

Letter Response 48-19

The mitigation requiring 5 years of baseline data has been deleted.

Letter Response 48-20

Please refer to the following statement on page 24 of the GS report titled, "Hydrology and Subsidence Potential of Proposed Coal-Lease Tracts in Delta Co. Colorado". Alluvial silt and clay could seal small subsidence fractures, but a large fault could partly dewater the alluvial aquifers. In addition, oral communication with GS personnel indicates that surface subsidence cracks are often short lived because they do seal themselves with fine sediments.

Letter Response 48-21

Since the EIS is regional in scope, the Gunnison River at Delta was the selected site for assessing changes in water quality/quantity, so both the Cedaredge and Paonia tracts could be analyzed collectively.

The assumptions BLM used to calculate these impacts are not detailed enough to calculate changes to water quality or quantity during the low flow months.

Letter Response 48-22

This statement has been deleted.

Letter Response 48-23

This was considered and reference is deleted.

Letter Response 48-24

See Response 41-8.

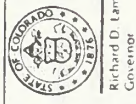
Letter Response 48-25

The assumptions used to calculate the changes to salt loading are not detailed enough to calculate low flow impacts.

Letter Response 48-26

The Colorado State Department of Health was contacted by the BLM in reference to the same concerns as the commentor. According to the Department of Health, highly saline mine discharges do exist in the North Fork Valley but are quickly diluted by surface waters and pose an insignificant impact as compared to other sources of salinity. Monitoring salinity is required by discharges in the North Fork Valley but to this date, no discharge exceeding maximum allowable total dissolved solids has been detected to where a limit has been enforced through the National Pollution Discharge Elimination System.

Department of Local Affairs



Richard D. Lamm
Governor

DIVISION OF LOCAL GOVERNMENT

Pat Raliff, Director

July 6, 1983

Mr. Ron Bolander
Bureau of Land Management
Utah State Office
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

SUBJECT: Draft Environmental Impact Statement
Uinta-Southwestern Utah Coal

Dear Mr. Bolander:

The Colorado Clearinghouse has received the above-referenced Draft Environmental Impact Statement and has distributed it to interested state agencies. Comments received from the Colorado Department of Highways are enclosed for your information.

Thank you for the opportunity to review this matter.

Sincerely,
Stephen O. Ellis
Stephen O. Ellis
Chief Planner

SE/vt
Enclosure

cc: Bureau of Land Management, Montrose

DEPARTMENT OF HIGHWAYS

P. O. Box 2107
Grand Junction, Colorado 81502 - 2107
(303) 242-2662

June 23, 1983



Mr. Stephen O. Ellis
State Clearinghouse
520 State Centennial Building
1313 Sherman Street
Denver, CO 80203

SUBJECT: REVIEW OF DRAFT ENVIRONMENTAL IMPACT STATEMENT (WEST-CENTRAL COLORADO PORTION) FOR UINTA-SOUTHWESTERN UTAH COAL

Dear Mr. Ellis:

The Colorado Department of Highways (CDH) District III office has reviewed the above Draft Environmental Impact Statement (DEIS), and our primary concern of this coal leasing program is the impact to state highways serving this leasing area. The DEIS is very weak in its analysis of transportation impacts, and we would recommend that additional analysis be done on transportation impacts. 49-1

The leasing of federal coal in west-central (Delta County) Colorado would adversely affect the state highway system in these potential lease areas, particularly if the coal is transported by truck as proposed for the Cedaredge lease. Both SH 133 and SH 65 are low volume, rural secondary roads which cannot withstand the physical abuse of continued and repetitive heavy truck hauling of coal. By today's standards both highways are substandard in design and stabilization requirements. We have already experienced significant damage on SH 133 from repetitive truck hauling of coal which has resulted in significant road surface (pavement) breakup and deterioration, shoulder breakdown, potholing, culvert failures and increased numbers and severity of vehicular accidents. These impacts and problems need to be addressed and mitigated in the Final Environmental Impact Statement (FEIS). 49-2

Therefore, if additional federal coal leases are awarded in either the Paonia or Cedaredge areas, we would request mitigation in maintaining the existing state highways in these areas, if lease plans include truck hauling of coal on the highway system. This mitigation would need to be stipulated by the BLM in the lease and would be accomplished by the leaseholders by either providing money directly to the Colorado Department of Highways for 49-3

additional stabilization through thick overlays on these highways or by the mine leaseholder placing funds into an escrow account in the Colorado Department of Highway's name. This money would then be used on an annual basis to make the minor roadway improvements, overlays and general repairs resulting from the truck haul.

In addition, any new access points for the mine-loadout/stockpile areas which directly access the highway system will have to be fully channelized (left-turn lane and acceleration/deceleration lanes) and yellow flashing light installed to warn the traveling public of heavy truck turning movements.

One option that would reduce the impacts and the necessary mitigation would be to utilize a separate haul road system that was interconnected with train loadout facilities which were located close to the mine areas. At Cedaredge the feasibility of a railroad spur to serve the area should be investigated. At a minimum the coal loadout should be located somewhere other than the City of Delta, as that is totally incompatible and unacceptable to us because of the long coal haul associated with this option. The impacts would have to be totally mitigated by the coal lessee which could involve some reconstruction of SH 65 between SH 92 and Eckert.

Increased accidents on both of these roadways can only be mitigated with reconstruction of the roadway to make it safer, which includes the improvement of sight distances, flattening slopes, easing curves and adding shoulders which give additional width (vehicle refuge areas) to the existing highway. If the roadway cannot be upgraded, the only other way to limit or reduce truck/car accidents is to remove the truck haul from the highway system (separate haul roads).

The DEIS on page 139 states that SH 133 is under construction with a new alignment for use by general traffic and the old highway for use by trucks hauling coal. This statement is misleading and not entirely accurate. There will eventually be a new alignment for SH 133 between Terror Creek (two miles east of Paonia) and a point three miles east of Somerset. This construction of a new alignment for SH 133 could take as much as another three to five years to complete. There is no alignment alternative to SH 133 planned between Terror Creek and Hotchkiss. The existing roadway will be improved in this area and that improvement will not begin until the Terror Creek to Somerset construction is complete. There is no improvement/reconstruction planned for SH 92 between Hotchkiss and Delta.

In addition, there is currently no work proposed by CDH on SH 65 between SH 92 and Cedaredge which makes this highway largely inadequate for a truck haul. These items need to be further addressed and clarified in the FEIS.

Because of impacts resulting to the existing transportation systems serving the potential coal lease areas, it will be necessary to include specific mitigation in the FEIS for these highway sections. This mitigation will also need to be included as stipulations in the BLM coal lease and not left to the permitting stage.

We appreciate the opportunity to review this DEIS and will be looking forward to reviewing the FEIS for these coal leases.

Very truly yours,

R. P. MOSTON
DISTRICT ENGINEER

Laurence R. Abbott

By LAURENCE R. ABBOTT
DISTRICT ENVIRONMENTAL MANAGER

LRA/jme

cc: Clevenger
Chocol
Moston/Sturm/Leonard/Perske
Sabin/Jackson
Bradbury
File

49-3

49-4

49-5

49-6

49-7

State Department of Highways

Letter Response 49-9
See Public Hearing DH Response 1-1.

Letter Response 49-1
See Public Hearing DH Response 3-1.

Letter Response 49-2
These impacts were adequately addressed in the DEIS on page 249. It is not within the jurisdiction of the BLM to mandate specific coal transportation methods. The EIS recognizes that the Cedaredge tract access route would need to be redesigned and substantially improved to handle the projected coal truck traffic. Mitigation requiring analysis and use of alternatives has been added to Appendix Three.

Letter Response 49-3
See Public Hearing DH Response 24-1.

Letter Response 49-4
Comment noted.

Letter Response 49-5
The potential lessees will address coal transportation alternatives before mining (see revised coal transportation mitigation, Appendix Three) to arrive at the most acceptable method to Delta County and to the State of Colorado. Also see Public Hearing DH Responses 1-1, 1-2, 1-4, and 24-1.

Letter Response 49-6
Comment noted. See Public Hearing DH Responses 1-2 and 1-4.

Letter Response 49-7
Text has been revised as requested.

Letter Response 49-8
Text has been changed to reflect that no work is proposed for that portion of State Highway 65. See Public Hearing DH Responses 1-4 and 24-1 and Response 49-5.

COLORADO WESTMDRELAND INC.

9034 East Easter Place, Suite 205, Englewood, Colorado 80112 ☐ 303-779-0902

July 5, 1983

Mr. Ron Bolander
Team Leader
BUREAU OF LAND MANAGEMENT
136 East South Temple
Salt Lake City, UT 84111

Re: Comments on the Uinta-Southwest Utah Region, Round Two, Draft Environmental Impact Statement

Dear Mr. Bolander:

Enclosed please find written comments which supplement our oral testimony on the above-referenced Draft EIS. Our emphasis is, of course, on the Paonia "D" Seam Tract.

As you know, the Paonia Tract is contiguous to our Orchard Valley Mine and represents a reserve base we have been attempting to obtain since 1976. A substantial baseline and analytical record has been developed over the years particularly in response to past emergency leasing and permitting for our operation. Significant ongoing activity continues and focuses principally on hydrology and transportation impacts associated with CWI's mining of the Proposed "D" Seam Tract. CWI, environmental groups, the community, water users, permitting agencies, and your own bureau have devoted serious time and effort in an attempt to develop and analyze the necessary factual baseline and then to arrive at mutually acceptable specific conditions for leasing and mining at the earliest point possible.

We do not believe that the EIS by itself or BLM alone can or needs to compose definitive conditions for coal development in the principal areas of concern. We do believe that the EIS and BLM can make a significant contribution to the attainment of this goal by recognizing the broader base necessary and available for assessment and resolution of these concerns and by expressly involving and participating with other interested parties, including the permitting agencies, in an effort to achieve common lease and permit conditions in advance of the lease sale itself.

Re: Comments on the Uinta-Southwest Utah Region, Round Two, Draft Environmental Impact Statement

Page --2--
July 5, 1983

We appreciate this opportunity to comment and to express our support for what we view as a responsive and responsible leasing process. Should you have any questions regarding these comments, please call me.

Very truly yours,

Christopher K. Seglem

Christopher K. Seglem
President

CKS/dq

Enclosure

COMMENT
BY
COLORADO WESTMORELAND INC.
ON
UINTA-SOUTHWESTERN UTAH COAL REGION
ROUND TWO
DRAFT ENVIRONMENTAL IMPACT STATEMENT

I. INTRODUCTION

As operator of the adjacent Orchard Valley Mine, Colorado Westmoreland Inc. (CWI) would like to comment on some of the major issues associated with the proposed leasing of the Paonia "D" Seam Tract and the supporting Regional Draft Environmental Impact Statement (DEIS). CWI is depending upon the February, 1984 lease sale to finally provide at least the semblance of a reserve base sufficient to meet contractual obligations, justify past and future capital investment, provide continued long-term employment and economic benefits to our workers and the rest of the North Fork Valley, and allow at last the safe, efficient, and economic recovery of the coal resource.

The Paonia "D" Seam Tract is really a maintenance tract for the Orchard Valley Mine. The tract is delineated according to CWI's Expression of Interest (the only one submitted) and, as evidenced by stipulations presented in the DEIS, will be conditioned with CWI expressly in mind. Other potential bidders have acknowledged this fact by withdrawing from participation in exploration of the reserve.

Though able to empathize with the Bureau of Land Management's (BLM) interest in treating this tract as a competitive one, we believe the DEIS should recognize more fully the real context in which the Paonia "D" Seam Tract inherently will be evaluated. As a maintenance tract, a substantial body of information, analysis, and experience has been developed over the years. Government agencies, environmental groups, the community, and CWI naturally approach this lease with certain understandings, obligations, and expectations as a consequence. These parties, including the state, are presently and concurrently grappling with the very same issues. Numerous activities, including data gathering and analysis are ongoing. By addressing the Paonia "D" Seam Tract in this context, we believe BLM can relieve itself from trying to resolve particular and complex problems alone and solely within the confining parameters of the Regional Environmental Impact Statement and at the same time free itself to contribute and participate with all interested parties in the early resolution of specific issues related to this tract.

II.

HISTORICAL PERSPECTIVE SHOWS THE CRITICAL IMPORTANCE OF LEASING THE PAONIA "D" SEAM TRACT IN FEBRUARY, 1984

To appreciate the importance of leasing the Paonia "D" Seam Tract on schedule, it is helpful to view it in historical perspective. CWI initiated efforts to lease a long-term reserve over six (6) years ago. In September of 1977 the Federal District Court in Washington, D. C. entered an injunction against the Department of Interior in the

National energy requirements and offsetting reliance on imported energy resources, the timely leasing of the Paonia "D" Seam Tract will attain certain other specific and deserving objectives:

1) CWI, heretofore confined to a narrow mining area by two small interim emergency leases, will be able to develop this very important public coal resource in a safer, sounder, more efficient and economical manner. Security of our miners will be improved, conservation and utilization of the mineral resource will be encouraged and protection of the environmental and multiple use goals will be enhanced.

2) Unlike the case of proposed development tracts which must assume the existence of future markets for coal, the "D" Seam Tract reserves will supply contract requirements as soon as CWI can obtain the right to mine the coal. Not only will national policy objectives thus translate promptly into consumer benefit, but public revenues will be increased through immediate realization of production royalties.

3) The faltering economies of the North Fork Valley and Delta County will be aided by providing for the continued and future operation of CWI, a major contributor to the community and the most productive underground coal mine in Colorado.

NRDC v. Hughes case preventing the long-term leasing of coal. Since that time, BLM has been able to provide limited Federal coal to CWI in two "emergency" coal lease sales. These sales, designed to permit existing coal production to be maintained until all of the Federal Coal Management Program's planning and environmental analysis procedures for coal leasing could be revised and implemented, allowed CWI to purchase a mere 7.5 million tons of recoverable Federal coal inside two extremely narrow mining areas. Should the February, 1984 sale be canceled, the next land use planning cycle which could support a CWI long-term coal lease is not scheduled to begin until 1987, with a lease sale unlikely until the early 1990's.

In 1982, CWI purchased the nearby Gulf Oil lease and so has exhausted alternative sources of coal for the Orchard Valley Mine. Thus, any additional delay in obtaining long-term reserves would force CWI to keep mining in the extremely limited areas of coal it has been able to obtain to date. Such lack of mining area could prevent us from meeting the existing coal supply contracts and would prohibit us from improving the layout of the mine to achieve a production plan which is safer and more efficient with respect to Federal resource recovery and protection.

111. PROMPT SALE OF THE PAONIA "D" SEAM TRACT WILL RESULT IN IMMEDIATE, SIGNIFICANT, AND SUBSTANTIAL PUBLIC BENEFITS

In addition to making a very immediate and tangible contribution to the national policy of fostering greater use of our country's coal to meet

We strongly urge recognition in the DEIS of the critical importance of a timely lease tract sale and the adverse impacts involved should one not take place in February, 1984. Likewise, we think the positive impacts should be reported.

50-1

IV. BY RECOGNIZING IN THE EIS THE AVAILABILITY OF A SUBSTANTIAL INFORMATIONAL AND ANALYTICAL BASE ON THE PAONIA "D" SEAM TRACT IN CONNECTION WITH CWI'S CONTIGUOUS ORCHARD VALLEY MINE, BLM COULD JOIN IN THE ONGOING ACTIVITIES AND EFFORT OF MANY PARTIES AND MAKE A SIGNIFICANT CONTRIBUTION TO THE PROPER AND TIMELY RESOLUTION OF THE MAIN ISSUES ASSOCIATED WITH THIS TRACT'S SALE.

We believe that addressing the Paonia "D" Seam Tract more as a maintenance tract, whether mined by CWI or some successor, will make the DEIS more relevant to the ultimate evaluation and resolution of the three key impact issues involved in this lease: socio-economics; water; and, transportation. Significant additional baseline information, as summarized below, is automatically incorporated into the evaluation and lends a more substantial foundation for projecting impacts and developing appropriate mitigating measures. Simultaneously, the EIS and BLM integrate into the broader decision-making framework for these issues, including the permitting process.

A. Socio-Economics

The DEIS concludes that there are minimal adverse impacts associated with this tract. It does so even while assuming that new portal and surface facilities will be built to access the coal

50-2

and that associated social impacts will be relatively greater because the estimated productivity of a new mine will be much lower (15 tons/manshift) than CWI's is in fact resulting in the introduction of significantly more new people into the community to produce 1.5 million tons of coal per year.

In reality no new mine will be constructed for the Paonia "D" Seam Tract. Thus, any impacts projected on the assumption that there will be a new mine are excessive. The impacts needing evaluation are those involved in whether CWI will be permitted to mine this coal or not.

CWI currently employs approximately 250 people, who with an average family size of between three and four persons, account for about 4 percent of Delta County's population. When CWI entered the North Fork Valley in 1976, Delta County was economically depressed. The company committed to hiring as many local people as possible and of all persons hired by CWI for work at the Orchard Valley Mine from 1976 to present, 86% have resided in Delta County when they were hired and another 6% have lived in Western Colorado. In other words, CWI has provided needed employment in this area. Over \$20,000,000 has been paid to these local citizens in wages and bonuses.

50-3

The company has also been committed to not negatively impacting the housing market if people from outside the region have to be hired. A local contractor has constructed single family dwellings for such employees under a special company subsidized purchase plan, so instead of creating a housing shortage, additional assessed valuation has been added to the communities and the county.

The policy of Colorado Westmoreland Inc. has also been to buy locally, wherever possible. Although specialized equipment and other items not readily available in the state of Colorado had to be purchased elsewhere, most of those items that could be purchased in Colorado, were. And, most of those that could be purchased in Delta County, were. Thus, of purchases of \$56,000,000 in the state of Colorado from 1976 to 1981, \$17,000,000 were made in Delta County and \$12,500,000 were made in the balance of Western Colorado.

Using accepted but conservative economic multipliers on wages, bonuses and purchases, economic activity generated by Colorado Westmoreland from 1976 to 1981 in Delta County totals \$93,814,980; the total amount of business activity generated for the state of Colorado for those factors is \$164,795,934. On a per capita basis for Delta County based on the 1980 census, and using only payroll and purchases, CWI has generated \$4,420 of economic activity for every person in Delta County.

In addition, while accounting for only about 4 percent of Delta County's population, CWI has paid an average of more than 8 percent of the county sales tax revenue and approximately 12 percent of the property tax revenue, not including taxes paid by the employees themselves, or impact funds. At least an additional \$5,000,000 has been paid by CWI in state sales taxes and by employees in income taxes. From 1977 to 1981, Colorado Westmoreland also paid a total of \$1,004,056 in severance tax monies. Of that figure, 55 percent went to the state general and trust funds, or \$555,231, and 6.75 percent went to Delta County and the political subdivisions within it, or \$67,774. And, between 1978 and 1981, Colorado Westmoreland paid \$6,248,002 in federal royalties to the United States. Of that amount, \$3,124,001 went to the state of Colorado for distribution in accordance with the 1977 state law. Of the Westmoreland payments, \$78,001 would have gone to the State Public School fund relieving the burden of taxpayers to the fund accordingly, \$1,562,001 would have been forwarded to the County Commissioners for use between the county and schools and \$312,400 would have been used by the Colorado Water Conservation Board. Additionally, 15 percent of the state's share of mineral leasing funds and 38-1/4 percent of the total amount of severance tax were directed to the Department of Local Affairs for distribution in the form of grants to local government. In the five-year period ending in 1981, the Department of Local Affairs granted \$3,689,666 to Delta County and local agencies within its boundaries. Based upon the percentage

formula and the amount paid by Colorado Westmoreland, \$852,651 or 23 percent of that amount was contributed by CWI.

Community involvement by Colorado Westmoreland Inc. in the North Fork Valley has taken shape in several different ways across the past several years. This involvement ranges from supporting youth sports programs to participating in community charitable and cultural activities. It has led to the formation of the North Fork Mine Rescue Association, which in turn is responsible for creating an awareness of safety through the annual mine rescue/first aid competition which brings between 10 and 16 teams to Paonia each year. And, it was Colorado Westmoreland employees who were instrumental in the establishment of Delta County's emergency radio network and emergency medical technician training program.

Not counting the individual efforts of Colorado Westmoreland employees and the more difficult to measure services across a six-year period ending on December 31, 1981, CWI donated more than \$250,000 in cash contributions to community educational programs, charities and municipal activities.

This is not an effort to gauge the total impact of the Orchard Valley Mine. However, when Colorado Westmoreland Inc. entered the North Fork Valley of Delta County, Colorado in 1976, much of what was needed was already in place. The basic road network and the

rail system was in place and most significantly most of the future employees of the company were in place. Delta County had been economically depressed and very few workers were imported. Thus, the impact normally considered in an operation such as the Orchard Valley mine was minimal -- most of the people were present; most of their needs were being met.

CWI has paid its way for what impacts were created. Based upon payments made in 1981, Colorado Westmoreland can be expected to continue to pay to local government and local government impact funds at a rate of more than \$1.5 million per year. The State can expect to receive portions of the federal royalties used to match state funds for state projects and can eventually expect to receive corporate state income taxes. Individual state income taxes and sales taxes paid by individuals employed by Westmoreland are in addition. And, of course, Colorado will benefit from its share of federal royalties and other taxes and assessments.

In its 1981 economic overview of Delta County, the Economic Development Department of the United Banks of Colorado listed several "major" employers: the school district was first; CWI was second. The importance and positive nature of CWI's impact on the socio-economic fabric of the community is underscored by current economic conditions. Only no leasing will put additional pressure on the local infrastructure.

According to the Colorado Division of Mines, 975 people were employed as underground miners in the North Fork Valley in August of 1981. Assuming a 10% factor for additional office and management staff, approximately 1,172 people were employed by the mining companies. As of March, 1983, only 619 people were employed. This represents a 47% decline in coal industry employment in the North Fork. Overall, the Colorado Labor Force reported a 17.6% rate of unemployment for Delta County in February, 1983.

CWI is the largest and probably most productive underground coal mine in Colorado today. We have demonstrated our ability to survive even in a market as bad as the one we currently face. Our greatest threat, and the public's as well, is the unavailability of coal reserves that can be economically mined. We believe the DEIS should report this fact, and address the positive socio-economic benefits which will flow from a prompt, fairly conditioned leasing of the Paonia "D" Seam Tract to Colorado Westmoreland.

B. Water

By recognizing the inseparable connection of the Paonia "D" Seam Tract to the Orchard Valley Mine, the DEIS would incorporate a significant body of baseline information, history, and analysis and project more accurately the probable range of impacts from leasing.

The fact is that the efforts of CWI, the community, environmental groups, permitting agencies, and BLM itself, especially over the past three years, have made the Paonia "D" Seam Tract an especially eligible candidate for leasing because of the time and attention already devoted to environmental and land use concerns. One need only refer to the land use planning and environmental assessments associated with CWI's two emergency leases, a lease modification, and its Farmer's Mine lease assignment, to establish the fact that this area has been subject to substantial study and evaluation over the past six years. In 1982 CWI became one of the first operators in Colorado to obtain Office of Surface Mining and Mined Land Reclamation Board mining and reclamation five-year permits under the permanent regulatory program and just this summer CWI received a new five-year permit for the entire mine and adjacent area while obtaining the right to mine the lease modification and Farmer's Mine areas. Thus, from the Environmental Assessment on Coal Lease C-25079 and the 14-volume permit application submitted in compliance with the federal and state surface mining laws to the stipulations and conditions attached to leases and permits as recent as June, environmental issues have been studied, analyzed, and resolved.

Most important of all, we believe CWI has translated these assessments and resolutions into an on-site compliance program which demonstrates that mining and environmental goals can be compatible.

Characteristically, the Paonia "D" Seam Tract has been tailored to prevent or mitigate adverse impacts. This is evident in the area of water protection.

Both the U. S. Geological Survey, at the request of BLM, and the MLRD, in connection with the permit issued this summer, have contributed significantly to a current assessment of potential impacts to water resources by the Orchard Valley Mine, in their Groundwater Study and Cumulative Hydrologic Impact Study, respectively. Both conclude that mining can be undertaken without adverse effect upon water resources.

Additional and extraordinary measures, however, have also been taken or are being considered now by the various parties to assure further protection for water resources. Thus, for example, in coordination with the community and in compliance with BLM State Director Francis' response to the water users' protest to the Management Framework Plan Amendment, CWI delineated and submitted an Amended Expression of Leasing Interest, which physically eliminated significant risk to the water resources identified by the community as being of most concern. CWI's Expression of Interest delineated requested coal reserves according to the areas of leasing priority suggested by the State Director; called for a single versus multiple seam lease; limited its request to thirty (30) million recoverable short tons of coal; drew the lease

boundaries so as to avoid and put completely outside the lease area the water sources of primary community concern - Terror Creek, West Roatcap Creek, and the Long Draw Domestic Water Supplies; and set forth a detailed water diversion and upgraded conveyance system for inclusion as a lease stipulation mitigating potential impacts to the intermittent East Roatcap Creek.

In addition to providing this very tangible, absolute protection to key water resources inside the BLM lease study area -- in essence eliminating the most significant hydrologic concerns related to the area -- CWI has vigilently considered additional concerns and points of view and has pursued a program to collect and analyze empirical data relevant to them. In consultation again with the community and the leasing and permitting agencies, CWI developed and then presented for review and revision last August a proposed comprehensive hydrology, subsidence, and water rights study. Data and results from this effort are now becoming available -- in advance of the lease sale, in advance of permitting, and years in advance of mining.

The Colorado Open Space Council (COSC) recently issued a report calling for BLM, in the exercise of its leasing authority, to include specific stipulations requiring further restrictions on mining, water replacement, and water insurance as lease stipulations on the Paonia "D" Seam Tract. Born of the State

Director's Water Protest Decision, these proposed lease stipulations bear a distinct kinship to several of the stipulations for mitigation identified by BLM in Appendix 3 of the DEIS.

In discussion with COSC staff, CWI has been assured that the proposed stipulations are subject to modification and that commonly acceptable conditions are attainable. CWI requires only that stipulations bear some reasonable relationship to genuine potential impacts, provide legitimate mitigation to bona fide unaddressed concerns, be reasonably comparable to those imposed on other mines (especially in the local region), and be attainable as a matter of law, technology, and economics.

As a practical matter, CWI believes stipulations framed in detailed descriptive terms, specifically identifying what water sources or water rights are to be protected, for example, and setting forth specific mitigations, as opposed to general, legalistic conditions are preferable. In the next section of our comments, we suggest a framework for accomplishing this task. But at this juncture, we must point out that the parameters of the DEIS alone simply do not provide sufficient factual or analytical basis for formulating specific stipulations. Attempting to do so results in misleading, improper, or incorrect conclusions and actions. A glance at some of the DEIS pertaining to water issues demonstrates this fact:

-- Pages 132 - 135 and 244 - 246 are vague and general with respect to baseline information and projected impacts. This can prove significant. 50-6

-- For example, contrary to p. 133, para. 4, line 10, the coal seam thickness in the tract ranges dramatically above and below 12' and so, presumably, does the danger of subsidence. 50-7

-- Projections on subsidence set forth on p. 244 represent interpolations of information and analyses applicable to sites not demonstrated to be at all similar to the Paonia "D" Tract. 50-8

-- Stipulation 15, p. A3 - 13, if read to mean that five years of baseline water quality and quantity data would be necessary before the "D" Tract could be mined, would unnecessarily, but very surely, close the Orchard Valley Mine and render the tract virtually valueless at this time since development must begin years in advance of that schedule. Any such stipulation, if necessary, should make clear that mining will not be prohibited until 1989 or later in connection with the collection of five (5) years' of additional hydrology data. 50-9

-- A stipulation establishing the presumption that any water loss, even unmeasurable amounts, would be attributed to mining 50-10

would not only be contrary to law, but would eliminate the possibility that water could be insured or bonded.

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-- Stipulation 1, p. A3 - 9, should address riparian habitat, rather than vegetation, and be clearly defined.

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-- Stipulation 3, p. A3- 10, should identify disturbed areas and the range of disturbance covered, i.e. road construction, unpredicted subsidence, etc.

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-- Stipulation 4, p. A3 - 10, should be clarified and based upon a documented need.

50-13

-- Stipulation 5, p. A3 - 10, must specifically identify where coal extraction will be restricted and in response to what danger to which water rights. Otherwise, the stipulation poses a real threat that the coal below an entire surface drainage basin could be withheld from mining on the basis of an unsupported claim by a junior or distant water right holder.

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-- Stipulation 16, p. A3 - 13, improperly and unnecessarily preempts the State of Colorado's legal responsibility and authority for water protection inside its borders and is based on a regulation declared invalid by the Federal courts.

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Much more information and analysis is available on this tract and should be relied upon in specifically, reasonably, and responsibly addressing potential impacts. We believe that it must be if further limitations are going to be imposed on the Paonia "D" Seam Tract prior to lease sale. How this can be accomplished is discussed later.

C. Transportation

Transportation represents the other principal environmental consideration related to the Paonia "D" Seam Tract. As with water, one must venture outside the bounds of the DEIS to fully appreciate and evaluate the extent to which this subject has matured as of this date.

Like in the case of water, CWI, the community, and government representatives have already devoted substantial time and effort to discussing and finding an acceptable transportation mitigation measure in anticipation of a lease sale even though actual implementation of a coal conveyance system other than trucking on Highway 133 is at least two (2) to three (3) years away. The fruits of this effort can be found as early as BLM's Environmental Assessment Record on Coal Lease Sale Application C-25079 and Associated Rights-of Way C-25150, filed in June of 1977, which addressed the question in great detail. And, following additional

developments and discussions among the participants, including environmental groups, Federal Coal Lease C-27432 stipulated upon CWI's execution:

Sec. 30 (f) Colorado Westmoreland, Inc. will operate in full compliance with all existing laws, rules, and regulations and take reasonable interim and long-term steps to mitigate any significant environmental impacts of increased trucking on State Highway 133 resulting from increased production at the Orchard Valley Mine as the need arises.

Sec. 30 (g) Colorado Westmoreland, Inc. will retain an independent highway consultant to review the truck haul situation for the purpose of making any appropriate suggestions for changes in procedures.

Sec. 30 (h) Colorado Westmoreland, Inc. has applied for permission to use tandem trucks on State Highway 133 which would double the coal hauling capabilities of each truck without significantly increasing the number of monthly trips from the mine to the train loadout. If such permission is granted, Colorado Westmoreland, Inc. will change to the tandem trucks as soon as possible.

Sec. 30 (i) A conveyor or other permanent capital-intensive mitigating measure will be installed to minimize Colorado Westmoreland Inc.'s hauling on State Highway 133 when a long-term lease is issued giving Colorado Westmoreland Inc. the ability to finance such a measure.

CWI complied with all of these stipulations, and, in anticipation of the impending lease sale, has devoted substantial effort over the past year to studying the permanent capital-intensive measure mentioned in Sec. 30 (i).

After investigating and evaluating a broad range of transportation alternatives encompassing diverse methodologies and routes, CWI convened numerous individual working sessions with interested parties and two community meetings to help fashion a framework for ultimate selection of an alternative which could take full advantage of the possible benefits of innovative technologies in coal transport, address subjective as well as objective considerations of affected persons, and meet the economic constraints inherently confronting CWI given the limited lease reserve base of the Paonia "D" Seam Tract and the depressed state of the economy and the coal market in particular. Thus, as with hydrology, a substantial body of information and discussion has been developed outside but in support of the DEIS, and allows for

an evaluation of impacts and mitigating measures based upon site specific facts and analyses developed openly and fairly with those presently having a stake in the outcome.

It is important to recognize that CWI has not and cannot select or commit itself to a particular transportation alternative at this juncture nor, for much the same reasons, should BLM. After examining and discussing with interested parties everything from aerial trams to a state highway frontage road carrying multiple unit trucks, we believe only three real alternatives present themselves:

- (1) A mine mouth to loadout pneumatic tube system which would constitute the first of its kind in the free world.
- (2) A conveyor system approximately 3,400' long and for the most part, below-grade from the area of CWI's power station along Steven's Gulch Road to the loadout facility.
- (3) A private haul road from the power station area to the loadout.

Each of these alternatives accomplishes the objective of the lease stipulation attached to C-27432: minimizing Colorado Westmoreland's hauling on State Highway 133. Each alternative provides for a tunnel under 133.

However, each also carries with it specific benefits and impacts: the tube is virtually impact free from an environmental point of view, but unproven and extremely costly, especially in view of the fact that a back-up system of trucks would have to be included; the conveyor minimizes environmental impacts and leaves open the potential for a future completely closed system, but even designed as is it presents an unreasonable financial burden given the limited reserve being leased, the mine's production level, and the current cost-price structure of the coal market; and, finally, the road minimizes cost -- although it does add cost to production, but forecloses other alternatives in the future and is apparently unacceptable to that new part of the community who will be impacted when the trucks are taken off the State Highway.

We believe selection of an alternative must be based on this entire history and effort as well as future developments. Any stipulations should retain a full measure of flexibility so that the best possible alternative can be implemented when the time that a decision must be made has arrived. Production may increase to a cost-effective load, new sources of financing may become available, and so on.

In addition to evaluating the Paonia "D" Seam Tract in the context of this rather significant degree of activity outside the formal EIS process, we believe the DEIS should be revised to include or

correct the following points with respect to transportation impacts and potential mitigating measures:

- The selection of a transportation alternative should be based in part on the economic reasonableness of the system in view of all attending circumstances. Language to this effect should be included in the stipulation.
- Actual construction of an alternative could be triggered by economic events, such as a certain level of increased production, the acquisition of additional federal reserves in the future, an offset against the lease sale bonus payment, a reduction in the royalty rate, or so forth.

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- The statement on p. 139, para. 2, lines 4 - 7, that construction of a new alignment for State Highway 133 is in progress and thus through traffic will be routed around coal trucks, is inapplicable to the Paonia "D" Seam Tract. The Colorado Department of Highway realignment designs of SH 133 for a section several miles before and after its intersection with SH 187 show no change in the alignment of the highway from its present location. The construction of a new highway in a new alignment and the utilization of the old highway by coal traffic refers specifically to that construction occurring several miles up the valley near the Mount Gunnison

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and Somerset mines. The statement mentioned above does not apply to the circumstances which exist near the Paonia "D" Seam Tract.

50-18

- Contrary to the assertion on p. 249 - 250, all coal traffic on SH 133 will not cease. Not all such traffic is the result of the Orchard Valley Mine. Only CWI's portion of that traffic will be removed.

50-19

E. Other

Numerous other statements and stipulations in the DEIS reflect the importance of acknowledging the contiguity of the Orchard Valley Mine and of relying upon the massive body of information and analysis in existence and constantly being added to in describing the affected environment, projecting impacts, and formulating mitigating measures. A couple of examples are provided below:

- Page 140, para. 1, lines 1 - 2, asserts the existence of eight sites eligible for the Register of Historic Places. None of these sites, however, have been field verified or examined to determine their qualifications for the National Register.

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- Page A3 - 12, Stipulation 11 includes a one-half mile radius buffer around each golden eagle nest site. Language from all

50-21

past leases and permits adjacent to the Paonia "D" Tract have specified a one-quarter mile or 1,000' buffer zone. An active golden eagle nest has been located within one-half mile of CWI's surface facilities for many years.

50-21

V. FRAMEWORK FOR DECISION: FAIR, REASONABLE, SPECIFIC STIPULATIONS REQUIRE THE CONSTRUCTIVE PARTICIPATION OF ALL PARTIES AND A BASE GREATER THAN THE REGIONAL EIS ALONE

CWI supports the apparent intention of BLM to join with other interested parties in addressing controversial issues as early in the leasing and permitting process as possible. Doing so has important commercial, as well as environmental, significance. Specific resolution of such issues as water protection and transportation mitigations is an important guide to us, for example, in knowing how many of the 40.5 million metric tons announced for sale will in fact be withdrawn from mining for environmental reasons so that we can reduce our estimates of the fair market value of the tract accordingly, perhaps initiate the search for additional reserves, assess the status of our contractual obligations, develop a mine plan, and commence the permitting process.

Conscious of BLM's admonition in Standard Stipulation No. 2 that "The United States Government does not warrant that the entire tract will be susceptible to mining....", it is extremely important to CWI, especially in view of the unavoidable imprecision of reserve projections and actual recovery percentages, that areas clearly off limits to mining because of

50-22

environmental constraints imposed by the Government itself be identified. We believe the Department of Interior has a responsibility to assist us in this endeavor.

50-22

Resolution of such issues is also clearly in the best interest of all those who advance the need for additional protections as well as those concerned with a timely and orderly lease sale and subsequent permitting of tracts free of challenge or litigation. The concern of an operating mine such as ours is especially great since time is of the essence in sustaining our ongoing activities and obligations.

We believe that we are all well on our way towards resolving the items of concern to everyone interested, affected, or responsible for this coal development. We believe specific decisions can be arrived at soon enough to accommodate the most concerned of people. Lease stipulations will occupy perhaps the major role in this process. However, we do not believe the Regional EIS by itself is a sufficient basis upon which to make these judgments. Nor should BLM alone shoulder this task. As pointed out repeatedly in these comments, many parties, a substantial body of history, and an ever-maturing data and analytical base all can and should contribute.

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CWI strongly recommends that BLM look especially to the state permitting agency, the Colorado Mined Land Reclamation Division (CMLRD), for guidance in the ultimate formulation of any specific stipulations and

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the resolution of outstanding issues. Particularly in the areas under consideration here, federal and state mining and water laws tend to defer to state agency authority and expertise. Certainly in the case of the CMLRD, we have the benefit of an experienced, professional group of trained experts on these issues in this region, and we should place the significant reliance on them contemplated by the Surface Mining Control and Reclamation Act and the Cooperative Agreement delegating primacy to them. In discussions with COSC, CWI, and, I believe, BLM, the CMLRD has expressed its willingness to participate in a constructive way in advance of the formal permitting process under these rather special circumstances in the hope of forging agreement on a tract acceptable for mining. We very much appreciate their participation in this effort bringing together so many parties and interests in unique and constructive combination.

VI. CONCLUSION: IN CONDITIONING THE TERMS OF THE PAONIA "D" SEAM TRACT, THE PARTIES SHOULD COMMIT TO A SET OF STANDARDS

- CWI believes that in this effort stipulations should meet certain standards:
- 1) They should be framed in descriptive, operational terms rather than in general, legalistic language.
 - 2) They must be reasonably attainable as a matter of law, technology, and economics.

- 3) They must be reasonably related to genuine potential impacts and provide legitimate mitigation to bona fide, unaddressed concerns.
- 4) They should be reasonably comparable and uniform to those imposed on other Federal tracts, especially in the local region.
- 5) To the extent BLM believes a degree of open competition must be formally maintained with respect to the Paonia "D" Seam Tract, it should make absolutely clear that the same stipulations apply to all potential bidders and operators on the Paonia tract to insure equality of opportunity in fair market evaluation, bidding, leasing, and mining.
- 6) Mitigation measures should be coordinated and complementary to the extent possible.
- 7) Redundant mitigation requirements or stipulations should be avoided and costs minimized, e.g. if water insurance is required, its cost should be offset against bonding requirements.
- 8) The need for restriction of coal extraction inside the lease tract should be balanced against the other special mitigating measures finally attached to the lease tract and any such restrictions should be identified and announced prior to the lease sale, perhaps as part of the call for comments on fair market value of the tract.

- 9) Final recoverable tonnages and lease boundaries should be revised downward to account for any acres or reserves eliminated due to environmental stipulations or refined exploration data and analysis.

Thank you.

Colorado Westmoreland, Inc.

Letter Response 50-1

Comment noted. The individual tract summary for the Paonia D Seam tract in Chapter Six of the EIS states that without the lease the coal resources of the Orchard Valley mine would be depleted by 1987 and employment would cease. The positive employment and income impacts of leasing are discussed in Chapter Four.

Letter Response 50-2

The coal regulations state that all long-term coal sales are competitive, therefore, a worst-case analysis was done on the Paonia D Seam tract which assumed a lessee other than CWI.

Letter Response 50-3

BLM recognizes CWI's view that the Paonia D Seam tract is a "maintenance" tract. However, the Federal Coal Leasing Amendments Act requires that all lease sales be competitive. Because lease sales are competitive, if a company other than CWI obtains the lease, a new portal may be constructed.

Letter Response 50-4

See Responses 47-9 and 50-1.

Letter Response 50-5

See Response 50-3.

Letter Response 50-6

BLM used and inserted all pertinent and available data into the "Affected Environment" and "Environmental Consequences" sections of the Draft EIS. Including baseline data in the EIS without knowing the details of the mine plan would be futile, since potential impacts could not be assessed with any degree of specificity. Also see Public Hearing DH Response 9-2.

Letter Response 50-7

The tract delineation report for the Paonia D Seam tract states that the minable thickness for the 'D' coal seam ranges from 4.5 to 12 feet. Therefore, the danger of subsidence would be greatest at 12 feet and least at 4.5 feet. Text has been changed to include the lower range.

Letter Response 50-8

Projections on maximum subsidence are from the Somerset, Colorado, area which is stratigraphically and structurally similar to the Paonia D Seam tract.

Letter Response 50-9

See Public Hearing DH Response 21-5.

Letter Response 50-10

A mitigating measure or a lease stipulation establishing the presumption expressed in this comment has not been developed.

Letter Response 50-11

Riparian vegetation is an important component and is indicative of riparian habitat. Stipulation 1 has been revised in the Final EIS as a mitigating measure using "alluvial fill" rather than "riparian vegetation" as the zone to be protected. A mitigation measure has also been included in the EIS with the sole purpose of protecting riparian habitat.

Letter Response 50-12

This stipulation will be enforced by the State of Colorado during the permit phase, it has been deleted.

Letter Response 50-13

This stipulation will be enforced by the State of Colorado during the permit phase, it has been deleted.

Letter Response 50-14

See Response 3-1.

Letter Response 50-15

Stipulation 16 has been revised to recognize the State of Colorado's role as administrator of the State's waters. Also, see Public Hearing DH Response 12-4.

Letter Response 50-16

See the revised transportation stipulation in Appendix Three.

Letter Response 50-17

See the revised mitigation measure on transportation. Construction of an alternative transportation method should begin as soon as possible after mine plan approval, simultaneously with mining of the Paonia D Seam tract.

Letter Response 50-18

See Response 49-7.

Letter Response 50-19

See Response 49-7.

Letter Response 50-20

CWL is correct that the sites have not been fully verified but the existing site forms provide enough information to make a preliminary judgment on their eligibility. The SHPO's comments agree with our preliminary assessment.

Letter Response 50-21

A 1/4 mile radius is the correct distance and the text has been revised accordingly.

Letter Response 50-22

See Public Hearing DH Response 21-7.

Letter Response 50-23

Comment noted. The mitigation measures in the EIS are to be used as guidelines for development of the final site specific lease stipulations. Data from site specific analysis and data developed for the mine plan will all be

utilized to develop final site specific mitigation. CMLRD will be involved with BLM and has commented on the Draft EIS.

Letter Response 50-24

Comment noted.

National Park Service

Letter Response 51-1

The unavoidable adverse impacts section was inconsistent with the analysis and has been rewritten to indicate that noise would be perceptible during a major portion of the time; blasting noise would be perceptible throughout the park, and that the majority of the visitors would perceive the noise as significantly adverse.

The noise levels cannot be definitely quantified at this time as mine plans and portal locations are not available. Regardless of the level of noise, the impacts could be significant and adverse to park visitors.

A requirement for control of noise and development of site specific mitigation has been added to Appendix Three. However, noise is difficult to control and unavoidable adverse impacts still would result.

The noise analysis in the Final EIS now indicates that noise would be contrary to the values for which most people visit the park and noise would continue during a major part of the time.

Letter Response 51-2

The analysis does appear to suggest inconsistencies. However, as stated in the EIS, the MESOPUFF model was applied to determine regional concentrations and is not appropriate for determining concentrations in the near field, close to emission sources. The ISCLT model was intended to predict annual average near field concentrations.

The rationale for the statement, "MESOPUFF is not as conservatively high as ISCLT", was not intended to be a general statement, but only regarding the way the models were used in this analysis. The main reason MESOPUFF gave lower values than ISCLT was because MESOPUFF accounted for deposition, whereas, in this analysis, ISCLT did not. This results in

exaggerated concentrations with increased distance downwind from sources in the ISCLT calculations. MESOPUFF did not predict high concentrations close in because many particles were deposited before reaching a receptor. The text has been changed to clarify this.



Utah Coal Operators Association

201 East South Temple
Salt Lake City, Utah 84102
Phone: (801) 533-6705

MEMBERS

- Badger Creek Coal Co
- Bozorth Shires Energy Co
- Chapelton Coal Co
- Energy Mining Corp
- Harco Steel Co
- Palmer Mines Co
- Rocky Mountain Coal Co
- Salt Lake Creek Coal Co
- Southern Utah Fuel Co
- SUNOCO Coal Co
- Texas Resources Inc
- Trial Mountain Coal
- U.S. Fuel Corp
- U.S. Steel Corp
- Valley Camp Coal Co

July 6, 1983

Mr. Ron Bolander, Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Ron:

The Utah Coal Operators Association appreciates the opportunity to update our earlier comment on the Uinta-Southwestern Utah Coal Region Round Two Draft Environmental Impact Statement.

Our Association has reviewed the above document in depth and find that we have no strong objection to alternate two, which recommends coal leasing at a high level of 1.668 billion tons; however our members still prefer, as we indicated in our earlier statement on June 9, 1983, alternate 3, medium level, containing 1.316 billion tons of coal.

Again, thank you for the opportunity to respond to the Round Two DEIS.

Sincerely yours,

Don Ross
President

DR:k1

xc: UCOA Distribution
Desmond Barker

Utah Coal Operators

Letter Response 52-1

Your comments are appreciated and will be considered in the decision making process.

P.O. Box 251
 Paonia, Colorado 81428
 July 13, 1983

Mr. Ron Bollandier, Team Leader
 Bureau of Land Management
 136 East South Temple
 Salt Lake City, Utah 84111

Dear Mr. Bollandier:

As holders of adjudicated water rights which could easily be affected adversely by mining in the Paonia D coal lease tract, we are deeply concerned about comments submitted to you and to State Director George Francis by the Colorado Department of Natural Resources.

In his letter of July 5, Acting Executive Director Hamlet J. Barry III asserts that "the protection of water rights in the State of Colorado is the exclusive function of state government and not presently subject to federal pre-emption or concomitant authority by any other jurisdiction." We have consulted several legal authorities and can find no legal justification for this statement. Certainly the State of Colorado has certain laws relating to the appropriation of water and water rights but that does not mean that the federal government is not responsible for protecting water and water rights, like other property rights, when leasing federal coal. The BLM must not be misled by the MLRB's last minute attempt to extend its turf in this case. Nor can the BLM use this fallacious argument as an excuse to escape its clearly mandated duty to protect our interests, as indicated in the comments submitted by COSEC, MCC and WSERC on the Draft Uinta-Southwestern Utah EIS.

We "water users" continue to insist that the BLM should include detailed and specific lease stipulations as mitigating measures to protect water and water rights in the Paonia tract. BLM and USGS studies both show that water loss (pollution, etc.) due to subsidence could have a severe effect on agriculture near the tract. State Director George Francis, in his Response to our protest against the North Fork MFP, recognized this very real risk and added to the land use plan assurances that water protection is one of the BLM goals. His response promised us that water and water rights would be protected through an effective combination of: 1) mining restrictions; 2) a water replacement or augmentation plan; and 3) water insurance or bond. If the lease sale is to conform to the land use plan (as required by law) the lease stipulations promised by the State Director simply must be included. In our comments on the EIS we indicated ways in which the stipulations proposed by the BLM could be improved but basically we support vigorously the BLM's efforts to carry out their duty to protect water through lease stipulations.

The entry of MLRB into this matter at such a late date is inappropriate and disruptive. As you know, industry, water users and county government have been working with the BLM for over a year now to resolve the water question so as to avoid the kind of confrontation between coal and agriculture that in the past has almost torn the county apart. We have now reached a consensus that is acceptable to all parties on the need for lease stipulations. The BLM should

concentrate on ironing out the details of the lease stipulations based on comments submitted at the hearing in Delta and later. The advice of the MLRB should be welcomed, of course, but the State cannot be allowed to usurp the authority of the BLM and to destroy the working relationship among concerned parties that has been so carefully developed over time. We can only deplore the bad timing and empire-building attitude on the part of the MLRB.

Sincerely yours,

CC: Hamlet J. Barry

George Francis

John Stencel

Delta County Commissioners

Chris Seglem

Ben Eastman

Franklin D. Kelly

Clare Moore

Robert Lewis

Bob Kirby

J. W. Call

Dora B. Burtner

J. W. Barnman

Felix J. Belmont

Arthur J. Estlin

A. Paul Douglas

Water Rights Holders In Colorado

Letter Response 53-1

Your comments are noted and are being considered in the development of appropriate mitigation measures. Your interest and involvement in the Federal coal leasing program is appreciated.

**KAISER
STEEL**

KAISER STEEL CORPORATION
COAL GROUP ■ KAISER CENTER
300 LAKESIDE DRIVE ■ P.O. BOX 58 ■ OAKLAND, CALIFORNIA 94604
(415) 271-2777 ■ TELEX 278528

July 15, 1983

Mr. Ron Bolander
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolander:

HAND DELIVERED

The following comments are submitted regarding the Dugout-Pace Tract being considered for inclusion in a proposed Coal Lease sale:

1. The Dugout-Pace Tract is contiguous to the Kaiser Steel Corporation North Lease and the only feasible access would be through future North Lease underground workings.
2. The Geological/Engineering Abstract gives this tract a LOW rating because of access, depth of cover, thickness of seams, numerous faults and interburden intervals.
3. Estimated recovery is listed at 20% in the Abstract. Longwall methods are not considered feasible because of the numerous faults present in this area. Room and pillar mining under the high cover present over this tract would be high cost and potentially very dangerous to personnel working in this environment.
4. Coal quality, quantity and minability are extrapolated from data obtained outside the physical limits of this tract. This could mean a much lower recovery factor would be attainable.

It is our contention that anyone bidding for coal rights on this tract would do so only for speculative purposes and not for the purpose of developing the property as a self sufficient mining operation. The present state of the coal industry will not improve sufficiently in the foreseeable future to make the Dugout-Pace Tract a viable mining operation. Existing leases and other proposed leases will be able to produce coal at a much lower cost than the most optimistic projections for Dugout-Pace.

It is recommended that the Dugout-Pace Tract be removed from further consideration as a potential Coal Lease tract.

Very truly yours,

Kevin A. Dwyer / for
Brett Harvey
Kaiser Steel Corporation
Sunnyside Coal Mine
P.O. Box D
Sunnyside, Utah 84539

BH:LH:jk

Kaiser Steel

Letter Response 54-1

These comments are relative to technical information concerning the Dugout-Pace tract. The information presented represents the best estimate of quality and quantity of the coal, but the Federal Government cannot guarantee that this situation actually exists. Potential bidders would have to evaluate the property and come to their own conclusions on the technical conditions that exist with this tract.

Letter Response 54-2

The Dugout-Pace tract has been listed as a low-priority tract for leasing and has been removed from the Preferred Alternative. It, however, has received full consideration in the leasing process and appears in two of the alternatives for leasing. The Company's position and comment on the Dugout-Pace tract appear to be correct and in agreement with BLM's opinion.

54-1

54-2



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295-0699

Ref: SPX-EA JUL 21 1983

Mr. Ron Bolland
Team Leader
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Bolland:

The Region VIII office of the Environmental Protection Agency has reviewed the Round Two draft environmental impact statement for the Uinta-Southwestern Utah Coal Region and offers the following comments.

Water Quality Impact Assessment

Soil losses are predicted in a somewhat specific nature just for the critically erosion prone areas (such as on p. 263). These charts are commendable as far as they go. An adequate prediction of soil losses should also include areas of moderate to severe erosion potential. "Acceptable" levels of soil erosion (p. 154) for the critical erosion areas need clarification and contrary to these charts, we think that cumulative soil losses should be estimated. From this more in-depth assessment, there would be a clearer picture of projected soil losses and performance standards anticipated from use of stipulated BMP's. It would also create a better linkage of soil losses (in tons per acre) to annual sediment yields (in acre feet). Overall, the anticipated soil losses seem very high for the short and long term. The rates don't seem to correlate with results which should reasonably be achieved from BMP's. We suggest some re-analyses.

We think that the potential impacts of sediment on surface water beneficial uses deserve additional analysis. The maintenance of water quality criteria, standards, and beneficial uses (for Alternatives 1-3) is mentioned on p. 177. Sediments would "add additional stress to already stressed ecosystems in and along the affected streams" in the area of the central Utah tracts (p. 159). Statements on page 266 and elsewhere predict only minor impact on surface water quality. However, we request additional quantification in the final EIS needed to clearly define anticipated impacts. Regulatory requirements for suspended solids are discussed on page 245 for development of the Colorado tracts. Why wasn't this information included for the Utah tracts?

This also applies to the water quality impacts of urban runoff and sediment from leasing - induced community development. Disclosure of this impact is important considering that several thousand acres would be converted to urban uses.

55-4
We would like to request, as a NEPA disclosure, that BLM estimate the amount of soil lost as a result of lease development - both ore - and post reclamation. This is unquantified (pp. 252, 299, 344). The cumulative impacts on water quality for each alternative were absent. This should be an important part of the EIS and should be based on supporting quantification.

Water Quality Impact Management

55-5
The DEIS briefly mentions a prohibition of new NPDES permits on National Forest lands (p. 161). We think that it is a misleading and far too brief interpretation of the anti-degradation clause of the Utah water quality standards. The applicable anti-degradation segments should be identified. The sediment control performance standards to be achieved by BMP installation (and enforced by the surface management agency) for non-point sources need clarification. This is important not only for the leases on anti-degradation segments, but also for the other segments with assigned beneficial uses. Suspended solids limitations for the Colorado tracts (p. 245) are an example of these performance standards. However, it appears to relate to only part of the impacts from lease development. This should be clarified.

55-6
Standard stipulation number 6 (appendix p. A 3-6) discusses monitoring requirements. Noticeably absent are monitoring requirements for water quality. This may be inferred from the special conditions (pp. A 3-8 and A 3-9). However, it still needs to be clearly specified. Stipulation 5 mentions "future programs of observation". Who will monitor and how often? Is the data going to be available for the State/EPA water quality protection personnel? The stipulations for the Colorado tracts (pp. A 3-9 through A 3-14) come much closer to the mark for what we regard to be adequate EIS water quality protection stipulations. However, monitoring responsibilities during and after mining should be specified there also.

55-7
The discussion of mechanisms to assure water quality enforcement should be strengthened. The program resulting in "adherence" to "water discharge criteria and standards" to protect established beneficial uses is a primary example (p. 177). The other primary example is the enforcement responsibility/commitment, particularly for leasee and the surface management agencies, to assure adequate non-point source BMP performance. We are concerned that there be a sufficient linkage of on-site inspections and monitoring to adequate BMP performance. Statements on page 4 start to address these issues but should be expanded.

55-8
We have a couple of concerns on reclamation requirements, particularly for the Utah tracts (pp. 58-59, 166). It appears from the statement in the second paragraph on page 166 that native trees and shrubs would not be part of reclamation efforts. They would have to be established naturally. Where they existed in the pre-disturbance plant community, we recommend that they be part of the reclamation program. Because of the severe climatic constraints to revegetation of the Emery tracts, we doubt that successful non-irrigated revegetation could be achieved in a reasonable timeframe. Yet the DEIS is very vague about irrigation requirements and should be improved. Limitations on disturbance of highly erosive soils may be necessary because of the reclamation constraints.

The discussion of local land use planning controls and constraints is commendable. It is a very important corollary to leasee/surface management agency responsibilities. However, we would like to see some clarification of the mechanisms to be used to assure compliance with the zoning and development requirements relating to water quality. This would relate to both county and municipal government. It should include mechanisms for non-point source controls for lease - induced urban growth.

55-9

The Southeastern Utah Association of Local Governments (a designated water quality management planning agency) has voiced adamant concerns against leasing on its municipal watersheds. The specific leases of concern, and to which the municipal watershed unsuitability criteria have been applied, include: Quitcupah, Castle Valley Ridge, Mud Creek and North Trough Springs, Trail Mountain, Gooseberry (out of the SEUALG area, but in the Scofield Reservoir - Price River drainage), and Ferron Canyon (also out of the SEUALG area, but on a drainage into its area). In reviewing the application of unsuitability criteria there are some concerns that we think should be addressed.

55-10

- Reasoning for exemptions and exceptions is poorly defined. For example, the Castle Valley Ridge tract would have "concurrency that mitigation measures and/or management requirements and constraints would be applied". What, in fact, is the justification? What does "concurrency" in this context mean? The language regarding the Quitcupah tract is even less definitive.

55-11

- The word exemptions was used several times. We found no documentation that any lease met the regulatory exemption criteria.

55-12

- What will be the process and timing for governmental concurrence? Exactly what governmental units will concur? Why isn't concurrence required for the Quitcupah tract?

- For the reasons mentioned elsewhere in our comments, we do not believe that assertions in the criterion justifications that there will be minimal impacts and adequate controls have been adequately substantiated.

55-13

SLM has made a commendable effort to project municipal wastewater treatment system needs. However, what does the term "moderation" mean in the first paragraph under Water and Sewer on page 183? We encourage the communities involved to utilize this EIS process in working with the established areawide water quality management agencies to plan for the growth impacts. In some cases, areawide WQM plans may need revision as a result of increased growth projections.

Air Quality

The air quality impact analysis is limited in its depth and detail. The two main dispersion models used in the analysis, Industrial Source Complex Long Term (ISCLT) and Point Area Line Deposition (PALDS), are limited in their ability to accurately predict the air quality impacts in complex terrain and transport over long distances. The ISCLT model was used to predict annual concentration and PALDS was used for the 24 hour TSP analysis. Also MESORUFF was used in some of the Class I analyses over long distances. In the results, the annual concentration are higher than the model 24 hour cases. This is because PALDS has a deposition algorithm allowing suspended particles to fall out according to their size and density. This is a correct approach, there should have been an attempt to modify the ISCLT model to include the deposition algorithm. The lack of this has greatly weakened the confidence in the annual analysis. The authors claim this was a conservative approach which it is, but we feel it limits the effectiveness of the annual analysis.

55-14

The modeling results of the different locations and scenarios is disturbing due to the fact that so many violations of the TSP Primary and Secondary NAAQS are predicted for both the annual and 24 hour time periods. The EIS describes exceedances of the annual and 24 hour TSP primary NAAQS in the Colorado lease area for all three mining alternatives. Although it is not stated, it appears that violations of the Class I annual and probably 24 hour standard will be exceeded at the Black Canyon of the Gunnison National Monument. In Utah there are two lease areas in the central and the southern parts of the state. In Central Utah were most of the leases are, the annual primary TSP standard is predicted to be exceeded. But due to the deposition calculations the Class II 24-hour, and both long and short term Class I standards will be protected. In the southern Utah lease area a violation of the Class II annual NAAQS is predicted. What is most disturbing is the impact that will occur in the southern portion of the Bryce Canyon National Park, a Class I area. Although no annual analysis was performed, the 24-hour analysis shows impacts beyond the Class I standard of 10 ug/m³. We feel that an adequate annual analysis would also show exceedances of the Class I standard. This is primarily due to the close proximity of the leases to the National Park. The visibility analysis portions of the EIS show some reductions in the perceptible contrasts and some significant reductions in the visible range measurements. The worst occurrences of these impacts will affect the Bryce Canyon National Park.

55-15

As noted throughout the analysis, the greatest impact on air quality comes not from actual mining emissions in the three lease areas but from population growth and high traffic volume on unpaved roads. We feel these road impacts are very important and could be controlled by paving off the mining leases are to be developed. In the EIS it was pointed out that new EPA emission factors were used for the mining activities to better address deposition of particulates. Additional research

55-16

is needed to analyze deposition characteristics of unpaved road particulates in order to predict more accurately their impact. Also, there is very limited meteorological data in the three lease areas. A sufficient network of meteorological stations in the areas need to be undertaken. The additional on-site meteorological data will be needed in the future to maintain the NAAQS and allocate the limited TSP standards, or not all leases will be able to be developed.

55-16

In view of the above comments and according to our guidelines, we have rated this DEIS as ER-2. This means that we have environmental reservations regarding some aspects of the proposed actions. More information and/or some modifications would help alleviate these concerns as our comments indicate. If you have any questions regarding our comments, please contact Mr. Mike Hammer of my staff (FIS 327-2351).

Sincerely yours,

John G. Welles
 John G. Welles
 Regional Administrator

Environmental Protection Agency

Letter Response 55-1

The soil discussions on pages 39, 95, 149 through 157, 203 through 209, 261 through 264, and 307 through 309 of the DEIS present descriptions of and impacts on areas of moderate to severe erosion potential. The areas are referred to as "areas of special soil management concerns." The Chapter 3 discussions give a description of the soil concern, natural sediment yields, and soil loss tolerance values for these areas. The Chapter 4 discussions present information on estimated soil losses without and with coal tract development on these same areas.

Page 154 of the DEIS refers to acceptable levels of soil erosion being reached through revegetation and erosion control measures. Acceptable levels refer to soil losses that do not exceed established soil loss tolerance values. Table 3-4 on page 41 of the DEIS explains that soil loss tolerance values are maximum rates of soil erosion that can occur and still remain a productive soil, i.e., 0.0063 inches per year for the majority of soils in the areas of concern. Therefore, as explained on page 154, paragraph 3 of the DEIS, revegetation and erosion control measures would reduce soil erosion to the soil loss tolerance values, i.e., soil profile would again be productive, within a 2- to 10-year period on most areas of concern.

Page 154 of the DEIS explains that soil losses depicted are considered as averages over the potentially disturbed areas of concern. The losses are shown as ranges; the ranges represent soil loss equation data for numerous soil associations found within the tract areas. Page 154 also explains that due to the lack of site specific coal tract development data, including erosion control schedules, soil movement could not be predicted. To predict actual cumulative soil losses, information would be needed on: (1) soil associations for occupied sites; (2) soil loss equation data, including assumptions for actual development operations, i.e., information used to compute Universal Soil Loss Equation and information on slope lengths, slope percents, percent groundcover,

percent ground surface disturbance, etc.; (3) schedules for vegetation to return to base level groundcover conditions; and (4) the expected effectiveness of erosion control programs. Similar information would be needed to determine cumulative losses without development which would, of course, be needed for comparative purposes. This information was not available for the Regional analysis performed for the Round Two leasing program.

As already stated, critical soil areas were analyzed. Disturbance on such areas would produce high losses. The losses as stated in the DEIS are representative of conditions on many soil associations and are based on local experiences with existing coal operations under proper management direction. Time required for mitigation, i.e., reduction of losses to or below soil loss tolerance values, is also based on local experiences with existing mine operations under proper management direction.

Letter Response 55-2

See Public Hearing SLCH Responses 3-6 and 3-7.

Letter Response 55-3

Control of urban runoff is addressed in County plans and regulated by County ordinances. Plan and ordinance direction is established to control discharge rates and thereby control sediment yields. Actual design and construction of community discharge systems (under plan and ordinance direction) should minimize sediment yields. Increased annual sediment yield over present would be insignificant.

Letter Response 55-4

See Response 55-1.

Letter Response 55-5

The intent of the statement on page 161 (paragraph 3, last two sentences) is to note that there are water-quality standards that need to be complied with during coal development. Requirements to meet these standards doubtless would be stipulated in detail in the leasing, and mining and reclamation plan documentation.

Letter Response 55-6

Thank you for your comment. These items would be considered in the leasing, and mining and reclamation plan documentation.

Letter Response 55-7

See Response 55-6.

Letter Response 55-8

The planting of trees in disturbed areas as part of reclamation was not discussed in the individual tract profiles. The planting of seedlings or mature trees could be required during preparation of a detailed mine plan. The planting of trees is usually required in those areas where the disturbance would constitute a significant scenic intrusion. With the vast majority of mining to be done by underground methods, critical scenic intrusions would not be expected. During the mine plan stage, if the planting of trees is required during reclamation, the time required to reestablish predisturbance vegetation conditions would be considerably shortened.

Mitigating measures and stipulations made a part of any lease issuance in the Emery coal complex, with the EMRIA Report 16 which recommends irrigation to ensure successful reclamation. On page 166 of the DEIS it is noted that due to climate and soil conditions "... special treatment and supplemental irrigation may be necessary." Details of these extra measures would be determined during the mine plan stage.

Letter Response 55-9

The mechanisms to be used to assure compliance with county development and zoning requirements will be based on requirements made part of the lease stipulations and mining plans.

The surface management agencies will support county recommendations for adherence to county requirements. Such recommendations have been included (in a general way) in the EIS.

Coordination with counties and recognition of county plans and ordinances are presently part of Federal land management agencies' planning processes.

Prior to actual lease sales and sale schedules the counties can develop and recommend site specific mitigation measures and stipulations for protection water quality. The federal agencies will do the same. County recommendations will (by way of the Governor's Office) be used in developing lease language. Such recommendations will be coordinated with site specific measures and stipulations proposed by federal surface management agencies.

Upon award of leases and as part of mine plan development, counties and federal agencies can refine measures and stipulations to address actual development work of a particular operator. Again, federal surface management agencies will be responsible for coordination with the concerned counties.

Thus, the mechanisms for assuring compliance are (1) the EIS process and resulting general measures and stipulations; (2) the lease sale, with refined site specific measures and stipulations; and (3) the actual mine plan development where measures and stipulations are keyed to definite actions.

Letter Response 55-10

Exception of Criteria 17 is allowed by 43 CFR 3461.1(1)(2) where the surface management agency (in this case Forest Service) in consultation with the municipality or the responsible local governmental unit, determines as a result of studies that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree. The Forest Service has determined that with proper mining techniques, mitigation, and constraints, the watershed would not be significantly affected. Concurrently in this case refers to Forest Service approval, in consultation with local governments (43 CFR 3461.1), of leasing only after stipulations are added to protect the watershed values. This process of consent is outlined in 43 CFR 3400.3-1 which states that for leases of land which is under the jurisdiction of a federal agency other than the

Department of the Interior (Forest Service is in the Department of Agriculture) the lease may be issued only with the consent of the appropriate official of the other agency, and subject to such conditions as that officer may prescribe to ensure the use and protection of the lands for the primary purpose for which they are being administered. A full description of the application of unsuitability criteria is not appropriate in the tract summaries, but is included in the site specific analyses of the tracts.

Letter Response 55-11

A full discussion of the application of unsuitability criteria is beyond the scope of the Regional EIS but is available in the site specific analyses of the tracts. The regulatory exemption criteria of 43 CFR 3461 were utilized in the unsuitability review.

Letter Response 55-12

The Forest Service tracts would not be leased by the Department of the Interior without the consent of the Department of Agriculture. The Secretary of the Interior and an authorized officer of the Department of Agriculture will concur on stipulations for protection of resources and existing land use prior to leasing or the Department of Agriculture would not give consent to lease. The site specific analysis for the Qultchupah tract explains that the exception to Criteria 17 on the tract was based on the enforcement of State of Utah's water quality standards. Measure 1 of Appendix Three requires lessees to comply with all applicable state and local laws and regulations. A full description of application of the unsuitability criteria is not appropriate for the Regional EIS but is given in the site specific analyses of the tracts.

Letter Response 55-13

The word "moderation" found on page 183 of the DEIS has been changed to "modernization".

Letter Response 55-14

BLM agrees that it would be more physically sound to

include a deposition algorithm for the ISCLT modeling. A deposition algorithm was included in some initial modeling using ISCLT and was found to apparently underpredict concentrations when comparing to air quality monitoring data. The model without deposition for 1981 gave results that generally compared well with 1981 monitoring data. Because of this, the deposition algorithm was removed. BLM feels that the model accurately predicts concentration near the sources, but exaggerates the concentration as distance from the sources increases, because deposition is not accounted for. Because site specific locations of facilities are not known, more accurate modeling is not needed at this time.

Letter Response 55-15

An analysis was performed for annual average concentrations. Although an isopleth map was shown, the concentration at Bryce Canyon was not reported. The maximum increase in annual average TSP concentration due to mining was estimated to be 4.5 $\mu\text{g}/\text{m}^3$ at Bryce Canyon National Park, which is very close to the annual PSD Class 1 increment of 5.0 $\mu\text{g}/\text{m}^3$. This has been added to the Final EIS. BLM acknowledges your concerns over the predicted air quality violations and will consider them in the decision making process.

Letter Response 55-16

The Final EIS includes mitigating measures that will be required of the lessee that should help control fugitive emissions. (See Appendix Three FEIS.) These measures include, among other controls, pavement of all long-term haul roads and major mine access roads. It should be noted that much of the increased unpaved road emissions would be from generally increased road use associated with increased population, and not directly related to an individual mine. The responsibility lies with the state or county, depending on jurisdiction of the road, to pave these roads. BLM concurs that the meteorological data is important in accurately predicting impacts and in maintaining NAAQS and PSD incremental limitations.

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APPENDIX I UNSUITABILITY CRITERIA

National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.

(2) *Exceptions.* (i) A lease may be issued within the boundaries of any National Forest if the Secretary finds no significant recreational, timber, economic or other values which may be incompatible with the lease; and (A) surface operations and impacts are incident to an underground coal mine, or (B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those National Forests west of the 100th meridian, that surface mining may be in compliance with the Multiple-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977. (ii) A lease may be issued within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted.

(3) *Exemptions.* The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977. The application of the portion of this criterion applying to land proposed for inclusion in the listed systems does not apply to lands to which substantial legal and financial commitments were made prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(b)(1) *Criterion Number 2.* Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes. Federally owned surface shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that:

(i) All or certain types of coal development (e.g., underground mining)

will not interfere with the purpose of the right-of-way or easement; or

(ii) The right-of-way or easement was granted for mining purposes; or

(iii) The right-of-way or easement was issued for a purpose for which it is not being used; or

(iv) The parties involved in the right-of-way or easement agree, in writing, to leasing; or

(v) It is impractical to exclude such areas due to the location of coal and

Subpart 3461—Federal Lands Review—Unsuitability for Mining

§ 3461.0-3 Authority.

(a) These regulations are issued under the authority of the statutes listed in § 3400.0-3 of this title.

(b) These regulations primarily implement:

(1) The general unsuitability criteria in section 522(a) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(a));

(2) The Federal lands review in section 522(b) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(b)), and

(3) The prohibitions against mining certain lands in section 522(e) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(e)).

§ 3461.0-6 Policy.

The Department shall carry out the review of Federal lands under section 522(b) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(b)) principally through land use planning assessments by the surface management agency regarding the unsuitability of Federal lands for all or certain stipulated methods of coal mining.

§ 3461.0-7 Scope.

Each criterion in § 3461.1 of this title uses the phrase "shall be considered unsuitable" as shorthand for "shall be considered unsuitable for all or certain stipulated methods of coal mining involving surface coal mining operations, as defined in § 3400.0-5(mm) of this title.

§ 3461.1 Criteria for assessing lands unsuitable for all or certain stipulated methods of coal mining.

(a)(1) *Criterion Number 1.* All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails,

method of mining and such areas or uses can be protected through appropriate stipulations.

(3) *Exemptions.* This criterion does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(c)(1) *Criterion Number 3.* Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

(2) *Exceptions.* A lease may be issued for lands:

(i) Used as mine access roads or haulage roads that join the right-of-way for a public road.

(ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated.

(iii) If, after public notice and opportunity for public hearing in the locality, a written finding is made by the authorized officer that the interests of the public and the landowners affected by mining within 100 feet of a public road will be protected.

(3) *Exemptions.* The application of this criterion is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977.

(d)(1) *Criterion Number 4.* Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.

(2) *Exemption.* The application of this criterion to lands for which the Bureau of Land Management is the surface management agency and lands in designated wilderness areas in National Forests is subject to valid existing rights.

(e)(1) *Criterion Number 5.* Scenic Federal lands designated by visual

resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

(2) *Exemptions.* This criterion does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977, on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(f)(1) *Criterion Number 6.* Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

(2) *Exemptions.* This criterion does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(g)(1) *Criterion Number 7.* All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are included in or eligible for inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that make it eligible for listing in the National Register) as determined by the surface management agency, in consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office shall be considered unsuitable.

(2) *Exceptions.* All or certain stipulated methods of coal mining may be allowed if the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and State Historic Preservation Office that the direct and indirect effects of mining, as stipulated, on a property in or eligible for the National Register of Historic Places will

not result in significant adverse impacts to the property.

(3) *Exemptions.* The application of this criterion to a property listed in the National Register is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977. The application of the criterion to buffer zones and properties eligible for the National Register does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(h)(1) *Criterion Number 8.* Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operation approved in an area or site if the surface management agency determines that:

(i) With the concurrence of the state, the area or site is of regional or local significance only;

(ii) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or

(iii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

(3) *Exemptions.* This criterion does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which includes operations on which a permit has been issued.

(i)(1) *Criterion Number 9.* Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.

(3) *Exemptions.* This criterion does not apply to lands to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(j)(1) *Criterion Number 10.* Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(k)(1) *Criterion Number 11.* A bald or golden eagle nest or site on Federal lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

(2) *Exceptions.* A lease may be issued if:

(i) It can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or

(ii) The surface management agency, with the concurrence of the Fish and Wildlife Service, determines that the golden eagle nest(s) will be moved.

(iii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(l)(1) *Criterion Number 12.* Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

(2) *Exception.* A lease may be issued if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations

were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(m)(1) *Criterion Number 13.* Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

(2) *Exception.* A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the falcon habitat during the periods when such habitat is used by the falcons.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(n)(1) *Criterion Number 14.* Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

(2) *Exception.* A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(o)(1) *Criterion Number 15.* Federal lands which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

(i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken;

(ii) Winter ranges most critical for deer, antelope, and elk; and

(iii) Migration corridors for elk.

A lease may be issued if, after consultation with the state, the surface

management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

(2) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(p)(1) *Criterion Number 16.* Federal lands in riverine, coastal and special floodplains (100-year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

(2) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(q)(1) *Criterion Number 17.* Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

(2) *Exception.* A lease may be issued where the surface management agency in consultation with the municipality (incorporated entity) or the responsible governmental unit determines, as a result of studies, that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(r)(1) *Criterion Number 18.* Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands $\frac{1}{4}$ mile from the outer edge of the far banks of the water, shall be unsuitable.

(2) *Exception.* The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(s)(1) **Criterion Number 19.** Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in § 3400.0-5(a) of this title, the standards in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

(2) **Exemptions.** This criterion does not apply to surface coal mining operations which produced coal in commercial quantities in the year preceding August 3, 1977, or which had obtained a permit to conduct surface coal mining operations.

(t)(1) **Criterion Number 20.** Federal lands in a state to which is applicable a criterion (i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

(2) **Exceptions.** A lease may be issued when:

(i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft comprehensive land use plan or land use analysis, plan, or supplement to a comprehensive land use plan, for the area in which such land is included, or

(ii) After consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the value which the criterion would protect.

(3) **Exemptions.** This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

§ 3461.2 Underground mining exemption from criteria.

(a) Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in § 3400.0-5 of this title, on any lease, if issued.

(b) Where underground mining will include surface operations and surface impacts on Federal lands to which a criterion applies, the lands shall be

assessed as unsuitable unless the surface management agency finds that a relevant exception or exemption applies.

§ 3461.3 Unsuitability assessment procedures.

§ 3461.3-1 Assessment and land use planning.

(a)(1) Each of the unsuitability criteria shall be applied to all coal lands with development potential identified in the comprehensive land use plan or land use analysis. For areas where 1 or more unsuitability conditions are found and for which the authorized officer of the surface management agency could otherwise regard coal mining as a likely use, the exceptions and exemptions for each criterion may be applied.

(2) The authorized officer of the surface management agency shall describe in the comprehensive land use plan or land use analysis the results of the application of each unsuitability criterion, exception and exemption. The authorized officer of the surface management agency shall state in the plan or analysis those areas which could be leased only subject to conditions or stipulations to conform to the application of the criteria or exceptions. Such areas may ultimately be leased provided that these conditions or stipulations are contained in the lease.

(b)(1) The authorized officer shall make his assessment on the best available data that can be obtained given the time and resources available to prepare the plan. The comprehensive land use plan or land use analysis shall include an indication of the adequacy and reliability of the data involved. Where either a criterion or exception (when under subsection (a) of this section the authorized officer decides that application of an exception is appropriate) cannot be applied during the land use planning process because of inadequate or unreliable data, the plan or analysis shall discuss the reasons therefor and disclose when activity planning, or, in the case of criterion 19, prior to approval of a permit, the data needed to make an assessment with reasonable certainty would be generated. The authorized officer shall make every effort within the time and resources available to collect adequate and reliable data which would permit the application of criterion 19 in the land use or activity planning process. When those data are obtained, the authorized officer shall make public his assessment on the application of the criterion or, if appropriate, the exception and the reasons therefor and allow opportunity for public comment.

(2) No lease tract shall be analyzed in a final regional lease sale environmental impact statement prepared under § 3420.4-5 of this title without significant data material to the application to the tract of each criterion described in § 3461.1 of this title, except, where

necessary, criterion 19. If the data are lacking for the application of a criterion or exception to only a portion of the tract, and if the authorized officer determines that it is likely that stipulations in the lease or permit to conduct surface coal mining operations could avoid any problems which may result from subsequent application of the criterion or exception, such tract may be included and analyzed in the regional lease sale environmental impact statement.

(c) Any unsuitability assessments which result either from a designation or a termination of a designation of Federal lands as unsuitable by the Office of Surface Mining Reclamation and Enforcement, or from changes warranted by additional data acquired in the activity planning process, may be made without formally revising or amending the comprehensive land use plan or analysis.

§ 3461.3-2 Consultation on unsuitability assessments.

(a) Prior to adopting a comprehensive land use plan or land use analysis which assesses Federal lands as unsuitable for coal mining, the Secretary or other surface management agency shall complete the consultation set out in §§ 3420.1-6 and 3420.1-7 of this title.

(b) When consultation or concurrence is required in the application of any criterion or exception in § 3461.1 of this title, the request for advice or concurrence, and the reply thereto, shall be in writing. Unless another period is provided by law, the authorized officer shall specify that the requested advice, concurrence or nonconcurrence be made within 30 days.

(c) When the authorized officer does not receive a response either to a request for concurrence which is required by this subpart but not by law, or to consultation within the specified time, he or she may proceed as though concurrence had been given or consultation had occurred.

§ 3461.4 Relationship of leasing to unsuitability assessment.

§ 3461.4-1 Application of criteria on unleased lands.

(a) The unsuitability criteria shall only be applied, prior to lease issuance, to all lands leased after July 19, 1979.

(b) The unsuitability criteria shall be initially applied either:

(1) During land use planning or the environmental assessment conducted for a specific lease application; or

(2) During land use planning under the provisions of § 3420.1-4 of this title.

§ 3461.4-2 Application of criteria on leased lands.

The unsuitability criteria shall not be applied to leased lands.

directions except where the boundaries of the land are in irregular form, and connected by courses and distances to an official corner of the public land surveys. In Alaska, the description of unsurveyed land shall be connected by courses and distances to either an official corner of the public land surveys or to a triangulation station established by an agency of the United States such as the Geological Survey, the National Oceanic and Atmospheric Administration, or the International Boundary Commission, if the record position is available to the general public.

(2)(i) If the land is acquired land in a non-public land state which has not been surveyed under the rectangular system of public land surveys, the land shall be described as in the deed or other document by which the United States acquired title to the lands or minerals.

(ii) If the land constitutes less than the entire tract acquired by the United States, it shall be described by courses and distances between successive angle points on its boundary tying by course and distance into an identifiable point listed in the description in the deed or other document by which the United States acquired title to the land.

(iii) If the description in the deed or other document by which the United States acquired title to the land does not include the courses and distance between the successive angle points on the boundary of the desired tract, the description in the application shall be expanded to include such courses and distances.

(iv) The application shall be accompanied by a map on which the land is clearly marked showing its location with respect to the administrative unit or project of which it is a part. It is not necessary to submit a map if the land has been surveyed under the rectangular system of public land surveys, and the land description can be conformed to that system.

(v) If an acquisition tract number has been assigned by the acquiring agency to the tract, a description by tract number will be accepted.

(vi) Any accreted land not described in the deed to the United States shall be described by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, and connected by courses and distances to an angle point on the perimeter of the acquired tract to which the accretions belong.

§ 3471.1-2 Land description in lease.

(a) All unsurveyed lands in a public land survey system state shall have a cadastral survey performed at Federal

Government expense before a lease or license to mine may be issued, except for areas covered by a skeleton survey, i.e. Utah and Alaska, and the lease when issued shall be described by legal subdivision (section, township, and range), or aliquot part thereof (but no less than 10 acres).

(b) If the land is acquired land in a non-public land state, the land in the lease shall be described in the same manner provided for lease applications under § 3471.1-1(d)(2) of this title.

§ 3471.2 Effect of land transactions.

§ 3471.2-1 Disposal of land with a reservation of minerals.

(a) Where the lands included in a lease or license to mine have been or may be disposed of with reservation of the coal deposits, a lessee or the holder of a license to mine must comply fully with the law under which the reservation was made. See, among other laws, the Acts of March 3, 1909 (34 Stat. 844; 30 U.S.C. 81); June 22, 1910 (35 Stat. 583; 30 U.S.C. 83-85); December 29, 1918, as amended (39 Stat. 862; 43 U.S.C. 291-301); June 17, 1949 (63 Stat. 200); June 21, 1949 (63 Stat. 214; 30 U.S.C. 54); March 8, 1922 (42 Stat. 415; 48 U.S.C. 376-377); and October 21, 1976 (90 Stat. 2759; 43 U.S.C. 1719).

(b) Any sale or conveyance of acquired lands by the agency having jurisdiction shall be subject to any lease or license to mine previously issued under the Mineral Leasing Act for Acquired Lands.

(c) Leases on acquired lands outstanding on August 7, 1947, and covering lands subject to the Mineral Leasing Act for Acquired Lands may be exchanged for new leases to be issued under that act.

(d) When: (1) the coal is to be mined by other than underground mining techniques, (2) the surface of the land is owned by a qualified surface owner, and (3) the lease is issued after August 3, 1977, the lessee shall comply with the terms of the written consent of the qualified surface owner not inconsistent with Federal and state mined land reclamation laws and regulations.

§ 3471.2-2 Effect of conveyance to State or local entity.

(a) If the United States has conveyed the title to, or otherwise transferred control of the land surface containing the coal deposits to (1) any state or political subdivision, agency, or its instrumentality, (2) a college, any other educational corporation, or association, or (3) to a charitable or religious corporation or association, the transferee shall be notified by certified mail of the application for the license to mine or lease, or the scheduling of a lease sale. The transferee shall be given

a reasonable period of time within which to suggest any stipulations necessary for the protection of existing surface improvements or uses to be included in the license or lease and state the supporting facts, or to file any objections to its issuance and state the supporting facts.

(b) Opposition by the state or local entity is not a bar to issuance of the license to mine or lease for the reserved minerals in the lands. (See, however, § 3461.1(b).) In each case, the final determination on whether to issue the license to mine or lease is based on the best interests of the public.

§ 3471.3-1 Protection of bona fide purchaser.

(a) The Secretary's right to cancel or forfeit a lease for any violation shall not adversely affect the title or interest of a bona fide purchaser of any lease or any interest therein. A bona fide purchaser must be a person, association, or corporation qualified to hold such lease or interest, even though the holdings of the party or parties from which the lease or interest therein was acquired or their predecessor(s) in title (including the original lessee of the United States), may have been cancelled or forfeited for any such violation.

(b) Any party to any proceedings with respect to a violation of any provision of the mineral leasing laws may be dismissed promptly as a party by showing that he/she holds and acquired his/her interest as a bona fide purchaser without having violated any provisions of the mineral leasing laws.

(c) If a party waives his or her rights under the lease, or if such rights are suspended by order of the Secretary pending a decision, rental payments and time counted against the term of the lease shall be suspended as of the first day of the month following the filing of the waiver or the Secretary's suspension until the first day of the month following the final decision in the proceeding or the revocation of the waiver or suspension.

§ 3471.3-2 Sale of underlying interests.

If, in any proceeding to cancel or forfeit a lease or any interest therein acquired in violation of any of the provisions of the mineral leasing laws, the lease or interest therein is cancelled or forfeited, and if there are valid options to acquire the lease or an interest therein that are not subject to cancellation, forfeiture, or compulsory disposition, this lease or interest therein shall be sold to the highest responsible qualified bidder by competitive bidding, in a manner similar to that provided for in the offering of leases by competitive bidding, subject to all outstanding valid interests and options. If less than the whole interest in the lease or interest therein is cancelled or forfeited, the partial interest shall be sold in the same way. If no satisfactory offer is obtained as a result of the competitive offering of

§3461.5 Exploration.

(a) Assessment of any area as unsuitable for all or certain stipulated methods of coal mining operations pursuant to section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272) and the regulations of this subpart does not prohibit exploration of such area under subpart 3410 of this title and under 30 CFR 211.2(a).

(b) An application for an exploration license on any lands assessed as unsuitable for all or certain stipulated methods of coal mining shall be reviewed by the Bureau of Land Management to ensure that exploration does not harm any value for which the area has been assessed as unsuitable.

APPENDIX 2
 RANKING AND RATIONALE FOR COAL TRACTS
 UTAH-SOUTHWESTERN UTAH REGION - ROUND TWO

Tract Name	Coal Field	Summary Ranking	Rationale
Alkali Creek	Book Cliffs	High	Tract is one of the few remaining larger tracts in the field with coal outcrop. High quality coal near potential shipping points. Minimum environmental impact anticipated. Some county concern for providing infrastructure for population growth.
Coal Creek	Book Cliffs	Medium	Large reserve of high quality coal with potential for a new operation. More exploration needed. Environmental impacts expected to be minimal. Some county concern for providing infrastructure for population growth.
Dugout-Pace	Book Cliffs	Medium	Adjacent to and most likely developed from existing holding. Good quality coal but anticipated low recovery due to depth. Environmental impacts expected to be minimal. Some county concern for providing infrastructure for population growth.
Graves	Book Cliffs	High	Adjacent to and most likely developed from existing operation. High quality coal but low recovery due to depth. Minimal environmental impact anticipated. Potential for adding 5 years operation to an existing operation.
Hoffman Creek	Book Cliffs	High	A small, isolated parcel of coal adjacent property under development. High quality coal. Environmental and socioeconomic impacts would be significant.
Soldier Creek	Book Cliffs	High	A larger tract of high quality coal with feasible access through adjacent properties. More exploration needed. Environmental impacts expected to be minimal. Some county concern for providing infrastructure for population growth.
Whitmore Park	Book Cliffs	Medium	Small tract of high volatile B bituminous coal. Fits in with other holdings. Environmental and socioeconomic impacts expected to be minimal.

APPENDIX 2 (cont'd)

Tract Name	Coal Field	Summary Ranking	Rationale
Gooseberry	Wasatch Plateau	Medium	A small tract that fits with other holdings. Coal data lacking but expected to be good. Impact from mining expected to be minimal but coal transportation could be a problem. Sanpete County supports development.
North Trough Springs	Wasatch Plateau	Medium	This is a mid-sized tract with limited coal information. Access best through present holdings. County has expressed concern about additional mining in the Scofield reservoir drainage. Potential added socioeconomic impact.
Mud Creek	Wasatch Plateau	Low	Limited coal and geologic information available. Access believed limited. Further mining in Scofield Reservoir drainage of concern to county.
Castle Valley Ridge	Wasatch Plateau	High	High quality coal but some faulting expected. Access limited except through existing operation. Environmental impact expected to be limited. Limited socioeconomic impact if an existing operation obtains the lease.
Trail Mtn.	Wasatch Plateau	High	Large tract with high quality coal expected. Access limited except through existing holdings. Environmental impact is likely low. Emery County concerned with rapid growth and financing infrastructure.
Ferron Canyon	Wasatch Plateau	Medium	Tract lacks information concerning coal quantity and quality but is expected to be very good. Access to tract is somewhat limited. Fits best with existing holdings. Environmental impacts are expected to be mitigable. Emery County has expressed concern about providing infrastructure for population growth.
The Pines	Wasatch Plateau	Medium	A larger tract of high quality coal. Access will be at high cost. Necessary rail transportation has not been developed. Environmental impacts expected to be mitigable. Emery County is concerned with financing infrastructure for population growth.

APPENDIX 2 (cont'd)

Tract Name	Coal Field	Summary Ranking	Rationale
Quitcupah	Wasatch Plateau	High	The largest tract under consideration. Good geologic information for delineation. High quality coal. Two access points. Minimal environmental impacts. Emery County concerned with financing infrastructure development.
Skumpah	Wasatch Plateau	Medium	A smaller tract of coal which is essential for economic access to an existing lease block. Minimal environmental impact anticipated. Sevier County supports expansion of coal mining.
Acord	Wasatch Plateau	High	Tract is surrounded by other holdings. Leasing prevents bypass or emergency leasing. Minimal environmental impact. County supports coal development.
Ivie	Wasatch Plateau	High	Very good quality coal; fits in with a mining operation on fee land. Good geologic and coal information. Minimal environmental impact. County supports coal development.
Walker Flat	Emery	High	Underground minable tract adjacent existing holdings. Access for a new operation limited. Minimal environmental impact anticipated. Emery County has expressed concern about financing growth.
Blue Trail Canyon	Emery	Low	Small reserve, limited coal information. Surface minable tract. Reclamation potential anticipated to be fair to poor. County concerned with financing infrastructure for development.
Alton Amphitheater	Alton	Medium	Subbituminous A coal. Good access. More exploration needed. Near the town of Alton. Concern with impact on water. County is encouraging coal development. Necessary coal transportation lacking.
Fisher Canyon	Alton	Medium	Subbituminous A coal. Potential exists for faulting and splitting. Inadequate data indicated need for further drilling. Low favorability for access and transportation. County is encouraging coal development.

APPENDIX 2 (concluded)

Tract Name	Coal Field	Summary Ranking	Rationale
Flax Lakes	Alton	Medium	Subbituminous A-B coal. Problem with faulting and access. Transportation of low desirability. Potential concern with water. County supports coal leasing and development.
Mill Creek Canyon	Alton	Medium	Subbituminous C coal. Further exploration needed. Low desirability for access and coal transportation. Some environmental concern. County supports coal leasing and development.
Ford Pasture	Alton	Medium	Subbituminous A, B, or C coal. Surface and underground minable. Most logically mined with adjacent property. Further exploration needed. Low desirability for access and transportation. Reclamation potential good. County supports coal leasing.
Cedaredge	Paonia-Sumerset	High	High volatile C bituminous to subbituminous A coal, underground minable, access good. Some critical big game habitat involved and potential impact on water sources. County supports leasing and development.
Paonia D Seam	Paonia-Sumerset	High	High volatile C bituminous coal, underground minable. Best access from existing facilities but other development possible. Some critical big game habitat, potential impact on water sources. County supports leasing and development.

APPENDIX 3
MITIGATING MEASURES

The following standard mitigating measures will be developed into stipulations for leases issued as a result of the final leasing decision. Minor modifications may be incorporated to allow for regulation and policy differences between surface management agencies.

The Authorized Officer shall mean the State Director, Bureau of Land Management or his delegated authority. The Authorized Officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service or District Manager, Bureau of Land Management as appropriate. Surface management agency for private surface is the Bureau of Land Management, except within Forest boundaries, the surface management agency for private surface shall be the Forest Service.

1. The Lessee will be responsible to comply with all applicable Federal, State, and local laws and regulations.
2. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah or Colorado program equivalent approved under cooperative agreement in accordance with Sec. 523(c) and final determination of suitability for mining. The United States Government does not warrant that the entire tract will be available for mining.
3. All support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. All disturbed areas and those areas occupied by such facilities will be rehabilitated in accordance with an approved reclamation plan, the "Surface Mining Control and Reclamation Act of 1977" Office of Surface Mining Regulations or approved Utah or Colorado program as applicable.
4. (a) Before undertaking any activities that may disturb the surface of the leased lands, the Lessee may be required to conduct a cultural resource field inventory and a paleontological appraisal of the mine plan area, exploration plan areas and adjacent areas that may be affected by lease related activities. The cultural resource field inventory will be required on all areas not previously inventoried at the required level of intensity. The paleontological appraisal will be required if the Office of Surface Mining (OSM) or Authorized Officer of the surface management agency has reason to believe the surface of the area to be affected has potential to contain fossils of scientific interest. If inventory and/or appraisal is required they shall be conducted by qualified professionals approved by the Authorized Officer Surface Management Agency and an acceptable report of the inventory or appraisal submitted to the OSM and Authorized Officer Surface Management Agency. The report shall contain the published literature relating to the area, results of the field inventory and recommendations for protecting any

cultural or paleontological resources of scientific interest that are identified as being affected. The lessee shall undertake measures to protect these resources in accordance with instruction from the OSM or the Authorized Officer Surface Management Agency if activities are associated with coal exploration outside an approved mining permit area.

(b) The lessee shall protect all paleontological and cultural resource properties within the lease area from lease-related activities until mitigation is applied. If disturbance of any cultural or paleontological resources of significant scientific interest cannot be avoided the lessee shall undertake such measures in accordance with instruction from the OSM and the Authorized Officer Surface Management Agency if activities are associated with coal exploration outside an approved mining permit area. This may include but is not limited to in situ evaluation and collection and preservation for future analysis. The lessee shall not commence surface disturbing activities until permission to proceed is given by the OSM or Authorized Officer Surface Management Agency as appropriate. The cost of conducting the inventories, appraisals, preparing reports and carrying out mitigation as directed prior to mining of the area in question shall be borne by the lessee.

(c) If cultural or paleontological resources are discovered during operations conducted under this lease that might be altered or destroyed by his operations, the lessee shall immediately bring such fossils or cultural artifacts to the attention of the OSM or the Authorized Officer Surface Management Agency as appropriate. The lessee shall not disturb such discoveries except as may be subsequently authorized by the OSM or Authorized Officer Surface Management Agency. Lease operation may continue as long as the specimen and site would not be damaged or destroyed by the activity. The OSM or Authorized Officer Surface Management Agency shall evaluate or have evaluated such discoveries within two (2) working days and notify the lessee as to what action is to be taken with respect to such discoveries. The cost of any required salvage of such fossils or cultural artifacts during mining operations will be borne by the lessee.

(d) These conditions apply to all fossils and cultural resources of significant scientific interest discovered within the lease area whether discovered on the surface, overburden, interburden or coal seam or seams. Fossils of significant scientific interest do not include those fossils commonly encountered in coal during mining operations. Skeletal remains shall be considered significant. All such fossils and cultural resources determined to be of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

5. The lessee shall, prior to entry upon the lease, conduct an intensive field inventory for threatened and endangered plant and/or animal species, bald or golden eagles, or migratory species of high Federal interest on those areas to be disturbed and/or impacted including the access routes to the lease area. The inventory shall be conducted by a qualified specialist(s) approved by the Authorized Officer, Surface Management Agency, and a report of the inventory and recommendation for the protection of these species submitted to and approved by the Authorized Officer, Surface Management Agency, and OSM or

Authorized Officer as appropriate. An acceptable report of any findings shall include the specific location, distribution, and habitat requirements of the species. The lessee shall protect these species within the lease area from any activities associated with operations conducted under the terms of the lease and shall undertake such protective measures as may be required by the Authorized Officer, Surface Management Agency, and OSM or Authorized Officer, as appropriate.

The lessee shall develop a plan of operation which will fully protect listed or proposed threatened or endangered fish species in the Colorado River System and shall submit the plan to BLM for consultation with FWS as required by Section 7 of the Endangered Species Act. Consultation must be completed prior to the irreversible or irretrievable committment of resource or funds for on-the-ground development.

This lease is issued and accepted with the express agreement that such consultation may require adjustments to the plan of operation, in regards to water usage and disposal resulting from mining and related operations. Limitations to the project, or other measures in order to assure compliance with such provisions of the Endangered Species Act as may be applicable at the time of development.

6.1 Each mining plan and the Department's approval thereof shall use, at a minimum, an appropriate combination of the following fugitive dust controls:

-Pavement or equivalent stabilization of all haul roads used or in place for more than 1 year;

-Treatment with semipermanent dust suppressant of all haul roads used or in place for less than 1 year or for more than 2 months;

-Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust;

-Reduction of fugitive dust at all coal dumps and truck to crusher locations through use of negative-pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

In the above measures, the term haul road should be interpreted to include roads used for haulage of coal and major mine access roads.

The following stipulations will be included in addition to the standard stipulations on all leases issued on Forest Service land.

1. The coal contained within the lease area and authorized for mining under this lease shall be extracted only by underground mining methods.

2. Powerlines used in conjunction with mining of coal from this lease shall be constructed so as to conform with the publication Suggested Practices for Raptor Protection on Powerlines, The State of the Art 1981 (Raptor Research Report No. 4, Raptor Research Foundation c/o Dept of Veterinary Biology; University of Minnesota).
3. The lessee shall provide for the suppression and control of fugitive dust on all haul roads, and at coal hauling, transportation, and storage facilities. The migration of road surfacing materials shall be controlled by watering, chemical treatment, or hard surfacing. Loss of gravel courses shall be periodically replaced.
4. In order to avoid surface disturbance on steep canyon slopes and the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific locations approved by the OSM with the concurrence of the Authorized Officer, Surface Management Agency and the Authorized Officer.
5. Prior to mining, the lessee shall perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. The study will be established in consultation with and approved by the Authorized Officer, Surface Management Agency, the OSM, and Authorized Officer Supervisor and shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface hydrology, vegetation, soil and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.
6. The lessee shall establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology, and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a sufficient number of points over the lease area. The monitoring shall be an extension of the baseline data and shall be conducted by a method approved by the OSM in consultation with and concurrence by the Authorized Officer Surface Management Agency and Authorized Officer.
7. Underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to surface structures, and improvements, and (3) damage or alter the flow of perennial streams. The lessee in his mining plan shall provide specific measures for the protection of escarpments. The OSM in consultation with and concurrence of the Authorized Officer and Authorized Officer, Surface Management Agency, shall approve such measures and may prescribe any additional measures to be employed such as mining methods, specify the amount of coal recovered, and determine any corrective measures considered necessary to assure that escarpment failure does not occur except at specifically approved locations, or that hazardous conditions are not created.

8. Existing surface improvements required for the surface uses of the lease area will need to be protected or maintained to provide for the post-mining continuance of the current land uses. Existing surface improvements whose utility may be lost or damaged as result of mining activities are to be replaced or restored.

9.1 All survey monuments, witness corners, reference monuments and bearing trees must be protected against destruction, obliteration or damage. At the conclusion of the mining operations, or upon the request of the Authorized Officer Surface Management Agency, any displaced, damaged or obliterated markers must be re-established, at the lessee's expense, in accordance with accepted Bureau of Land Management (BLM) survey practices as set forth in the Manual of Surveying Instructions. A complete record of the monumentation and the methods used in re-establishment will be furnished to the Chief, Branch of Cadastral Survey, at the appropriate State Director's Office (BLM).

In addition to the standard stipulations, special stipulations will be included in the lease terms. These stipulations are based on the mitigating measures contained in the individual site specific tract profiles. The stipulations will generally relate to special conditions or situations inherent in the characteristics or situations expected to be created by the mining of the tract. These stipulations generally relate to one or more of the following:

1. Provide those conditions under which a lease may be issued as set forth under the "exemptions" contained in the "unsuitability criteria" regulations (43 CFR 3460).
2. Set forth the reclamation goals for post - mining land use(s).
3. Minimize conflict between existing and potential land uses and coal mining.
4. Minimize impacts to other resource values or provide for the protection of other resources.
5. Provide special environmental protection requirements related to specific tract conditions.
6. Provide special safety and hazard reduction requirements.
7. Provide protection of future government interests.

The special stipulations will contain the following types of requirements.

1. The use of special construction and mining technology.
2. No surface occupancy of specific areas of a lease.
3. Restrict certain surface activities such as drilling to specific times of the year.

4. Require maintenance or upgrading of existing facilities such as roads to accommodate coal mining operations and existing uses.
5. Protection of scenic values.
6. Protection of existing government land improvements and facilities.
7. Additional studies may be required to be performed by the lessee before mine plans approval.
8. On the southern Utah tracts lessees will be required to use upgraded mufflers and baffling systems on equipment when available, place surface facilities in proximity to topographic features for maximum sound deflection from Bryce Canyon National Park.

The following mitigation measures are specific to the Colorado lease tracts.

1. Coal extraction will be prohibited in buffer zones established along East Roatcap Creek and Stevens Gulch where the overburden is 600 feet thick or less in order to prevent all surface and subjacent disturbance to the overburden. If necessary, access entryways needed to extract the coal on the west side of these water courses will be permitted through the buffer zones. The buffer zones will include the above mentioned bank-full stream channels and the alluvial fill associated with them. The angle of draw used to protect these areas from subsidence will be dictated by site-specific geologic and mining conditions (the estimated angle of draw for the Mesa Verde formation is 15 to 20 degrees).

On the remainder of the lease tract, the coal extraction process will be conducted so as not to impair the water quality or quantity of all water impoundments, wells, springs, seeps, and all natural and manmade water conveyance systems on and immediately adjacent to the lease tract.

2. The lessee will be required to replace the water supply of any owner of a vested water right which is injured as a result of mining activities. Water loss will be determined and this provision enforced in accordance with Colorado State Law.

3. Existing cross-tract and on-tract water flows shall be maintained by the lessee even following release of the permit bond by the Colorado State Mined and Land Reclamation Board. Compliance with this mitigation shall be assured by an increase in the BLM administered lease bond for a monetary amount and for a time period to be determined in consultation with the Colorado State Mined Land Reclamation Division prior to the permit bond release.

4. The lessee, before issuance of the mine permit, will conduct and provide to BLM an inventory of all existing state adjudicated water rights in and adjacent to the lease tract which may be impacted by subsequent mining activities. At a minimum, this inventory will include: the water right holder, location, source, amount of decree, beneficial use, historical flow, and the appropriation and adjudication dates.

5. Detailed geotechnical studies shall be conducted prior to construction of portal and associated facilities to determine if the area is compatible with the new portal site.

6. A visual contrast analysis will be made prior to construction of proposed surface modifications and reclamation efforts to assure minimum visual impact at all stages of tract development, and compliance with BLM's Visual Resource Management (VRM) policies.

7. State-of-the-art mining techniques (pillar and panel widths, rate of coal development and extraction, mine method, etc.) shall be used in areas identified in Unsuitability Criteria 2, 3, 14, and 19 (Appendix 1) to control subsidence. These techniques would ensure that sufficient coal is left in place to prevent subsidence.

8. An appropriate angle of draw as dictated by the site-specific geologic and mining conditions shall determine the area of influence for maximum coal removal in the areas identified in Unsuitability Criteria 2, 3, 14, and 19 (Appendix 1) to be protected from subsidence.

9. The lessee shall consult with all owners of occupied dwellings and maintain or, with the owner's consent, adjust the designated 300-foot buffer zone in order to mine near private dwellings located on the Paonia D tract.

11. With respect to the golden eagle nest sites identified on the Paonia D tract:

a. No permanent surface facilities or disturbances shall be located within a one-fourth mile radius buffer zone around each golden eagle nest site.

b. No surface activities will be allowed within a one-fourth mile radius buffer zone around each golden eagle site from March 1 to July 1.

c. Any proposed activities in, or adjacent to, these buffer zones will require approval from the BLM, on a site-specific basis, after consultation with the U.S. Fish and Wildlife Service.

d. This one-fourth mile buffer zone would also apply to any eagle nests discovered in the future.

11. A 1/8 mile buffer zone on each side of perennial and ephemeral streams with riparian habitat will be protected from surface disturbance, excluding subsidence. If riparian habitat disturbance is unavoidable, it will be approved on a site specific basis by BLM after consultation with the Colorado Division of Wildlife and the U.S. Fish and Wildlife Service.

12. A seasonal closure on surface activities, from December 1 to April 15, shall be imposed on all portions of the tracts identified as "most critical big game winter range". Where surface facilities must be located on these ranges, off-site habitat improvement or mitigation may be required. Such activities must be approved by the BLM after consultation with the Colorado Division of Wildlife.

13. All coal transportation from the Paonia D tract will be by conveyor or other permanent alternative method to avoid truck hauling on State Highway 133.

14. The lessee, prior to mining coal from the Colorado tracts, will prepare a NEPA quality environmental analysis assessing alternative methods of transportation. The purpose of the assessment is to determine the most environmentally and economically acceptable and least impacting route and/or means of hauling coal to the loadout facility. The assessment will consider all resources including safety, noise, and economic feasibility.

The alternatives assessed will be determined by BLM (Montrose District) in consultation with the lessee, Delta County and the State of Colorado (Mined Land Reclamation Division and State Department of Transportation). The BLM, with the above consulting agencies will determine if the analysis meets NEPA requirements upon its completion. The most environmentally acceptable and least impacting route and/or means of hauling coal to the loadout facility will be submitted by the lessee as part of the Colorado Mined Land Reclamation Division permit application.

APPENDIX 4
MAJOR PLANT COMMUNITIES AND TYPICAL SPECIES

Vegetation Type	Major Vegetation Species	
	<u>Common Name</u>	<u>Scientific Name</u>
<u>Utah</u>		
Riparian	Fremont Poplar	Populus fremontii
	Sandbar willow	Salix exigua
	Kentucky blugrass	Poa pratensis
	Greasewood	Sarcobatus vermiculatus
	Saltcedar	Tamarix pentandra
Grassland	Squirreltail grass	Sitanion hystrix
	Sandberg bluegrass	Poa secunda
	Sticky rabbitbrush	Chrysothamnus viscidiflorus
Sagebrush-Grass	Big sagebrush	Artemisia tridentata
	Indian ricegrass	Oryzopsis hymenoides
	Cheatgrass	Bromus tectorum
Pinyon-Juniper	Gambel oak	Quercus gambelii
	Utah juniper	Juniperus osteosperma
	Pinyon pine	Pinus edulis
	Big sage	Artemisia tridentata
Mountain Brush	Mountain snowberry	Symphoricarpos orephilus
	Gambel oak	Quercus gambelii
	Yarrow	Achillea millefolium
	Mountain mahogany	Cercocarpus montanus
Ponderosa Pine	Ponderosa pine	Pinus ponderosa
	Douglas fir	Pseudotsuga menziesii
	Bittergrush	Purshia tridentata
	Serviceberry	Amelanchier utahensis
Aspen-Conifer	Quaking aspen	Populus tremuloides
	Douglas fir	Pseudotsuga menziesii
	Mountain juniper	Juniperus scopulorum
	Alpine fir	Abies lasiocarpa
	Engelmann spruce	Picea engelmannii
Aspen	Quaking aspen	Populus tremuloides
	Tailcup lupine	Lupinus caudatus
	Nodding brome	Bromus anomalus
	Big sage	Artemisia tridentata
	Dandelion	Taraxacum officinale

APPENDIX 4 (concluded)

Vegetation Type	Major Vegetation Species	
	Common Name	Scientific Name
Mountain Meadow	Slender wheatgrass	Agropyron trachycaulum
	Bluegrass	Poa spp.
	Needlegrass	Stipa lettermannii
	Larkspur	Delphinium nelsonii
	Cinquefoil	Potentilla fruticosa
<u>West-Central Colorado</u>		
Sagebrush	Big sagebrush	Artemisia tridentata
	Muttongrass	Poa fendleriana
	Kentucky bluegrass	Poa pratensis
	Bottlebrush squirreltail	Sitanion hystrix
	Arrowleaf balsamroot	Balsamorhiza sagittata
Pinyon-Juniper	Utah Juniper	Juniperus osteoperma
	Big sagebrush	Artemisia tridentata
	Gambel oak	Quercus gambelii
	Common serviceberry	Amelanchier alnifolia
	Muttongrass	Poa fendleriana
Mountain Shrub	Gambel oak	Quercus gambelii
	Common serviceberry	Amelanchier alnifolia
	Kentucky bluegrass	Poa pratensis
	Elk sedge	Carex geyeri
Aspen	Quaking aspen	Populus tremuloides
	Thurber fescue	Festuca thurberi
	Kentucky bluegrass	Poa pratensis
	Nodding brome	Bromus anomalus
Riparian	Cottonwood	Populus sp.
	Chokecherry	Prunus virginiana
	Skunkbush	Rhus trilobata
Agricultural	Major crops are alfalfa and fruit.	

APPENDIX 5
OBJECTIVES OF VISUAL RESOURCE MANAGEMENT CLASSIFICATIONS

The BLM and Forest Service use scenic quality, sensitivity, and visual distance criteria to determine visual management objectives for public lands under their respective jurisdictions. Visual management terminology differs between the two agencies, but management objectives are similar as outlined below:

<u>FOREST SERVICE TERMINOLOGY</u>	<u>BLM TERMINOLOGY</u>	<u>MANAGEMENT OBJECTIVE</u>
Preservation	Class I	This class provides for natural ecological changes only. (There are no Class I areas within any of the lease tracts.)
Retention	Class II	Changes in any of the basic landscape elements should not be evident in the management activity.
Partial Retention	Class III	Changes in the basic elements may be evident in the management activity. However, modifications should remain subordinate to the landscape character.
Modification- Maximum Modi- fication	Class IV	Changes may subordinate the landscape character, but must reflect what could be natural occurrence in the characteristic area.
Unacceptable Modification	Class V	Change is required. The area has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape.

APPENDIX 6
AREAS WITH SPECIAL DESIGNATION OR POTENTIAL FOR SPECIAL DESIGNATION
IN CENTRAL AND SOUTHERN UTAH

Agency	Name	Present Designation	Potential Designation	Reference
<u>Central Utah</u>				
FS	4-307		Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
BLM	Link Flat	Natural Area	Wilderness ^b	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-067		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-068A		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-054		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-023		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-025		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-007		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-028		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-029A		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-060-045		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Cleveland-Lloyd Dinosaur Quarry	Natural Landmark		Natural Landmarks Inventory, (HCRS, 1979)
NPS	Capitol Reef (NP-906)	National Park	Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Green River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	Range Creek		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	Price River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	San Rafeal River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
<u>Southern Utah</u>				
FS	4-254		Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
FS	4-259		Wilderness ^e	Utah Wilderness Status Map, (BLM, 1981c)
FS	4-260		Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
BLM	Phipps-Death Hollow	Natural Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	The Gulch	Natural Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	North Escalante	Natural Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	Escalante Canyon	Natural Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	Devil's Garden	Natural Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	Paria Canyon	Primitive Area	Wilderness ^f	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-238		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-242		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-248		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-249		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-241		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-050-247		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-075		Wilderness ^g	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-076		Wilderness ^g	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-078		Wilderness ^g	Utah Wilderness Status Map, (BLM, 1981c)

APPENDIX 6 (concluded)

Agency	Name	Present Designation	Potential Designation	Reference
BLM	UT-040-268		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-077		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-082		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-061		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-230		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-217		Wilderness ^c	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-247		Wilderness ^d	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-248		Wilderness ^g	Utah Wilderness Status Map, (BLM, 1981c)
BLM	UT-040-079		Wilderness ^g	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Little Rockies	Natural Landmark		Natural Landmarks Inventory, (HCRS, 1979)
NPS	Canyonlands (NP-905)	National Park	Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Zion (NP-930)	National Park	Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Bryce Canyon (NP-903)	National Park	Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Capitol Reef (NP-906)	National Park	Wilderness ^a	Utah Wilderness Status Map, (BLM, 1981c)
NPS	Glen Canyon	National Recreation Area		
NPS	Dirty Devil River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	Deep Creek River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	Escalante River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	North Fork Virgin River			
NPS	Paria River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
NPS	Colorado River		Wild & Scenic	Nationwide River Inventory, (NPS, 1982)
State of Utah	Kodachrome Basin	State Reserve		

a Administratively endorsed as suitable for wilderness designation.

b The natural area is an instant study area (ISA) for wilderness review.

c The unit has been determined to contain wilderness values and is a wilderness study area (WSA).

d A portion of the unit was determined to contain wilderness values and was designated as a WSA, and the remainder of the unit was released from wilderness review. This decision was subsequently appealed. The entire unit is currently subject to interim management protection until a decision concerning management of the unit is again reached (timeframe unknown).

e Recommended for further planning.

f The natural/primitive area and contiguous lands together comprise an instant study area (ISA) for wilderness review.

g The unit was determined to lack wilderness character and was released from wilderness review. This decision was subsequently appealed. The unit is currently subject to interim management protection until a decision concerning management of the unit is again reached (timeframe unknown).

APPENDIX 7 NET ENERGY ANALYSIS

Appendix Table 7-1 summarizes and compares the estimated energy use by mining operations, transportation and mining related infrastructure (input energy) with the amount of energy available in the recoverable coal (output energy). Ratio's range from 205:1 in central Utah to 66:1 in southern Utah. It is expected that much of the coal developed from Round Two leasing would be shipped out of the region. Also, specific uses or locations are not known, therefore, the ratios given in Appendix Table 7-1 considers only local transportation and does not reflect anticipated uses or energy efficiency.

Analysis Assumptions

The net energy analysis methodology come from "Net Energy Calculations Methodology," BLM Instruction Memorandum CO 81-302, August 21, 1981.

Energy Inputs

1. Underground Mine Operation energy input is based on 1.49×10^5 Btu's expended to mine one ton of coal and total recoverable coal as estimated in Table 2-1.

2. Surface Mine Operation energy input is based on 1.614×10^5 Btu's expended to mine each ton of surface mined coal as shown on Table 2-1.

Coal transportation energy inputs for the Colorado tracts are based on truck haulage to railroad loadouts at distances shown on Table 2-1.

3. Employee and Service Vehicle energy requirements are based on the use of gasoline with 125,000 Btu's per gallon. Total fuel use for the Utah tracts is taken from Tables 4-19, 4-58, 4-77 and 4-36. Energy requirements for employee transportation for the Colorado tracts were calculated from the distribution of employees to various commuting distances, 6,250 Btu's per working day and a 355 day work year over a 27 year mine life for "Paonia D" and 40 year mine life for Cedaredge.

4. Infrastructural energy requirements are based on populations estimated in Table 4-18, 4-30, 4-41, 4-52, and 4-71 and an energy requirement of 17,465 Btu's per day per person. It was assumed that the mining related population would remain at the same level for a forty year project life.

Energy Outputs

Mine life energy output is based on the estimated recoverable coal given in Table 2-1 and the average coal energy content is given in 2-2.

APPENDIX TABLE 7-1
UTAH TRACTS MINE LIFE NET ENERGY SUMMARY

	<u>Alternative 1</u>	<u>Alternative 2</u>	<u>Alternative 3</u>
Central Utah Tracts			
<u>Energy Inputs (Btu's)</u>			
<u>Mining Operations</u>	<u>709.2 x 10¹²</u>	<u>600.47 x 10¹²</u>	<u>698.85 x 10¹²</u>
<u>Transportation</u>	<u>287.6 x 10¹²</u>	<u>256.5 x 10¹²</u>	<u>282.5 x 10¹²</u>
<u>Infrastructure</u>	<u>45.3 x 10¹²</u>	<u>42.6 x 10¹²</u>	<u>44.9 x 10¹²</u>
<u>Total</u>	<u>1,042.1 x 10¹²</u>	<u>899.57 x 10¹²</u>	<u>1,020.25 x 10¹²</u>
<u>Energy Outputs (Btu's)</u>	<u>203,945 x 10¹²</u>	<u>187,721 x 10¹²</u>	<u>201,000 x 10¹²</u>
<u>Output/Input Ratio</u>	<u>196:1</u>	<u>205:1</u>	<u>197:1</u>
Southern Utah Tracts			
<u>Energy Inputs</u>		<u>Same as</u>	<u>No mining under</u>
		<u>Alternative One</u>	<u>this Alternative</u>
<u>Mining Operations</u>	<u>289.1 x 10¹²</u>		
<u>Transportation</u>	<u>277.5 x 10¹²</u>		
<u>Infrastructure</u>	<u>21.4 x 10¹²</u>		
<u>Energy Output</u>	<u>38,825 x 10¹²</u>		
<u>Output/Input Ratio</u>	<u>66:1</u>		
Colorado Tracts			
<u>Energy Inputs</u>		<u>Same as</u>	<u>Same as</u>
		<u>Alternative One</u>	<u>Alternative One</u>
<u>Mining Operations</u>	<u>96.0 x 10¹²</u>		
<u>Transportation</u>	<u>31.6 x 10¹²</u>		
<u>Infrastructure</u>	<u>3.9 x 10¹²</u>		
<u>Total</u>	<u>131.5 x 10¹²</u>		
<u>Energy Output</u>	<u>13,930 x 10¹²</u>		
<u>Output/Input Ratio</u>	<u>106:1</u>		

APPENDIX 8
WILDLIFE TERMS AND FORMULAS

I. Pheasant Population Estimate Formula

Cock Harvest:	from Harvest Survey in annual report
Post-Season Hens/Cocks:	from Winter Sex-Ratio Counts in the annual report
Percent Cocks Harvested:	calculated by change in ratio from pre-season to post season =
Post Cocks/Hens	pre cocks/hens
<hr/>	
(from Winter Sex Ratio counts)	-(assumed 1.2 hens/cocks)
Post	Cocks/Hens
Pre-season Population:	Cock Harvest: percent harvested = Pre-season Cocks: pre-season cocks x 1.2 (assumed hens/cocks pre-season) = pre-season hens; then combine cocks and hens for total

Pheasants per acre in the fall = estimated cocks, hens or total ÷ acres of cropland in county.

II. Game Habitat Designations (UDWR)

C - Critical - Sensitive use areas that, because of limited abundance and/or unique qualities, constitute irreplaceable, critical requirements for "high interest wildlife."^a

HP - High Priority - Intensive use area that due to relatively wide distribution do not constitute critical values but which are highly important to "high interest wildlife."

S - Substantial - Existence areas used regularly by "high interest wildlife" but at moderate levels with little or no concentrated use.

Y - Yearlong (limited value) - Occasional use areas that either are sparsely populated or that show sporadic or unpredictable use by "high interest wildlife."

^a High Interest Wildlife: All wildlife species classed as game; economically important species (consumptive or nonconsumptive value); species of special aesthetic, scientific, or education value; and species designated by the Division of Wildlife Resources as declining or of limited distribution due to habitat constraints. Does not include Federally listed threatened and endangered species.

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GLOSSARY

- ACRE-FOOT. The quantity of water required to cover 1 acre to a depth of 1 foot; equal to 43,560 cubic feet or 325,900 gallons.
- ALLUVIAL. Pertaining to deposits made by flowing water.
- ANIMAL UNIT MONTH (AUM). The amount of forage required to graze one cow or five sheep for a 1 month period. A measure of range capacity.
- ANNUAL AVERAGE DAILY TRAFFIC. Theoretically this would be a summation of all the vehicles passing one point divided by the number of days in the year. Practically, this figure is usually based on sample traffic counts adjusted on the basis of nearby permanent traffic count stations. Peak traffic counts would be substantially greater.
- ANTICLINE. Applied to strata which dip in opposite directions from a common ridge or axis.
- AQUIFER. A zone, stratum, or group of strata that can store and produce water and can yield water to wells in economically significant quantities.
- BUTEO. The broad-winged, soaring buzzard hawks.
- BUTTE. An isolated hill with steep sides and a top that is flat.
- CE-1 ZONE, CE-2 ZONE. Lands within Carbon and Emery Counties determined by the counties to be critical environmental zones and are accordingly ascribed limited uses.
- COAL FIELD. An area of country, the underlying rocks of which contain minable coal seams.
- COLLUVIAL. Consisting of alluvium in part and containing angular fragments of the original rocks.
- CONTINUOUS MINER. A mining machine designed to remove coal from the face and load the coal into cars or conveyors without the use of drills or explosives, employing instead a rotating head which cuts up and down the coal face.
- CROWDED (TRANSPORTATION). Any two-lane State highway which is or would be carrying an equivalent of 5,000 vpd, counting each truck as five autos in rolling terrain.
- CULTURAL RESOURCES. Fragile and non-renewable evidences of human activity, occupation, and endeavor reflected in districts, sites, structures, and natural features that were of importance in human events. Cultural resources are further categorized in terms of their prehistory and historic values; however, each of these aspects represents a part of the continuum of events from the earliest evidences of man to the present day.
- DEMONSTRATED RESERVES. A collective term for the sum of measured and indicated coal reserves or resources in a given area.
- DIP. The angle at which a bed or stratum is inclined from the horizontal.
- DOME. A symmetrical structural uplift having approximate circular outline in plain view.
- DRAGLINE. A type of excavating equipment which casts a ropehung bucket a considerable distance, collects the dug material by pulling the bucket toward itself on the ground with a second rope, elevates the bucket, and dumps the material on a spoil bank, in a hopper, or on a pile.
- EYRIE. The nest of a bird of prey.

FAULT. A fracture or a fracture zone in the earth zone along which there has been displacement of the two sides relative to one another parallel to the fracture.

FISHED OUT. A permanent reduction in expected or previously experienced fishing success on a particular water body to the point of abandonment of the effort by the majority of the participants.

FLOODPLAIN. The flat ground along a stream covered by water at the flood stage.

GLACIATION. In geology, pertaining to, characteristic of, produced, deposited, or derived from a glacier.

GRABEN. A depressed segment of the earth's crust bounded on at least two sides by faults.

INFERRED RESOURCE. A mineral (e.g., coal) for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements.

INFRASTRUCTURE. The basic equipment, utilities, productive enterprises, installation and service essential for the development, operation, and growth of an organization, a city, or a nation.

IN PLACE RESOURCE. The total amount of coal both inferred and demonstrated, estimated to be located in a given area.

INSTANT STUDY AREA. An area that was officially designated as a natural or primitive area prior to the 1976 passage of FLPMA.

JOINT. A divisional plane that divides a rock and along which there has been no visible movement parallel to the plane.

KNOLL. A usually small rounded land eminence.

KNOWN GEOLOGIC STRUCTURE (KGS). A natural underground reservoir capable of holding oil and gas.

KNOWN RECOVERABLE COAL RESOURCE AREA (KRCRA). An area of country, including Federal land, which meets minimum standards for recoverable coal deposits in accordance with accepted mining practices as determined by the Geological Survey.

LAND MANAGEMENT PLAN. A plan establishing the allocation of land resources and the decisions relating to the coordination of the various uses and activities within a planning unit.

LIMESTONE. A sedimentary rock which contains at least 50 percent calcium carbonate and magnesium carbonate.

LIMIT ANGLE. The angle of inclination from the vertical of the line connecting the edge of the mine workings and the edge of the subsidence area. The limit angle is positive if the width of the subsidence trough is wider than the mined panel, or negative if the width of the subsidence trough is narrower than the mined panel.

LITHIC SCATTER. An archaeological site characterized by the presence of flaked tools, chips, cores, or flakes only.

LOGICAL MINING UNIT (LMU). An area of coal land that can be developed and mined in an efficient, economical, and orderly manner with due regard for the conservation of coal reserves and other resources.

LONGWALL MINING. A system of mining on straight coal faces in which the developing headings are driven to the boundary or limit line and then the coal seam is extracted by longwall faces retreating toward the entry.

MAXIMUM MODIFICATION. A Forest Service visual resource management classification that allows for management activities to dominate the landscape character in foreground, middleground, and background areas.

MINING PLAN. A complete mining and reclamation operation plan prepared in compliance with the Mineral Leasing Act of 1920, Surface Mining Control and Reclamation Act of 1977, and other applicable laws and regulations.

MITIGATING MEASURE. Methods used (often included as lease stipulations) to reduce the significance of or eliminate an anticipated environmental impact.

MODIFICATION. A Forest Service visual resource management classification that allows for management activities to dominate the landscape character in background areas.

MOLLUSCS. Invertebrate animals (such as oysters, snails, or clams) with a soft unsegmented body usually enclosed in a calcareous shell.

MONOCLINE. An abrupt downward flexure of nearly horizontal strata without any corresponding bend to form an anticline or syncline.

NATIONAL PARK. A land/water area designated by Congress as part of the National Park system to be managed by the National Park Service to preserve unique natural values of distinction while providing for public enjoyment of the area.

NATIONAL RECREATION AREA. A land/water area with nationally significant recreational potential designated by Congress as part of the National Park system to be managed by the National Park Service to provide for public use and enjoyment while protecting public values.

NATIONAL REGISTER PROPERTY. A site, structure, district, building, or object deemed significant in American history, architecture, archaeology, or culture which is identified on a list maintained by the Secretary of the Interior.

NATURAL AREA. Public land area, designated by the BLM as a Natural Area, to be managed in a manner that protects the area's unique or unusual natural values.

NATURAL LANDMARK. Land or water containing geological or ecological values of National significance that is officially registered as a National Natural Landmark to encourage preservation and enhancement of the scientific and educational values of the site.

NORMAL FAULT. A fault where the upper wall of rock over an inclined fault plane has been depressed with respect to the rocks below the fault plane.

OVERBURDEN. Material of any nature, consolidated or unconsolidated, that overlies a deposit of useful material, ores, or coal.

PARTIAL RETENTION. A Forest Service visual resource management classification that allows for management activities to be visually evident but subordinate to the landscape character.

PERCHED AQUIFER. Unconfined ground water separated from an underlying body of ground water by an unsaturated zone.

PLANNING AREA. A group of planning units for which a single Land Management Plan has been prepared.

PLANNING UNIT. The basic management unit of BLM administered lands or National Forest lands. Land Management Plans are generally prepared for these units.

POTABLE WATER. Water suitable for human use and consumption.

PREFERENCE RIGHT LEASE APPLICATION (PRLA). Until the early 1970s, the Federal Government issued prospecting permits to interested parties to explore for coal for in areas where economically valuable deposits were not known to exist. By demonstrating that the permit area contained

commercially valuable coal, a prospecting permit holder could apply for, and obtain, a lease to mine the deposit. Such lease applications were called preference right lease applications (PRLAs) and leases were issued without competition. Under the Federal Coal Leasing Amendments Act of 1976, non-competitive coal leases are no longer permitted, subject to valid existing rights.

PRESERVATION. A Forest Service visual resource management classification that allows for natural ecological changes only.

PRIMITIVE AREA. Public land area, designated by the BLM or Forest Service as a Primitive Area, to be managed in a manner that protects the area's primitive recreational values.

QUATERNARY. Comprises all geologic time from the end of the tertiary up to the present.

RAPTOR. Living on prey; a group of carnivorous birds consisting of hawks, eagles, falcons, vultures, and owls.

REGIONAL COAL TEAM. A specific coal production region's Federal/State team which pursuant to 43 CFR 3400.4(b) considers and suggests policy for regional leasing target setting, tract delineation, and site-specific analysis in the coal production region; guides and reviews tract ranking; and conducts the selection and sale scheduling process in order to recommend regional lease sale alternatives to be analyzed in the Regional Lease Sale Environmental Impact Statement and to be recommended to the Secretary of the Interior.

RETENTION. A Forest Service visual resource management classification that allows only for management activities that are not visually evident.

REVERSE FAULT. A fault where the rock mass on one side of an inclined fault plane is pushed over the rock mass on the other side of the fault plane, and where the hanging wall appears to have moved up in relation to the foot wall.

ROADLESS AREA REVIEW AND EVALUATION II. The Forest Service review and evaluation of public lands under its jurisdiction for Congressional wilderness designation.

ROADLESS INVENTORY UNIT. An area of public lands under jurisdiction of the BLM that is roadless, is at least 5,000 acres in size, or is contiguous to an area that is undergoing wilderness inventory.

ROCK SLOPE. An inclined passage (portal) driven through rock strata to obtain access to the coal.

ROOM AND PILLAR. A system of mining in which the coal is mined in rooms separated by narrow ribs or pillars. The rooms are driven parallel to each other. The pillars are usually pulled as mining operations retreat from the area.

SCOPING. Process used for determining the range of issues to be addressed, potential significant issues, and possible alternatives which should be considered in an EIS. Scoping also identifies insignificant issues which do not require analysis. Federal, State, and local agencies, and the public sector participate in the scoping process.

SEDIMENTARY. A descriptive term for rock formed of sediment, or rocks formed by precipitation from solution.

SEDIMENT YIELD. The amount of soil an area loses every year through natural processes, usually expressed in acre-feet per square mile per year. One acre-foot per square mile per year, reduced to simpler terms, means that a square mile of land loses about 0.01 inches of soil every year. This is a result of the normal and ongoing processes of water and wind erosion.

SHALE. A laminated sediment, in which the constituent particles are predominantly of the clay grade.

SITE SPECIFIC ANALYSIS. An environmental assessment prepared for a specific coal tract, detailing environmental impacts expected to result from the leasing and development of that tract.

STATE RESERVE. State land area of unique or unusual natural values, managed by the State to protect and enhance those values.

STIPULATION. A condition or requirement attached to a lease, usually dealing with protection of the environment or recovery of the coal.

SUBSIDENCE. Surface sinking, caving, or distortion resulting from the collapse of underground mine workings.

SURFACE MINING. Mining at or near the surface where the overburden is removed to expose and extract the coal.

SYNCLINE. A fold in rocks in which the strata dip inward from both sides toward the axis.

TOPSOIL. The fertile, dark colored surface soil, or "A" horizon.

TRACT. A defined area of land which will logically be proposed as a single lease offering. At the preliminary tract stage, the exact boundaries of tracts are still subject to adjustment based on subsequent analysis and revised coal information.

UNACCEPTABLE MODIFICATION. A Forest Service visual resource management classification that identifies areas where manmade disturbance is excessive and rehabilitation is necessary.

UNDERGROUND MINING. A mining method used to extract coal where the overburden is not removed, as opposed to surface mining.

UNSUITABILITY CRITERIA. Criteria, specified in coal management regulations 43 CFR 3461 that identifies those lands which shall be considered unsuitable for all or certain stipulated methods of coal mining.

VRM (VISUAL RESOURCE MANAGEMENT). The system by which the Forest Service and BLM classify and manage the visual resource of public lands under their respective jurisdictions. Based on their scenic qualities, sensitivities, and the distances from which they are viewed, the lands are classified into management units.

VRM CLASS I. A BLM visual resource management classification that allows for natural ecological change only.

VRM CLASS II. A BLM visual resource management classification that allows for management activities that are not visually evident.

VRM CLASS III. A BLM visual resource management classification that allows for management activities to be visually evident but subordinate to the landscape character.

VRM CLASS IV. A BLM visual resource management classification that allows for management activities to subordinate the landscape character.

VRM CLASS V. A BLM visual resource management classification that identifies areas where manmade disturbance is excessive and rehabilitation is necessary.

WILD AND SCENIC RIVER. Rivers officially designated by Congress as part of the National, Wild, and Scenic River System to be managed in a manner that protects wild, scenic, and/or recreational values.

WILDERNESS AREA. Public land area officially designated by Congress as part of the National Wilderness Preservation System, to be managed in a manner that protects the area's naturalness, solitude, and primitive and recreational values.

WILDERNESS STUDY AREA. An area of public lands under jurisdiction of BLM that has been determined and declared to have wilderness character through inventory and evaluation.

ABBREVIATIONS

AADT	Annual Average Daily Traffic
ACEC	Area of Critical Environmental Concern
Acre-ft/year	Acre-feet per year
ADT	Average Daily Traffic
AQRV	Air Quality Related Values
AUM	Animal Unit Month
BACT	Best Available Control Technology
BLM	Bureau of Land Management
Btu	British thermal unit
CE-1	Critical Environmental Zone 1
CE-2	Critical Environmental Zone 2
CO	Carbon Monoxide
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
CWI	<u>Colorado Westmoreland, Inc.</u>
dBA	Decibels Weighted Sound Level
DOI	Department of the Interior
D&RGW	Denver and Rio Grande Western Railway Company
DTV	Daily Traffic Volume
EIS (ES)	Environmental Impact Statement
EMRIA	Energy Minerals Rehabilitation Inventory and Analysis
EMT	Emergency Medical Technician
EPA	Environmental Protection Agency
ERT	Environmental Research & Technology, Inc.
FAA	Federal Aviation Administration
FCLAA	Federal Coal Leasing Amendments Act of 1976
FLPMA	Federal Lands Policy and Management Act of 1976
FS	Forest Service
FW-10	Forestry and Watershed Zone 10
gal/min	Gallons per minute
GS	Geological Survey
GMU	Game Management Unit
GRF-1	Grazing, Recreation, and Forestry Zone 1
HCRS	Heritage Conservation and Recreation Service
Hwy	Highway
I-70	Interstate Highway 70
ICC	Interstate Commerce Commission
IPP	Intermountain Power Project
ISA	Instant Study Area
ISCLT	Industrial Source Complex Long Term Model
KGS	Known Geologic Structure
KRCRA	Known Recoverable Coal Resource Area
LMU	Logical Mining Unit
MER	Maximum Economic Recovery
MESOPUFF	Mesoscale Puff Model
MFP	Management Framework Plan
MGD	Million gallons per day
M&G-1	Mining and Grazing Zone 1
Mgd	Million gallons per day
MMS	Minerals Management Service

Abbreviations (cont'd.)

MRLD	Mined Land Reclamation Division (State of Colorado)
MSW	Master's Degree in Social Work
MTPY (MTY)	Million tons per year
MU-160	Multiple Use Zone 160
MW	Megawatt
NA	Not Available or Not Applicable
NAAQS	National Ambient Air Quality Standards
NMHC	Non-Methane Hydrocarbons
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
ORV	Off-road vehicle
OSM	Office of Surface Mining
PALDS	Point, Area, Line Model with Deposition and Sedimentation
PAS	Planning and Assessment System Model
PCPI	Per Capita Personal Income
PLUVUE	Plume Visibility Model
PRLA	Preference Right Lease Application
PRWID	Price River Water Improvement District
PSD	Prevention of Significant Deterioration
RARE II	Roadless Area Review and Evaluation II
RCT	Regional Coal Team
SAM	Spacial Allocation Model
SBA	Small Business Administration
SCS	Soil Conservation Service
SCORP	State Comprehensive Outdoor Recreation Plan
SEUALG	Southeastern Utah Association of Local Governments
SHPO	State Historical Preservation Officer
SMCRA	Surface Mining Control and Reclamation Act
SRS	San Rafael Swell
STSA	Special Tar Sand Area
TDS	Total Dissolved Solids
T&E	Threatened and Endangered
TPY	Tons per year
TSP	Total Suspended Particulates
U-10	Utah State Highway 10
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UORA	Utah Outdoor Recreation Agency
UPED	Utah Process Economic and Demographic Impact Projection Model
UP&L	Utah Power and Light Company
US 6	United States Primary Highway 6
USFWS	United States Fish and Wildlife Service
VPD	Vehicles per day
VRM	Visual Resource Management
WPRS	Water and Power Resources Service
WSA	Wilderness Study Area

REFERENCES CITED

- Aerocomp, Inc., 1982. Air Quality Analysis for the Uintah - Southwestern Utah Coal Region - Round II. Aerocomp Document 32TR03 - Draft Report. Prepared for the Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- Aldon, E.F., 1973. "Revegetating Disturbed Areas in the Semiarid Southwest." Journal of Soil and Water Conservation. Volume 28, Number 5. pp. 223-225.
- Aldon, E.F. and Springfield, H.W., 1975. "Techniques for Establishing Native Plants on Coal Mine Spoils in New Mexico." Prepared for the Third Symposium on Surface Mining and Reclamation. Volume 1.
- Arizona Depart. of Health Services, 1977-1980. "Air Quality Data for Arizona, 1977 to 1980." Arizona Department of Health Services.
- Axetell and Cowherd, 1981. "Improved Emission Factors for Fugitive Dust from Western Surface Coal Mining Sources."
- Bagley, J.M., et al. 1964. "Water Yields in Utah." Utah Agricultural Experiment Station Special Report Number 18. 65 p.
- Bleak, et al. 1965. "Problems in Artificial and Natural Revegetation of the Arid Shadscale Zone of Utah and Nevada." Journal of Range Management. Volume 18, Number 2.
- BLM, 1975. "Resource and Potential Reclamation Evaluation - Alton Study Site - Alton Coal Field." EMERIA Report Number 4 - 1975. Cooperative Study by the U.S. Department of the Interior: Bureau of Reclamation, Bureau of Land Management, and Geological Survey.
- BLM, 1977 and 1980. "Forest Management Framework Plan." U.S. Department of the Interior, Bureau of Land Management, Richfield District, Richfield, Utah.
- BLM, 1979a. Final Environmental Impact Statement, Federal Coal Management Program. U.S. Government Printing Office, Washington, D.C. 20402.
- BLM, 1979b. "Energy Minerals Rehabilitation Inventory and Analysis." EMRIA Report Number 16: Reclaimability Analysis of the Emery Coal Field, Emery County, Utah. Prepared for the U.S. Department of the Interior, Bureau of Land Management by Geoscientific Systems and Consulting, Plaza Del Ray, California.
- BLM, 1979c. "San Rafael Management Framework Plan and Supplement." U.S. Department of the Interior, Bureau of Land Management, Moab District, San Rafael Resource Area, Price, Utah.

References Cited
(cont'd.)

- BLM, 1980a. Allen Warner Valley Energy System Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management, Salt Lake City, Utah.
- BLM, 1980b. "Final Escalante, Paria, Zion Planning Unit Management Framework Plan Summary." U.S. Department of the Interior, Bureau of Land Management, Cedar City District, Cedar City, Utah.
- BLM, 1981a. Final Uinta - Southwestern Utah Regional Coal EIS. U.S. Department of the Interior, Bureau of Land Management, Salt Lake City, Utah.
- BLM, 1981b. "Price River/Range Creek Coal Area Land Use Plan." U.S. Department of the Interior, Bureau of Land Management, Moab District, Price River Resource Area, Price, Utah.
- BLM, 1981c. "Utah Wilderness Study Map, 1981." U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- BLM, 1981d. "Bald Eagle Inventory, 1981." U.S. Department of the Interior, Bureau of Land Management, Montrose District Office, Montrose, Colorado.
- BLM, 1981e. "North Fork Planning MFP Update; Coal Unsuitability Application." U.S. Department of the Interior, Bureau of Land Management, Montrose District Office, Montrose, Colorado.
- BLM, 1982a. "Projected Baseline for the Calculation of the Leasing Target." U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- BLM, 1982b. Uinta - Southwestern Utah Coal Region, Site Specific Analyses for Graves, Coal Creek, Soldier Creek, Alkali Creek, Dugout Pace, and Blue Trail Canyon Tracts. U.S. Department of the Interior, Bureau of Land Management, Moab District, Price River Resource Area, Price, Utah.
- BLM, 1982c. Uinta - Southwestern Utah Coal Region, Site Specific Analyses for Flax Lakes, Alton Amphitheater, Fisher Canyon, Mill Creek Canyon, and Ford Pasture Tracts. U.S. Department of the Interior, Bureau of Land Management, Cedar City District, Cedar City, Utah.
- BLM, 1982d. "Wildlife Observation Reports." U.S. Department of the Interior, Bureau of Land Management, Montrose, Colorado.
- Boner, T.C., et al., 1977. "A Survey of Endangered, Threatened, and Unique Terrestrial and Aquatic Wildlife in Utah's Coal Planning Area." Utah Division of Wildlife Resources, Salt Lake City, Utah. Prepared for U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah. Contract Number YA-512-CT6-257. 62 p.

References Cited
(cont'd.)

- Bottorff, R., 1974. "Cottonwood Habitat for Birds in Colorado." American Birds. Volume 28, Number 6.
- Bray, O.E. and Barnes, V.G., 1967. A literature review on black bear populations and activities of the National Park Service: Colo. Coop. Wildlife Research Unit, 34 p.
- Butler, E. and Marsell, R.E., 1972. "Cloudburst Floods in Utah, 1939-69." Cooperative Investigation Report. Utah Division of Water Resources, Salt Lake City, Utah.
- Carbon County, 1981. "Development Code of Carbon County, Utah." Carbon County Planning and Zoning, Carbon County Courthouse, Price, Utah.
- Carbon County, 1982. "Memo on Carbon County Plan and Zoning Ordinances." Carbon County Planning and Zoning, Carbon County Courthouse, Price, Utah.
- Centaur Associates, Inc., 1980. "Draft Statement Components, Uinta - Southwestern Utah Coal Region Environmental Impact Statement." Centaur Associates, Washington, D.C.
- Clyde, et al., 1981. "Water Quality in Pleasant Valley, Utah." Utah Water Research Laboratory, Utah State University, Logan, Utah.
- Colorado Department of Health, n.d. "Annual Colorado Air Quality Data Reports." Colorado Department of Health, Air Pollution Control Division.
- Colorado Department of Highways, 1978. Final Environmental Impact Statement, Hotchkiss to Paonia Dam - Project R-133 (5), Delta and Gunnison Counties. Colorado Department of Highways, Denver, Colorado, in cooperation with U.S. Department of Transportation, Federal Highway Administration.
- Colorado Department of Highways, 1980. Colorado Traffic Volume Studies Book, 1980. Colorado Department of Highways, Staff Traffic and Safety Projects Branch.
- Colorado Division of Wildlife, 1969. "Big Game Pellet Group Transects." Colorado Division of Wildlife, Montrose, Colorado.
- Colorado Geological Survey, 1980. "Summary of Coal Resources in Colorado." Special Publication Number 13. Colorado Geological Survey.
- Colorado Mined Land Reclamation Board, 1982. "Cumulative Hydrologic Impact Study and Probable Hydrologic Consequences." Unpublished. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Montrose District, Montrose, Colorado.
- Colorado Westmoreland, Inc., 1981-1982. "Colorado Westmoreland, Inc., Deer Study." Colorado Westmoreland, Inc., Paonia, Co.

References Cited
(cont'd.)

- Colorado Water Division, 1981. "Annual Report 1981 - Water Year Irrigation, No. 4." Colorado Water Division.
- Cordova, R.M., 1981. "Ground-water conditions in the Upper Virgin River and Kanab Creek Basins Area, Utah, with Emphasis on the Navajo Sandstone." Technical Publication, Volume 70. Utah Department of Natural Resources, Salt Lake City, Utah.
- Dalton, L.B., et al., 1977. Species List of Vertebrate Wildlife that Inhabits Southeastern Utah. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- Danielson, T.W., et al., 1981. "Hydrology of the Coal-Resource Areas in the Upper Drainages of Huntington and Cottonwood Creeks, Central Utah." Water Resources Investigations. Open File Report 81-539. U.S. Department of the Interior, Geological Survey.
- Danielson, T.W. and Sylla, D.A., 1982. "Hydrology of the Southern Wasatch Plateau Coal Resource Area, central Utah." Water Resources Investigation. Open File Report 82-4009. U.S. Department of the Interior, Geological Survey.
- Doelling, H.H., 1972. "Central Utah Coal Fields, Sevier - Sanpete Wasatch Plateau, Book Cliffs, and Emery." Utah Geological and Mineralogical Survey Monograph. Series Number 3. University of Utah, College of Mines and Mineral Industries, Salt Lake City, Utah.
- Doelling, H.H., et al., 1979. "Coal Studies." Utah Department of Natural Resources, Geological and Mineral Survey Division, Special Studies 49.
- Doelling, H.H., and Graham, R.L., 1972a. "Eastern and Northern Utah Coal Fields: Vernal, Henry Mountains, Sego, LaSal - San Juan, Tabby Mountain, Coalville, Henry's Fork, Goose Creek, and Lost Creek." Utah Geological and Mineralogical Survey. Monograph Series Number 2. University of Utah, College of Mines and Mineral Industries, Salt Lake City, Utah.
- Doelling, H.H., and Graham, R.L., 1972b. "Southwestern Utah Coal Fields: Alton, Kaiparowits Plateau, and Kolob-Harmony." Utah Geological and Mineralogical Survey. Monograph Series Number 1. College of Mines and Mineral Industries, University of Utah, Salt Lake City, Utah.
- DOI, 1982. "Federal Coal Management Report, Fiscal Year 1981." U.S. Department of the Interior. U.S. Government Printing Office.
- Dunrud, R., 1976. "Some Engineering Geologic Factors Controlling Coal Mine Subsidence in Utah and Colorado." U.S. Department of the Interior, Geological Survey, Professional Paper Number 969.

References Cited
(cont'd.)

- Dunrud, C.R., and Osterwald, F.W., 1980. "Effects of Local Mine Subsidence in the Sheridan, Wyoming Area." U.S. Department of the Interior, Geological Survey, Professional Paper 1164.
- Emery County, 1979. "Zoning Resolution of Emery County, Utah." Emery County Board of Commissioners, Emery County Courthouse, Castle Dale, Utah.
- EPA, 1976. "Quality Criteria for Water." U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1977. "Towards a National Strategy for Noise Control." U.S. Environmental Protection Agency, Washington, D.C.
- ERT, 1980a. "Air Quality Technical Report for the Kaiparowits Coal Development and Transportation Study." Environmental Research & Technology, Inc., Fort Collins, Colorado.
- ERT, 1980b. Kaiparowits Coal Development and Transportation Study. Environmental Research & Technology, Inc., Fort Collins, Colorado.
- Foch, J.D. and Oliver, G.S., 1980. "Technical Report on Sound Levels in Bryce Canyon National Park and Noise Impact of the Proposed Alton Coal Mine." Noise Technical Assistance Center, University of Colorado, Denver, Colorado.
- Frischknecht, N.C. and Ferguson, R.B., 1980. 1979 Annual Progress Report, Revegetation Studies on Disturbed Overburden, Emery Coal Field. Interagency Agreements UT-910-1A9-0436 and Utah 6. Prepared for Intermountain Forest and Range Experiment Station, Shrub Sciences Laboratory, Provo, Utah. 35 p.
- FS, 1976 and 1980. Final Environmental Statement for Land Use Plan, Salina Planning Unit, Fishlake National Forest. U.S. Department of Agriculture, Forest Service, Richfield, Utah.
- FS, 1979. Final Environmental Statement, Ferron-Price Planning Unit, Manti-LaSal National Forest. U.S. Department of Agriculture, Forest Service, Price, Utah.
- FS, 1981. "Castle Valley Ridge Proposed Coal Lease Tract, Carbon and Emery Counties, Utah." U.S. Department of Agriculture, Manti-LaSal National Forest, Price, Utah.
- FS, 1982. "Environmental Assessment for Trail Mountain Coal Lease Tract." U.S. Department of Agriculture, Manti-LaSal National Forest, Price, Utah.

References Cited
(cont'd.)

- FS/BLM, 1980. "Forest Planning Unit - Coal Unsuitability Study." U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Richfield, Utah.
- FS/BLM, 1982. Uintah - Southwestern Utah Coal Region Site Specific Analyses for Gooseberry, North Trough Springs, Castle Valley Ridge, Mud Creek, Trail Mountain, Ferron Canyon, The Pines, Quitcupah, Skumpah, Acord, and Ivie Coal Tracts. U.S. Department of Agriculture: Manti-LaSal National Forest, Price, Utah; Fishlake National Forest, Richfield, Utah. U.S. Department of Interior: Moab District BLM Office, Moab, Utah; Richfield District BLM Office, Richfield, Utah.
- Gazin, C.L., 1941. "The Mammalian Faunas of the Paleocene of Central Utah, with Notes on the Geology." U.S. Natural History Museum Proceedings. Volume 91, Number 3121. pp. 1-53.
- Gilmore, C.W., 1946. "Reptilian Fauna of the North Horn Formation of Central Utah." U.S. Department of the Interior, Geological Survey, Professional Paper 210-C. pp. 29-53.
- GS, 1971. "Effect of Grazing on the Hydrology and Biology of the Badger Wash Basin in Western Colorado, 1953-1966." Water Supply Paper 1532-D. U.S. Department of the Interior, Geological Survey.
- GS, 1979a. Development of Coal Resources in Central Utah, Final Environmental Statement. Parts I and II. U.S. Department of the Interior, Geological Survey.
- GS, 1979b. Development of Coal Resources in Southern Utah, Final Environmental Statement. Parts I and II. U.S. Department of the Interior, Geological Survey.
- GS, 1980. "A Preliminary Evaluation of Ground-Water Contribution to Salinity of Streams in the Upper Colorado River Basin in Colorado and Adjacent Parts of Wyoming and Utah." U.S. Department of the Interior, Geological Survey.
- GS, 1982. "Water Resources Data, Water Year 1981." U.S. Department of the Interior, Geological Survey Water Data Report UT-81-1.
- GS, 1983. "Hydrology and Subsidence Potential of Proposed Coal Lease Tracts in Delta County Colorado." Water Resources Investigations Report 83-4069. U.S. Department of the Interior, Geological Survey.
- Hagihara, J.S., et al., 1972. Interim Guide for Rating Soils According to Their Soil Suitability for Rangeland Seeding, Nevada. Prepared for U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah. Technical File Code 73123.

References Cited
(cont'd.)

- HCRS, 1979. "Natural Landmarks Program State Inventory Index." U.S. Department of the Interior, Heritage Conservation and Recreation Service - now the National Park Service, Washington, D.C.
- Hoffnagle, G.F., B.A. Egan, and B.R. Greene, 1977. Application of Models in Complex Terrain Proceedings: Joint Conference on Application of Air Pollution Meteorology, Salt Lake City, Utah.
- Hubbard, 1956. "The Effects of Plant Competition upon the Growth and Survival of Bitterbrush Seedlings." Research Note Number 109. Prepared for the U.S. Department of Agriculture, Forest Service, California Forest and Range Experiment Station.
- Jacobson, K.E., 1981. "The Economic Impact of Potential Changes in Federal Grazing Policies on Ranches in Wayne County, Utah." Utah State University, Logan, Utah.
- Jensen, J.A., 1966. "Dinosaur Eggs From the Upper Cretaceous North Horn Formation of Central Utah." Brigham Young University Studies. Volume 13. Brigham Young University, Provo, Utah. pp. 55-67.
- Jeppsen, R.W., et al., 1981. "Hydrologic Atlas of Utah. Utah Water Research Laboratory, Utah Agricultural Experiment Station, Utah State University, Logan, Utah.
- Johnson, R.R., et al., 1977. "Endangered Species vs. Endangered Habitats: A Concept." General Technical Report RM-43. U.S. Department of Agriculture, Forest Service, Fort Collins, Colorado.
- Kane County, 1982a. "Amended Kane County Master Plan." Five County Association of Governments, St. George, Utah. 43 p.
- Kane County, 1982b. "Kane County, Utah - Zoning Ordinance." Five County Association of Governments, St. George, Utah. 57 p.
- Kelly, K., 1980. "Results of National Park Service Visitor Survey Conducted at Bryce Canyon National Park." U.S. Department of the Interior, National Park Service, Washington, D.C. 21 p.
- Kilpatrick, F.A., 1979. "Erosion and Sedimentation (in Synfuels Development - Earth Science Considerations)." Special Report. U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Kirkham and Rogers, 1981. "Earthquake Potential in Colorado." Bulletin 43, Plates 1 and 3. Colorado Geological Survey, Denver, Colorado.
- Landis, E.R., 1959. "Coal Resources of Colorado." Bulletin 1072-C. U.S. Department of the Interior, Geological Survey, Denver, Colorado.

References Cited
(cont'd.)

- Lee, 1912. "Coal Fields of Grand Mesa and the West Elk Mountains, Colorado." Bulletin 510. U.S. Department of the Interior, Geological Survey, Denver, Colorado.
- Lines, G.C. (Editor), 1983. "Hydrology of Area 56, Northern Great Plains and Rocky Mountain Coal Provinces." Water - Resources Investigations Report (In review). U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Lyon, L.J., 1979. "Habitat Effectiveness as Influenced by Roads and Cover." Journal of Forestry. Volume 77, Number 10.
- Lyons, S.M., 1978. "The Impact of Surface Soil Removal on Plant Production, Transpiration Ratios, Nitrogen Mineralization Rates, Potential Sediment Losses, and Chemical Water Quality Within the Chained and Reseeded Pinyon-Juniper Types in Utah." M.S. Thesis. Utah State University, Logan, Utah.
- Moore, R.C., and Nawrocki, M., 1980. "Effects of Subsidence From Thick Seam Coal Mining on Hydrology." U.S. Department of the Interior, Bureau of Mines.
- Mundorff, J.C., 1972. "Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Price River Basin, Utah." Technical Publication 39. Utah Department of Natural Resources, Salt Lake City, Utah.
- Mundorff, J.C., 1979. "Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Dirty Devil River Basin, Utah." Technical Publication 65. Utah Department of Natural Resources, Salt Lake City, Utah.
- Mundorff, J.C. and Thompson, K.R., 1982. "Reconnaissance of the Quality of Surface Water in the San Rafael River Basin, Utah." Technical Publication 72. Utah Department of Natural Resources, Salt Lake City, Utah.
- NPS, 1978-1981. "Visibility Data for Bryce Canyon National Park." U.S. Department of the Interior, National Park Service.
- NPS, 1980. "Results of the NPS Visitor Survey Conducted at Bryce Canyon National Park, Summer 1980." U.S. Department of the Interior, National Park Service, Washington, D.C.
- NPS, 1982. "The Nationwide Rivers Inventory." U.S. Department of the Interior, National Park Service, Washington, D.C.
- OSM, 1980. "Southern Utah Petition Evaluation Document." U.S. Department of the Interior, Office of Surface Mining, Denver, Colorado.

References Cited
(cont'd.)

- Parker, L.R., 1976. "The Paleocology and Flora of the Blackhawk Formation (Upper Cretaceous) from Central Utah." Ph.D. Thesis, Michigan State University, East Lansing, Michigan. Also Dissertation Abstracts International, Volume 37, Number 9, pp. 4372B-4373B, 1977.
- Porter, R.D. and White, C.M., 1973. "The Peregrine Falcon in Utah, Emphasizing Ecology and Competition with the Prairie Falcon." Biological Series. Volume 18, Number 1. Brigham Young University, Provo, Utah.
- Price, D. and Arnow, T., 1974. "Summary Appraisals of the Nation's Groundwater Resources - Upper Colorado Region." U.S. Government Printing Office, Washington, D.C.
- Price, D. and Miller, L., 1975. "Hydrologic Reconnaissance of the Southern Uinta Basin, Utah and Colorado." Technical Publication 49. Utah Department of Natural Resources, Salt Lake City, Utah.
- Price, D., 1980. "General Chemical Quality of Ground Water in the Alton - Kolob Coal Fields Area, Utah." Miscellaneous Investigation Map I 1235-C. U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Price, D., 1982. "Selected Surface - Water Data for the Manti 30 x 60 Minute Quadrangle, Utah." Miscellaneous Investigations Map (Unpublished). U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Ruzzo, W., 1982. "Report on the Sage Grouse Survey at the Alton Coal Leasehold." Utah International, Inc., Environmental Quality Department.
- SAI, 1981. "Climate of the Kanab Resource Area." Final Report. Environmental Applications Division, Science Applications, Inc.
- Sanpete County, 1981a. "Sanpete County Development Plan - A Guide for the Physical Development of Sanpete County, 1980-2000." Sanpete County Planning Committee, Sanpete County Courthouse, Manti, Utah.
- Sanpete County, 1981b. "Development Code of Sanpete County." Sanpete County Planning Committee, Sanpete County Courthouse, Manti, Utah.
- Scott, R.W., et al., 1977. "Ranking of Wildlife Values on Federal Coal Lands." Utah Division of Wildlife Resources, Salt Lake City, Utah.
- SCS, 1973. "Estimating Sediment Yields for the State of Utah." Western United States Water Plan Map. U.S. Department of Agriculture, Soil Conservation Service.
- SCS, 1978. "Soil Reconstruction Material for Drastically Disturbed Areas." National Soils Handbook Notice 24, Section 403.6(a). U.S. Department of Agriculture, Soil Conservation Service.

References Cited
(cont'd.)

- SCS, 1979. "Important Farmlands of Delta County, Colorado." U.S. Department of Agriculture, Soil Conservation Service, Portland, Oregon.
- SCS, 1981. "Soil Survey of Paonia Area, Colorado." U.S. Department of Agriculture, Soil Conservation Service. U.S. Government Printing Office, Washington, D.C.
- SCS, 1982. Colorado River Water Quality Improvement Program Final Environmental Impact Statement. U.S. Department of Agriculture, Soil Conservation Service.
- SEUALG, 1980. "Community Attitude Survey" Compiled by Dr. T.J. Alsop, January 1, 1980, Southeastern Utah Association of Local Governments for the U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- Sevier County, 1976. "Sevier County and Cities, 1976-1995, Master Plan Report." Sevier County Planning Commission, Sevier County Courthouse, Richfield, Utah.
- Sevier County, 1979. "Revised Ordinance for Sevier County, 1979 - Including Zoning and Subdivision Regulations." Sevier County Planning Commission, Sevier County Courthouse, Richfield, Utah.
- Smith, M.T., 1982. Letter concerning National Register Sites within the Uinta-Southwestern Utah Coal Region Round II Proposed Tracts. From Utah SHPO to Douglas McFaddin, BLM.
- Snow, C., 1972. Habitat Management Series for Endangered Species: Black-Footed Ferret. Report Number 2. U.S. Department of the Interior, Bureau of Land Management, Colorado State Office, Denver, Colorado.
- Stokes, W.L. (Editor), 1964. "Geologic Map of Utah" Special Map. University of Utah, Salt Lake City, Utah.
- Thames, J.L. (Editor), 1977. "Reclamation and Uses of Disturbed Land in the Southwest." The University of Arizona Press, Tucson, Arizona.
- Thayne, G. and Hudson, L., 1978. "Calculations for Increase in Deer, Elk, Upland Game and Fishing Pressures in the State of Utah." Unpublished Technical Report prepared for the Intermountain Power Project EIS. U.S. Department of the Interior, Bureau of Land Management, Richfield, Utah.
- Thomas, B.E., and Lindskov K.L., 1983. Methods for Estimating Peak Discharges and Flood Boundaries of Streams in Utah: U.S.G.S. Water Resources Investigations Report 83-4129, 77p.

References Cited
(cont'd.)

- Thomas, et al., 1979. "Riparian Zones." Wildlife Habitats in Managed Rangelands - The Great Basin of Southeastern Oregon, General Technical Report PNW-80. U.S. Department of Agriculture, Forest Service.
- UDWR, 1977. Utah Cougar Harvest 1976-77. Publication 77-10. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- UDWR, 1978. Statewide Fishery Management Survey, 1977. Publication 78-13. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- UDWR, 1980. Unpublished office files. Utah Division of Wildlife Resources, Southeastern Region Office, Price, Utah.
- UDWR, 1981a. The 1981 Utah Investigations and Management Recommendations Book. Publication 81-4. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- UDWR, 1981b. Utah Upland Game Annual Report, 1981. Publication 82-8. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- UDWR, 1982a. Utah Big Game Investigations and Management Recommendations, 1981-1982. Publication 82-3. Utah Division of Wildlife Resources, Salt Lake City, Utah.
- UDWR, 1982b. Unpublished office files, Utah Division of Wildlife Resources.
- UORA, 1973. "State Comprehensive Outdoor Recreation Plan 1970-1985." Utah Outdoor Recreation Agency, Salt Lake City, Utah.
- UORA, 1978. "Utah SCORP (State Comprehensive Outdoor Recreation Plan) Proposed Plan Outline." Utah Outdoor Recreation Agency, Salt Lake City, Utah.
- U.S. Environmental Data Service, 1968. Weather Atlas of the United States. 262 p.
- USFWS, 1981-1982. Unpublished office files. U.S. Department of the Interior, Fish and Wildlife Service, Salt Lake Area Office, Salt Lake City, Utah.
- USFWS-UDWR, 1978. "Stream Evaluation Map, State of Utah - 1978." U.S. Department of the Interior, Fish and Wildlife Resources, Salt Lake City, Utah.
- U.S. Weather Bureau, 1963. "Normal Annual and May-September Precipitation (1931-60) for the State of Utah." Special Map. United States Weather Bureau.

References Cited
(cont'd.)

- Utah Bureau of Air Quality, 1977-1981. "Utah Air Quality Data Reports, 1977-1981." Utah Bureau of Air Quality.
- Utah Bureau of Air Quality, 1980. "1980 Utah Emissions Inventory and Air Quality Data Report." Utah Bureau of Air Quality.
- Utah Department of Agriculture, 1981. "Utah Agricultural Statistics." State Annual Report. Utah Department of Agriculture, Salt Lake City, Utah.
- Utah Department of Agriculture, 1982. "Utah Agriculture Statistics." Prepared by the Utah Department of Agriculture, Salt Lake City, Utah, in cooperation with the U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service.
- Utah Division of Health, 1978. "Wastewater Disposal Regulations, Utah State Division of Health: Part II, Standards of Quality for Waters of the State." Utah State Division of Health, Salt Lake City, Utah.
- Utah Division of Health, 1982. "State of Utah, Water Quality Report." April 1982. Utah State Division of Health, Water Pollution Control, Salt Lake City, Utah.
- Utah Native Plant Society List, 1981. "Meeting Report, Utah Rare Plants." February 1981 Newsletter. Utah Native Plant Society, Utah Chapter, Salt Lake City, Utah.
- Utah State Planning Coordinator's Office, 1983. "Social and Economic Impact Analysis for the Uintah Southwestern Utah Coal Environmental Impact Statement (Draft)." Prepared for the U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- Vaughn Hansen Associates, 1980. "Hydrologic Inventory and Baseline Study of the Valley Camp Lease Area and Adjacent Areas, Carbon and Emery Counties, Utah." Valley Camp of Utah, Inc., Clear Creek, Utah. 196 p.
- Vories, D.C. (Editor), 1976. "Reclamation of Western Surface Mined Lands Workshop Proceedings, March 1-3, 1976." ERT Ecology Consultants, Inc., Denver, Colorado.
- Waddell, K.M., et al., 1978. "Selected Hydrologic Data, 1931-77, Wasatch Plateau - Book Cliffs Coal-Fields Area, Utah." Utah Basic Data Report 31. U.S. Department of the Interior, Geological Survey.
- Waddell, K.M., 1982. "Scofield Reservoir Water Quality." Water-Supply Paper (Unpublished). U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.

References Cited
(concluded)

- Waddell, K.M., et al., 1982. "Selected Hydrologic Data, Price River Basin, Utah, Water Years 1979 and 1982." Utah Hydrologic Data Report 38. U.S. Department of the Interior, Geological Survey.
- Welsh, S.L., 1977. Endangered and Threatened Plant Species of the Central Coal Lands, Utah. Brigham Young University, Provo, Utah.
- Welsh, S.L. and Neese, E., 1980. Inventory of Potentially Endangered or Threatened Plant Species of Selected Coal Lands of Emery County, Utah. Endangered Plant Studies, Inc. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah. Contract Number UT-060-79-SOA-019.
- Woolley, R.R., 1946. "Cloudburst Floods in Utah 1850-1938." Water Supply Paper 994. U.S. Department of the Interior, Geological Survey.

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UTAH GOAL LEASES

REF. NO.	LESSEE	SERIAL NUMBER
1	AMCA Coal Leasing Inc.	SL-027304 SL-063058 U-010511 U-020668
2	Beaver Creek Coal Company	U-38722 U-020641 SL-064903 U-4319 U-33454 U-020668 U-32727 U-41793 SL-051279-063188
3	Bishopgate Coal Corporation (Soldier Creek Coal Co.)	U-50722 SL-063270 U-06606 U-024414 U-7653
4	Carroll County Coal Co. (Southern Utah Fuel Co.)	SL-063583 U-053995 U-064531 U-0149084 U-28297 U-47860 U-073039 U-073040 U-073041 U-090231 U-0101213 U-0101214 U-0101215 U-0101217 U-0101218 U-5287 U-5287 U-5287
5	Consolidation Coal Co. and Kemper Coal Co.	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
6	Franklin Real Estate Co. and Blackhawk Coal Co.	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-0124166 U-0126916 U-0140770 U-0147999 U-0148552 SL-050619-052424 U-47974 SL-020662 U-24059 U-74070 U-7955 U-1389 SL-066145 SL-068754-U-1215
7	Consolidation Coal Co. and Kemper Coal Co.	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
8	Consolidation Coal Co. and Kemper Coal Co.	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
9	C.D.P. Coal Development Co.	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
10	Energy Reserves Group	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
11	Sunoco Energy Development Co.	U-024316 U-024317 U-0141171 U-0141176 U-0141177 U-0141178 U-02067-00916 U-07064-027821 U-07746 U-09906 U-092147 U-0144820 SL-07993-046653 SL-046652 SL-046442-050115 SL-071737 U-018244 U-058184 U-046445 SL-050541 SL-052986-063383 U-010140 SL-064660 U-069291 U-02785 U-014217 U-014218 U-039706 U-0126947 U-0126948 U-020354 SL-062605 U-017354 U-067499 U-071739 U-47974 U-47975 U-47976 U-0142235 U-0142236 U-020395 U-044076 U-5135
12	Franklin Real Estate Co. and Blackhawk Coal Co.	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-0124166 U-0126916 U-0140770 U-0147999 U-0148552 SL-050619-052424 U-47974 SL-020662 U-24059 U-74070 U-7955 U-1389 SL-066145 SL-068754-U-1215
13	General Exploration Company Kaiser Steel Corp.	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-0124166 U-0126916 U-0140770 U-0147999 U-0148552 SL-050619-052424 U-47974 SL-020662 U-24059 U-74070 U-7955 U-1389 SL-066145 SL-068754-U-1215
14	General Exploration Company Kaiser Steel Corp.	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-0124166 U-0126916 U-0140770 U-0147999 U-0148552 SL-050619-052424 U-47974 SL-020662 U-24059 U-74070 U-7955 U-1389 SL-066145 SL-068754-U-1215
15	Kanawha & Hocking Coal & Coke Co. (Valley Camp of Utah)	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-0124166 U-0126916 U-0140770 U-0147999 U-0148552 SL-050619-052424 U-47974 SL-020662 U-24059 U-74070 U-7955 U-1389 SL-066145 SL-068754-U-1215
16	Charles W. and J.D. Kingston Coastal States - Gely	U-020668 U-38727 U-46464 SL-031286 U-7949 U-13097 U-3704 SL-069555 SL-062648 U-2810 SL-036407 SL-024471 SL-063985 U-026883-058261 SL-046612 SL-050133 SL-051221 U-02864 U-09039 U-014275 U-024317 U-024318 SL-06407-064621 SL-064620 SL-066116 U-1355 U-47978 U-47979 SL-070645-U-02292 U-084923 U-084924 U-040151 U-083566 SL-048223 SL-050111 U-082996 U-49322 U-098783 U-098784 U-098785 U-098787 U-0103107 U-0103109 U-0103129 U-0103130 U-0105419 U-0148273 SL-071561 U-083003 U-083004 U-0115791 U-0115792 U-0115793 U-0115833 U-0130985 U-0130986 U-0130989 U-0130990 U-0130991 U-0130992 U-0140836 U-0140837 U-0145535 U-24427 U-07835 SL-050639 U-0119366 U-0120794 U-0146664 U-096476 U-096477 U-096478 U-011149 U-0101141 U-0103108 U-0103109 U-0103132 U-0103133 U-0113854 U-0115856 U-0115857 U-0115858 U-087805 U-087806 U-087807 U-087828 U-087832 U-087834 U-087835 U-087836 U-087837 U-082139 U-092140 U-092141 U-092142 U-096486 U-096494 U-096495 U-096496 U-096497 U-096498 U-096502 U-096509 U-0101142 U-0103141 SL-044502 SL-044503 SL-058578 U-060745 U-060746 U-060747 U-083072 U-087808 U-0101153 U-088774 U-088775 U-0105404 U-0115938 U-0122579 U-0122582 U-0122583 U-0122584 U-0122585 U-0122586 U-0122632 U-0122675 U-012

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