United States Deparment of the Interior

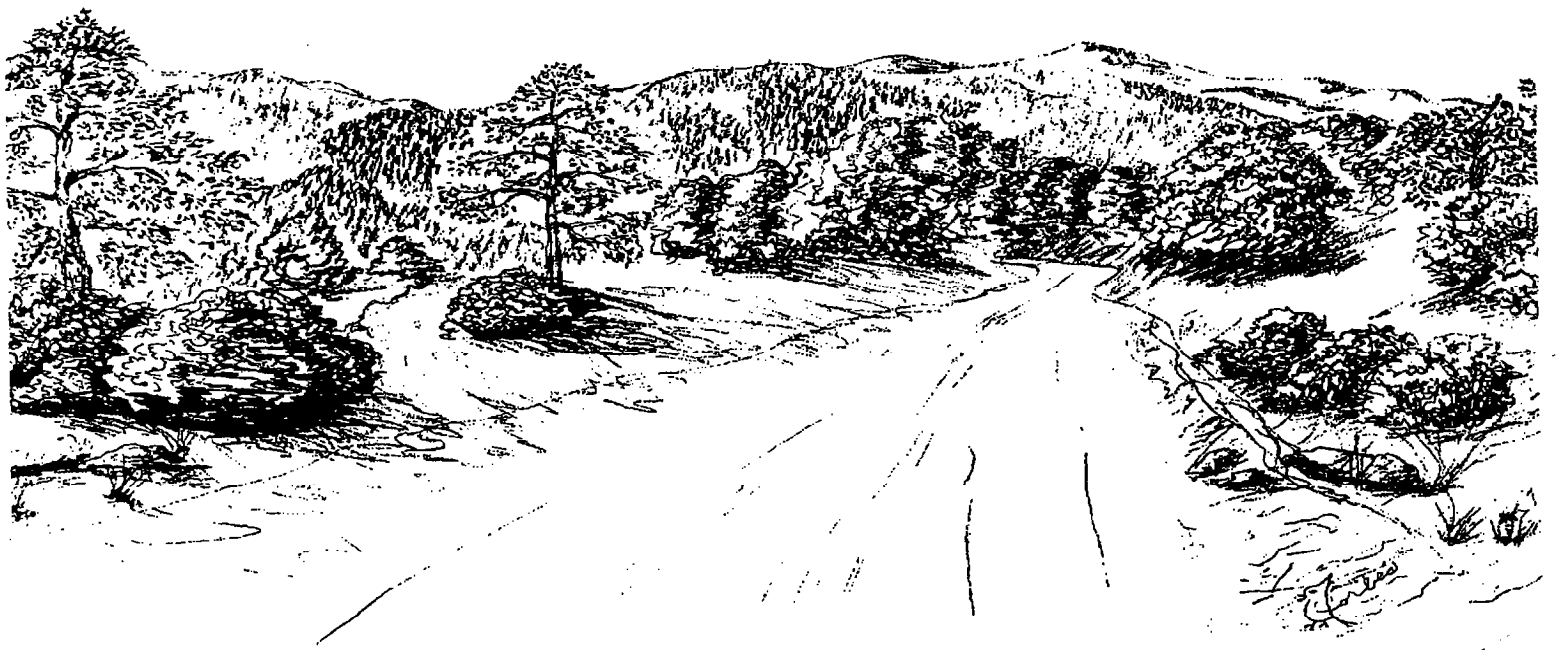
DES - 93-32

BUREAU OF LAND MANAGEMENT
Royal Gorge Resource Area
Cañon City District, Colorado

September 1993

ROYAL GORGE RESOURCE AREA

DRAFT RESOURCE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
CANON CITY DISTRICT OFFICE
P.O. BOX 2200
CANON CITY, COLORADO 81215-2200

Dear Reader:

Enclosed for your review and comment is the Draft Royal Gorge Resource Management Plan/Environmental Impact Statement (RMP/EIS).

The draft RMP/EIS presents four multiple use management alternatives for the BLM-administered lands within the Royal Gorge Planning Area and analyzes the environmental impacts of implementing each alternative. This document also serves as the draft environmental impact statement (EIS) for the analysis of the wild and scenic river proposals for Beaver Creek and the Arkansas River. Related documents, including the Royal Gorge Resource Area Grazing EIS and the Cañon City District Wilderness Environmental Impact Statement, are available for review in the Royal Gorge Resource Area Office and the Cañon City District Office in Cañon City, Colorado.

You are invited to make written or oral comments on this document. Public hearings to receive oral comments are scheduled as follows:

Date and Time	Address	City/State
Monday, November 1, 1993 2 to 4 p.m. and 7 to 9 p.m.	Rodeway Inn 11595 W. 6th Avenue	Lakewood, Colorado
Tuesday, November 2, 1993 2 to 4 p.m. and 7 to 9 p.m.	Buena Vista Community Center East Main and Evans	Buena Vista, Colorado
Wednesday, November 3, 1993 2 to 4 p.m. and 7 to 9 p.m.	BLM District Office 1370 East Main	Cañon City, Colorado

An informal open house will be held 1 hour prior to each session to allow you to meet with BLM representatives to discuss and ask questions regarding the draft RMP/EIS.

For consideration, your written comments must be received by close of business (4:30 p.m.) on January 10, 1994. Please include your name and complete mailing address on all written comments, including any copies of oral testimony that you make available to us.

Written comments should be addressed to Dave Taliaferro, RMP Project Manager, Bureau of Land Management, Cañon City District Office, P.O. Box 1171, Cañon City, CO 81212

Sincerely yours,

Donnie R. Sparks

Donnie R. Sparks
District Manager

DRAFT

ROYAL GORGE
RESOURCE MANAGEMENT PLAN
AND
ENVIRONMENTAL IMPACT STATEMENT

DES - 93 - 32

September 1993

Prepared by
United States Department of the Interior
Bureau of Land Management
Colorado State Office
Cañon City District Office
Royal Gorge Resource Area

Prepared by: L. Mac Berta — 8/23/93
Area Manager, Royal Gorge Resource Area — Date

Recommended by: Donnie R. Sparks — 8/23/93
District Manager, Cañon City — Date

Approved by: Bob Moore — 8/28/93
State Director, Colorado — Date

DRAFT

RESOURCE MANAGEMENT PLAN
and
ENVIRONMENTAL IMPACT STATEMENT
for the
ROYAL GORGE PLANNING AREA

Baca, Bent, Crowley, Chaffee, Custer, El Paso, Fremont, Huerfano, Kiowa, Lake, Las Animas, Otero, Park, Prowers, Pueblo, and Teller Counties, Colorado

Draft (X) Final ( )

Lead Agency: The United States of the Interior, Bureau of Land Management

1. Type of Action: Administrative

2. For further information, contact:Dave Taliaferro, RMP Project Manager, Bureau of Land Management, Cañon City District, P.O. Box 1171, Cañon City, CO 81212; telephone (719) 275-0631.

3. Abstract: This draft resource management plan and environmental impact statement describes and analyzes four alternatives for managing BLM-administered lands and resources within the Royal Gorge Planning Area in Colorado. These alternatives are: (1) Existing Management (No Action) Alternative; (2) Resource Conservation Alternative; (3) Resource Utilization Alternative; and (4) Preferred Alternative. This document also includes the environmental analysis required for the wild and scenic river proposals.

4. Comments on the draft resource management plan and environmental statement must be received by: Close of business, **January 10, 1994.**

ACRONYMS

ACEC--Area of critical environmental concern

AQRV--Air quality related values

ATV--All terrain vehicle

AMP--Allotment management plan

ARPA--Archaeological Resources Protection Act

AUM--Animal unit month

BLM--Bureau of Land Management

CFL--Commercial forest land

CFR--Code of Federal Regulations

CMA--Cooperative management agreement

CNAP--Colorado Natural Areas Program

CRMP--Cultural resource management plan

CSU--Controlled surface use

DOW--Division of Wildlife

EA--Environmental assessment

EIS--Environmental impact statement

EPA--Environmental Protection Agency

ERMA--Extensive resource management area

ESA--Economic study area

FERC--Federal Energy Regulatory Commission

FLPMA--Federal Land Policy Management Act

FMP--Forest management plan

FR--Federal Register

HMP--Habitat management plan

IMPG--Interim Management Policy and Guidelines

IAP--Integrated activity plan

MFP--Management framework plan

NEPA--National Environmental Protection Act

NCA--National conservation area

NRA--National recreation area

NRHP--National Register of Historic Places

NSO--No surface occupancy

OHV--Off-highway vehicle

R&PP--Recreation and Public Purposes

RGPA--Royal Gorge Planning Area

RGRA--Royal Gorge Resource Area

RMP--Resource management plan

ROD--Record of decision

ROS--Recreation opportunity spectrum

SPG--Supplemental program guidance

SPM--Semiprimitive motorized

SPNM--Semiprimitive nonmotorized

SRMA--Special recreation management area

USFS--United States Forest Service

USFWS--United States Fish and Wildlife Service

USGS--United States Geological Service

VRM--Visual resource management

W&SR--Wild and scenic river

WHA--Wildlife habitat area

WSA--Wilderness study area

wtp--Willingness to pay

SUMMARY OF ALTERNATIVES

SUMMARY

The following table displays a summary of management for each resource within each alternative. More details are shown in Chapter 3 and the consequences of these management prescriptions are in Chapter 4.

TABLE S-1
Summary Comparison of Alternatives

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Vegetation	Distribute new forage to livestock and/or big game on case-by-case basis on I category allotments	Distribute new forage to big game first until DOW herd management goals are reached, then to livestock until suspended nonuse is satisfied	Distribute new forage to livestock first until suspended nonuse is satisfied	Distribute new forage on a case-by-case basis to either livestock or big game through cooperative efforts with Federal and state agencies and private groups (i.e., the Colorado Habitat Partnership Program)
	Manage forage on 636,000 acres/97%	Manage forage on 583,000 acres/89% without special values	Manage forage on 653,000 acres/100%	Manage forage on 642,884 acres/98%, including management for limited forage on 46,833 acres; manage for special values on 10,116 acres/2%
	Manage 92,854 acres/14% for forest production	Manage 244,554 (37%)acres of forest lands for other resource values	Same as Alternative A	Manage 151,700 acres (23%) of forest land for enhancement of other values
Livestock grazing	Allocate grazing on 636,000 acres/97%	Allocate grazing on 583,000 acres/89%	Allocate grazing on 653,000 acres/100%	Allocate grazing on 642,884 acres/98%
	Exclude grazing on 17,000 acres/3%	Exclude grazing on 70,000 acres/11%		Exclude grazing on 10,116 acres/2%
Riparian areas	Protect approximately 15 acres/less than 1% from livestock grazing	Protect 650 acres/26% from grazing	Same as Alternative A	Protect 325 acres/13% from grazing
		Protect 2,550 acres/100% from mineral development, waterpower/ reservoir resources, and OHV use		Protect 1,275 acres/50% from mineral development, waterpower/ reservoir resources, and OHV use
Forest and Woodlands	Harvest products on 92,854 acres/38% Enhance other resource values on 151,700 acres/62%	Enhance sensitive resource values on all 244,554 acres/100%	Same as Alternative A	Same as Alternative A

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Wildlife habitat		Protect big game birthing and critical habitat (191,605 subsurface acres/8%) from fluid mineral leasing through NSO Protect big game birthing areas (17,499 acres/3%) from mineral materals disposal, mineral entry, major ROWs, and OHV use; waterpower withdrawals would be terminated Protect big game critical winter habitat (90,306 acres/14%) from major ROWs, livestock grazing in areas of conflict, and OHV use	Protect big game birthing and critical winter habitat (191,605 subsurface acres/8%) from mineral leasing with standard lease stipulations	Protect big game birthing areas (17,499 acres/3%) from mineral materials disposal, coal leasing, major ROWs, OHV use
	Protect habitat seasonally from fluid mineral leasing: - raptor nesting/fledgling (4,500 subsurface acres/less than 1%); - big game critical winter habitat (164,500 subsurface acres/approximately 1%); - bighorn sheep critical winter and lambing habitat (6,580 subsurface acres/less than 1%)	Protect habitat seasonally from fluid mineral leasing: - raptor nesting/fledgling (59,566 subsurface acres/2%); - wild turkey (29,000 subsurface acres/1%); - all big game winter (597,218 acres/24%)		Protect habitat seasonally from fluid mineral leasing: - big game critical winter and birthing (191,600 subsurface acres/8%) - wild turkey habitat (29,000 acres)
		Protect habitat seasonally from mineral operations through claimant notification: - raptor nesting and fledgling (59,566 acres/9%); - wild turkey (10,712 acres/ 2%; - big game critical (90,306 acres/ 14%)		Protect habitat seasonally from mineral operations through claimant notification: - raptor nesting and fledgling (59,566 acres/9%); - wild turkey (10,712 acres/ 2%; - big game critical (90,306 acres/ 14%) Address big game habitat with known conflicts through cooperative efforts with Federal and state agencies and private groups (i.e., Colorado Habitat Partnership Program)

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Fishery habitat	Exclude grazing on 55 acres/ less than 1%	Exclude grazing on 55 acres/less than 1%	Same as Alternative A	Same as Alternative A
	Protect 11,108 acres/100% from fluid mineral leasing with standard lease terms	Protect 11,108 acres/100% from mineral development	Same as Alternative A	Same as B except 11,108 acres/100% would be protected from fluid mineral leasing with standard lease stipulations
		Limit OHV use on 2,550 acres/23%		
		Discontinue grazing on 650 acres/6% with conflicts to fisheries		Protect 325 acres/3% with conflicts from livestock grazing; discontinue grazing on 325 acres/3% with conflicts
Special status plant species	Protect species on 5,319 acres/47% from mineral development and OHV use	Protect species on 11,403 acres/100% from mineral development and OHV use	Same as Alternative A	Same as Alternative B
Special status animal species		Protect habitat (23,700 acres/ 7%) from fluid mineral leasing with NSO	Protect habitat (206,400 acres/ 100%) from fluid mineral leasing with standard stips only	Same as Alternative B except peregrine falcon habitat would be protected with standard stipulations only
	Protect habitat (82,400 acres/40%) seasonally from fluid mineral leasing	Protect habitat (335,376 acres/ 93%) seasonally from mineral development		Same as Alternative B
Fluid minerals	Open for leasing with standard stips (2,200,864 subsurface acres/88%)	Open for leasing with standard stips (854,116 subsurface acres/34%)	Open for leasing with standard stips (2,486,718 subsurface acres/99%)	Open for leasing with standard stips (1,715,897 subsurface acres/69%)
	Open for leasing with NSO stips (4,254 subsurface acre/less than 1%s)	Open for leasing with NSO stips (650,136 subsurface acres/26%)	Open for leasing with NSO stips (4,254 subsurface acres/less than 1%)	Open for leasing with NSO stips (37,220 subsurface acres/1%)
	Open with seaonal limitations (284,854 acres/11%	Open with seasonal limitations (985,720 subsurface acres/40%)		Open with seasonal limitations (412,517 subsurface acres/17%)
				Open with controlled surface use stipulations (324,338 acres/13%)

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Locatable minerals	Open to mineral entry (648,761 acres/99%)	Open to mineral entry (332,426 acres/51%)	Same as Alternative A	Open to mineral entry (435,180 acres/67%)
	Closed to mineral entry (4,239 acres/1%)	Closed to mineral entry (187,597 acres/29%)		Closed to mineral entry (84,843 acres/13%)
		Open seasonally to mineral entry (132,977 acres/20%)		Same as Alternative B
Mineral materials	Open for mineral material disposal on a case-by-case basis (648,761 acres/99%)	Open for mineral material disposal under standard stipulations (332,426 acres/51%)	Same as Alternative A	Open for mineral material disposal under standard lease stips (435,180 acres/67%)
	Closed to mineral material disposal (4,239 acres/1%)	Closed to mineral material disposal (187,597 acres/29%)		Closed to mineral material disposal (84,843 acres/13%)
		Open seasonally to mineral material disposal (132,977 acres/20%)		Same as Alternative B
Coal minerals	Suitable for underground or surface mining (131,000 acres/100%)	Suitable for consideration for underground or surface mining (53,000 acres/41%) - Suitable but unavailable for suface mining (167 acres/less than 1%) - Suitable for underground or suface mining seasonally (23,788 acres/45 %) - Suitable and available for surface mining (29,045 acres/22%)	Same as Alternative A	Same as Alternative B, except 23,788 acres/45% would be available
		Available for consideration for underground mining only (78,000 acres/59%)		Same as Alternative B
Paleontology resources	Protected from mineral development (2,728 acres/100%)	Protected from mineral development, timber harvesting, and wood gathering (2,728 acres/100%)	Same as Alternative A	Same as Alternative B
	Retain 2,728 acres(100%) in public ownerhip	Same as Alternative A	Same as Alternative A	Same as Alternative A
	OHV use to designated roads and trails on 2,728 acres/100%)	Same as Alternative A	Same as Alternative A	Same as Alternative A

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Historical resources	Protect values on 2,728 acres/4%	Protect values on 76,341 acres/100% through ACEC designation	Protect values on 2,728 acres/4% through ACEC designation	Same as Alternative B except leasing for fluids would be with standard stips only
	Potential loss of values on 5,920 acres/8% from minerqal development and OHV use	Protect values on 5,920 acres/8% from mineral development and OHV use	Protect values 2,640 acres/3% on a case-by-case basis from mineral materials disposal	
Archaeological resources	Protect values on 2,728 acres/6%	Protect values on 61,209/100% acres through ACEC designation	Protect values on 2,728 acres/6%	Same as Alternative B
		Additional protection on 8,800 acres/28% from mineral development and OHV use	Protect 8,800 acres/14% with standard lease stipulations for fluid minerals	Same as Alternative C
Transportation and access	Total roads, trails, and railroads on BLM-administered land (1,056 miles/100%)	Total roads, trails, and railroads on BLM-administered land (625 miles/100%)	Total roads, trails, and railroads on BLM-administered land (1,051 miles/100%)	Total roads, trails, and railroads on BLM-administered land (877 miles/100%)
	BLM system roads/trails (263 miles/25%	BLM system roads/trails (316 miles/51%	BLM system roads/trails (258 miles/25%)	BLM system roads/trails (314 miles/36%)
	BLM system roads/trails to be maintained (263 miles/25%)	BLM system roads/trails to be maintained (302 miles/48%)	BLM system roads/trails to be maintained (728 miles/69%)	BLM system roads/trails to be maintained (554 miles/63%)
	Provide 10.5 miles of new access	Provide 50 miles of new access	Provide 6 miles of new access	Provide 56 miles of new access
Rights-of-way	Excluded 0 acres Avoided 4,318 acres/1% Designated corridors 0 acres	Excluded 340,350 acres/58% Avoided 241,666 acres/42% Designated corridors 0 acres	Excluded 0 acres Avoided 80 acres/less than 1% Designated corridors 47,992 acres/8%	Excluded 264,462 acres/46% Avoided 52,358 acres/9% Designated corridors 24,938 acres/4%
	Unrestricted areas 577,698 acres/99%	Unrestricted areas 0 acres	Unrestricted areas 533,944 acres/92%	Unrestricted areas 240,258 acres/41%
Land ownership adjustments	Identify 71,500 acres/11% for disposal by appropriate means other than exchange	Identify 33,056 acres/5% for disposal by appropriate means other than exchange	Identify 102,553 acres/16% for disposal by appropriate means other than exchange	Identify 83,134 acres/13% for disposal by appropriate means other than exchange
	Identify 563,500/86% acres for retention/acquisition	Identify 616,187 acres/94% for retention/acquisition	Identify 420,003 acres/64% for retention/acquisition	Identify 462,141 acres/71% for retention/acquisition
	Identify 18,000 acres/3% for disposal through exchange, R&PP lease, or transfer	Identify 3,757 acres/1% for disposal through exchange, R&PP lease, or transfer	Identify 130,444 acres/20% for disposal through exchange, R&PP lease, or transfer	Identify 107,725 acres/16% for disposal through exchange, R&PP lease, or transfer

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Withdrawals and classifications	Continue withdrawals on 3,596 acres/less than 1%	Same as Alternative A	Continue withdrawals on 2,496 acres/less than 1%	Same as Alternative A
	Continue waterpower/reservoir withdrawals on 7,994 acres	Continue waterpower/reservoir withdrawals on 1,241 acres	Same as Alternative A	Same as Alternative B
	Initiate new withdrawals on 2,728 acres/less than 1%	Initiate new withdrawals on 110,571 acres/17%	Same as Alternative A	Initiate new withdrawals on 77,046 acres/12%
			Revoke withdrawals on 1,100 acres/less than 1%	
Waterpower/reservoir resources	Identify 7,994 acres/100% suitable for intensive management	Identify 1,241 acres/16% suitable for intensive management	Same as Alternative A	Same as Alternative B
	Identify 0 acres suitable for restricted management	Identify 0 acres suitable for restricted management	Same as Alternative A	Same as Alternative B
	Identify 0 acres unsuitable	Identify 6,753 acres/84% unsuitable	Same as Alternative A	Same as Alternative B
Areas of critical and environmental concern designations	Designate 4,238 acres/1%	Designate 112,081 acres/17%	Designate 4,238 acres/1%	Designate 78,556 acres/12%
	Protect 4,238 acres/1% with limitations of OHV use to designated roads and trails.	Protect 112,08 acres/17% with limitations of OHV use to designated roads and trails.	Same as Alternative A	Protect 78,556 acres/12% with limitations of OHV use to designated roads and trails.
Wild and scenic river designations	Recommend 0 miles and acres for designation	Recommend 146 miles (21,931 acres/100%) for designation	Same as Alternative A	Same as Alternative A
Off-highway vehicle use	Designate 564,918 acres/86% open	Designate 0 acres open	Designate 24,358 acres /4% open	Designate 16,356 acres /3% open
	Designate 10,240 acres/2% limited seasonally	Designate 575,158 acres/88% limited seasonally or to designated roads and trails;	Designate 550,800 acres/84% limited seasonally or to designated roads and trails	Designate 558,802 acres/85% limited seasonally or to designated roads and trails
	Designate 77,842 acres/12% closed	Same as Alternative A	Same as Alternative A	Same as Alternative A
Visual resources	Retain Class II areas (206,436 acres/100%) under BLM-administration; protect from fluid mineral development and limit OHV use on 2,407 acres/12% of Class II areas	Retain under BLM-administration Class II areas (206,436 acres/100%) and protect from mineral development, ROWs, and limit OHV use	Same as Alternative A except only a portion of Class II areas (2,407 acres/1%) would be retained under BLM administration	Same as Alternative B except Class II areas (206,436 acres/100%) would be protected by CSU stipulations and would not be retained under BLM administration

Table S-1 (Continued)

Resource/Value	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Recreation	Maintain primitive and semiprimitive settings and opportunities on 44,300 acres/72%	Maintain primitive and semiprimitive settings and opportunities on 61,624 acres/100%	Same as Alternative A	Same as Alternative B
	Degradation from mineral development and OHV use could occur on 17,324 acres/28% of semiprimitive nonmotorized settings and recreation values	Degradation from mineral development and OHV use would not occur on 17,324 acres/28% of semiprimitive nonmotorized settings and recreation values	Same as Alternative A	Same as A, except fluid minerals would be leased under standard stipulations Emphasize provision of visitor information in Royal Gorge ERMA
	Evaluate ROWs on case-by-case basis	Protect values on 266,548 acres/41% from ROWs and utility corridors	Same as Alternative A	Same as Alternative B
	Existing developed sites (80 acres) and all new developed sites would be withdrawn from mineral entry and leased for fluid minerals with NSO stipulations, closed to disposal of mineral materials, timber cutting, and livestock grazing, excluded from major ROW/ corridor development, and retained in public ownership	Same as Alternative A	Same as Alternative A	Same as Alternative A
		Retain under BLM-administration or through partnerships 235,311 acres/36%		Manage 235,311 acres/36% by BLM or through partnerships
National recreation areas	Continue to manage109,000 acreas/17% as SRMA (5,000 acres of this is managed jointly with DPOR)	Same as Alternative A	Recommend 125,000 acres/19% in Arkansas River corridor for NRA	Same as Alternative C

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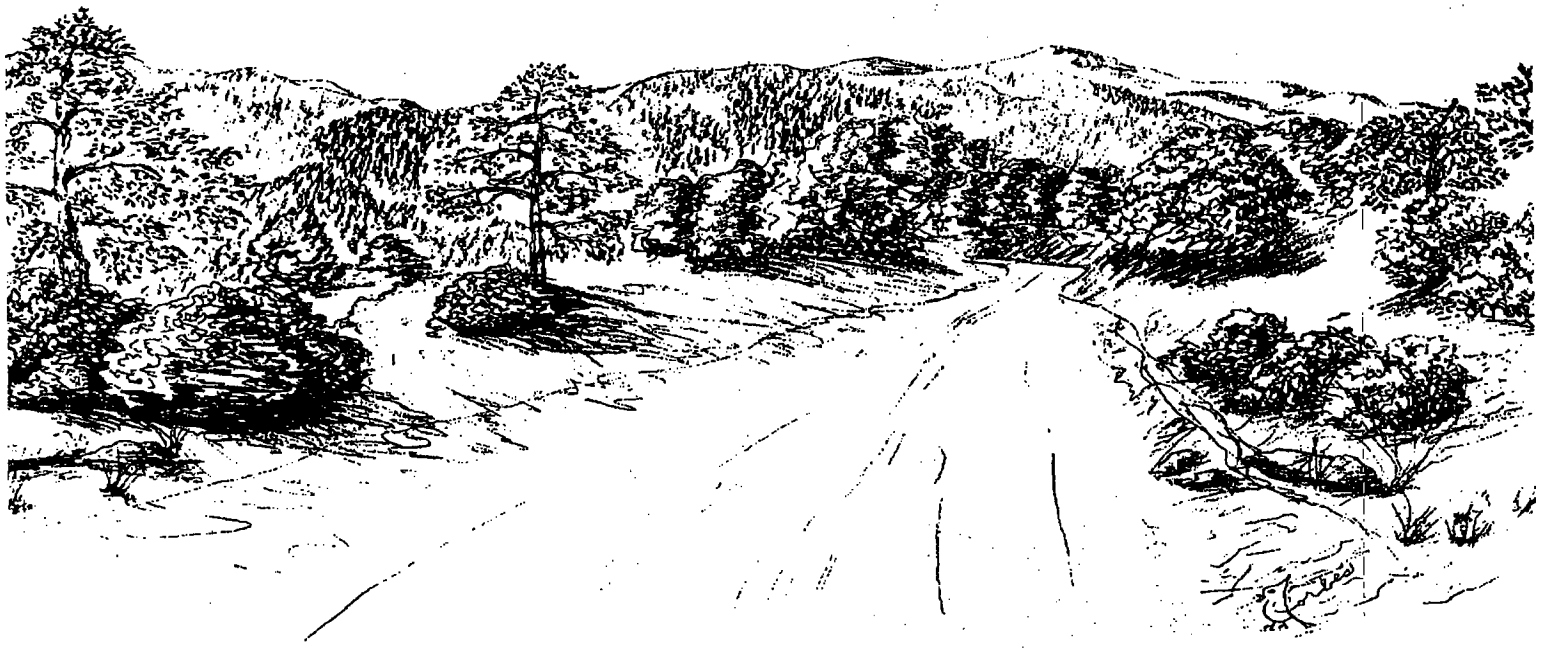
CHAPTER 1
INTRODUCTION



CHAPTER 1 INTRODUCTION

This document consists of a draft resource management plan (RMP) and a draft environmental impact statement (EIS) analyzing the effects of the management actions and alternatives within the plan. The draft RMP/EIS has been prepared in accordance with Bureau of Land Management (BLM) planning regulations (43 CFR 1600) and the National Environmental Policy Act (NEPA) of 1969 (40 CFR 1500).

PURPOSE AND NEED

The primary purpose of this RMP/EIS is to update and integrate BLM land use planning for the Royal Gorge Resource Area (RGRA) into a single, comprehensive land use plan. This will provide the overall framework for managing and allocating public land resources and uses in the Royal Gorge Planning Area over the next 15 to 20 years. This draft RMP/EIS analyzes four alternatives; the Existing (No Action) Alternative, the Resource Conservation Alternative, the Resource Utilization Alternative, and the Preferred Alternative.

The approved RMP will meet the BLM statutory requirement for a master land use plan as mandated by Section 202 of the Federal Land Policy and Management Act (FLPMA) of 1976 and the requirements of the Wild and Scenic River Act (16 U.S.C. 1271). The approved RMP will update and supersede all three existing land use planning documents and all amendments in the RGRA: the 1978 Raton Basin Management Framework Plans (MFP), the 1981 Royal Gorge MFP, and the 1985 Eastern Plains Planning Analysis. The MFP decisions are re-analyzed in the Existing Management Alternative in chapters 3 and 4.

This RMP was initiated as a result of the plan monitoring process. In July 1987, an MFP/PA Monitoring Report was completed. The report basically stated that from a consistency, conformity, policy, and workable standpoint, the resource area is in need of more effective planning documentation. Either a major comprehensive plan amendment of all three plans or a new RMP needed to be completed. This latter process was chosen.

PLANNING AREA LOCATION

The Royal Gorge Resource Area (RGRA) of the Cañon City District encompasses approximately 688,725 acres of BLM-administered surface estate land in the eastern part of Colorado (see Map 1-1). The resource area is approximately 320 miles long and about 250 miles wide extending from the Continental Divide on the west to the Wyoming and Nebraska on the north, to the Kansas border on the east, and to the Oklahoma and New Mexico borders on the south. There are approximately 2,915,000 acres of subsurface mineral estate administered by BLM in the resource area.

The Northeast Resource Management Plan (NERMP) completed in September 1986 includes the approximate northern half of the RGRA. The document provides land use decisions for approximately 35,275 surface acres and 615,000 subsurface acres, and this portion of the RGRA is not covered in the Royal Gorge RMP.

The Royal Gorge Planning Area (RGPA) consists of the southern half of the RGRA and encompasses approximately 653,000 surface acres and 2.3 million subsurface acres (see Maps 1-2 and 1-3). The larger exclusions shown on these maps include other Federal lands, which are covered in their land use plans; i.e., U.S. Forest Service, U.S. Army, National Park Service, etc.

PLANNING PROCESS DESCRIPTION

Planning Process

The planning process for this RMP/EIS began in September 1989. During this process, planning issues (consisting of issues and management concerns) and planning criteria were identified. These criteria have been and will continue to be addressed throughout development of all nine steps of the plan. These steps are summarized in Figure 1-1.

Planning Schedule

The planning schedule, which will conclude in 1993 with completion of the approved resource management plan/ record of decision (RMP/ROD) and the beginning of the plan implementation process, follows:

October 1, 1993

Draft RMP/EIS mailed out to public, placed in selected libraries, and sent to various BLM offices.

October 8, 1993

EPA/BLM publishes FR Notice and the 90-day public review period begins.

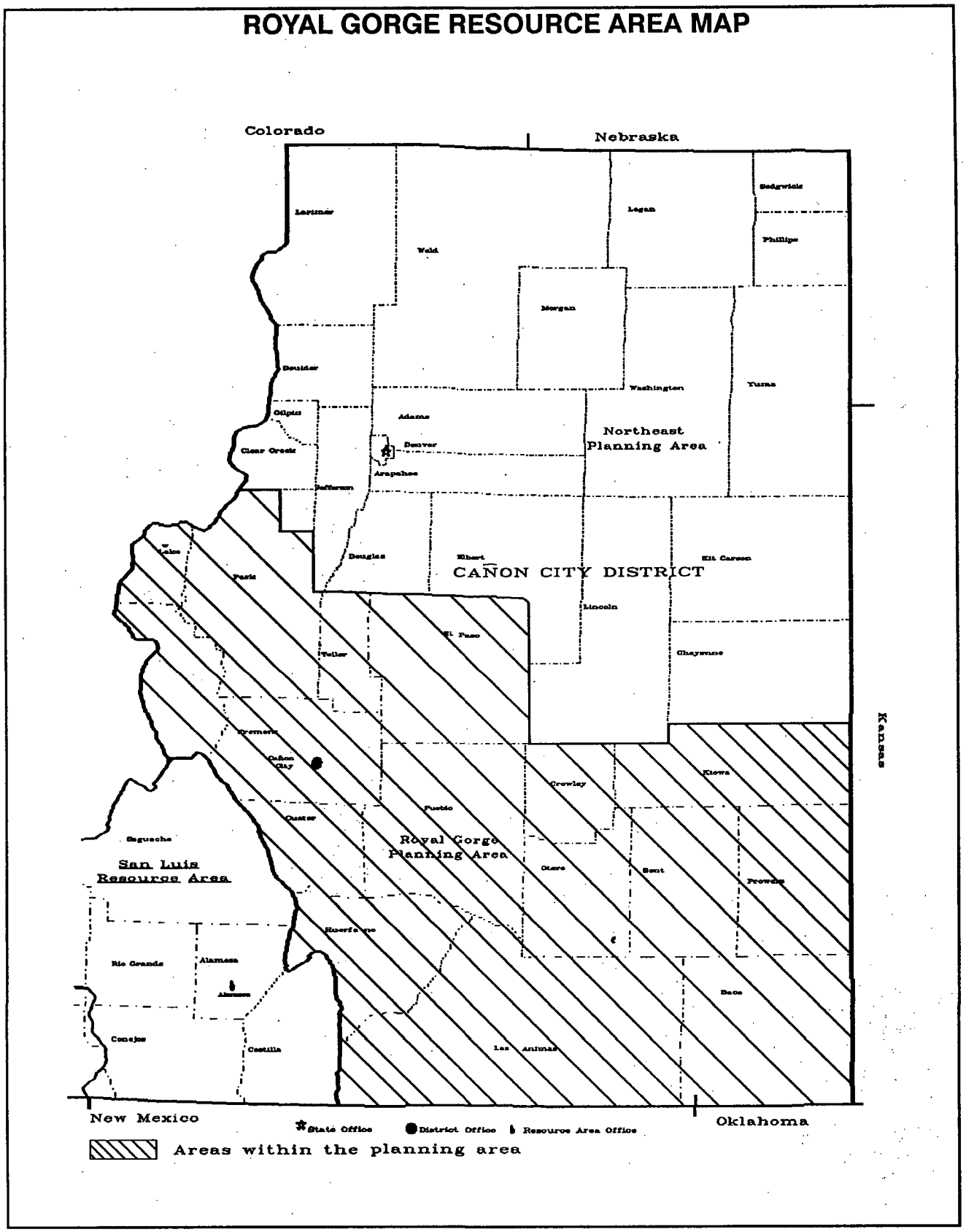
November 1, 2, and 3, 1993

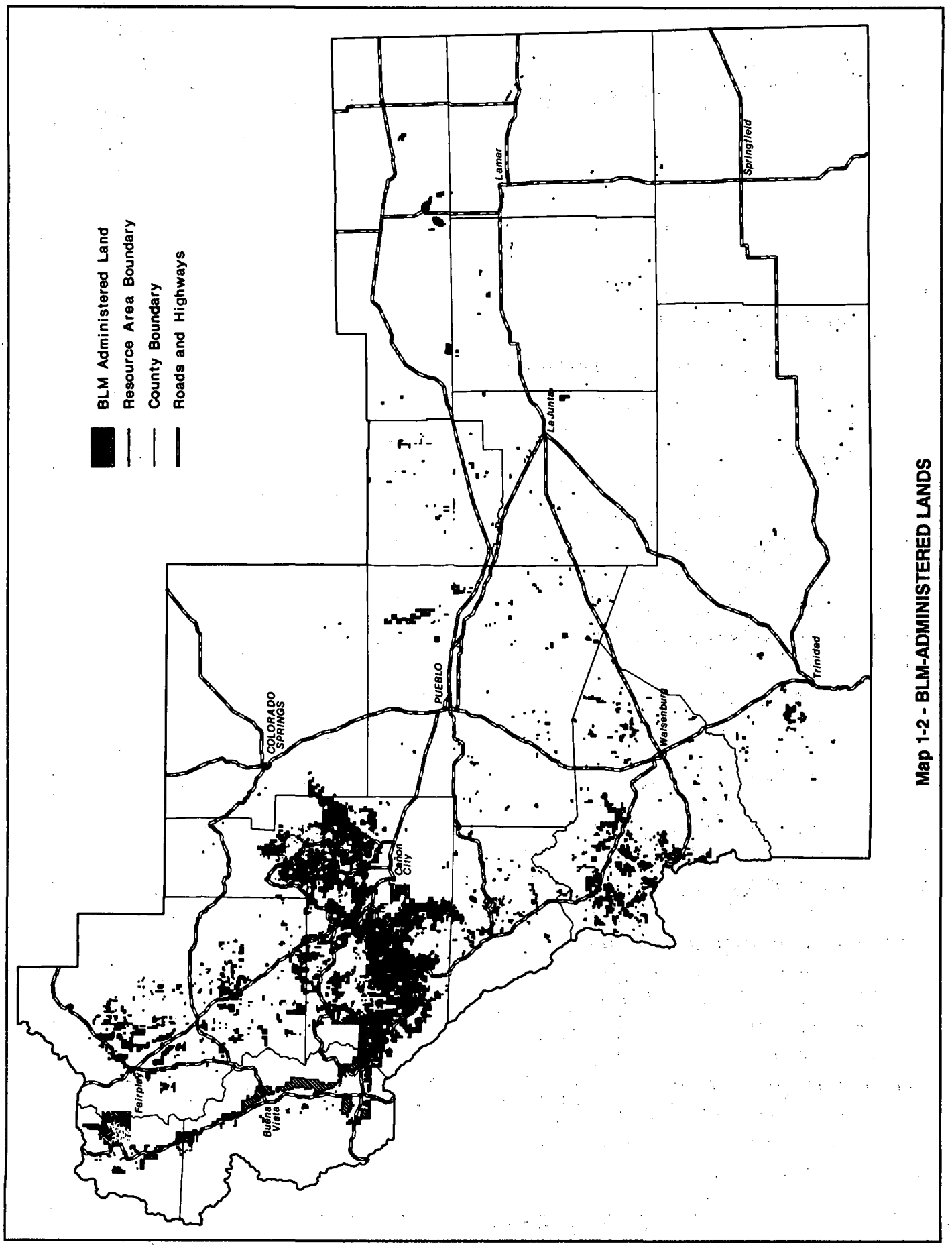
Public hearings in Denver, Buena Vista, and Cañon City.

January 10, 19934

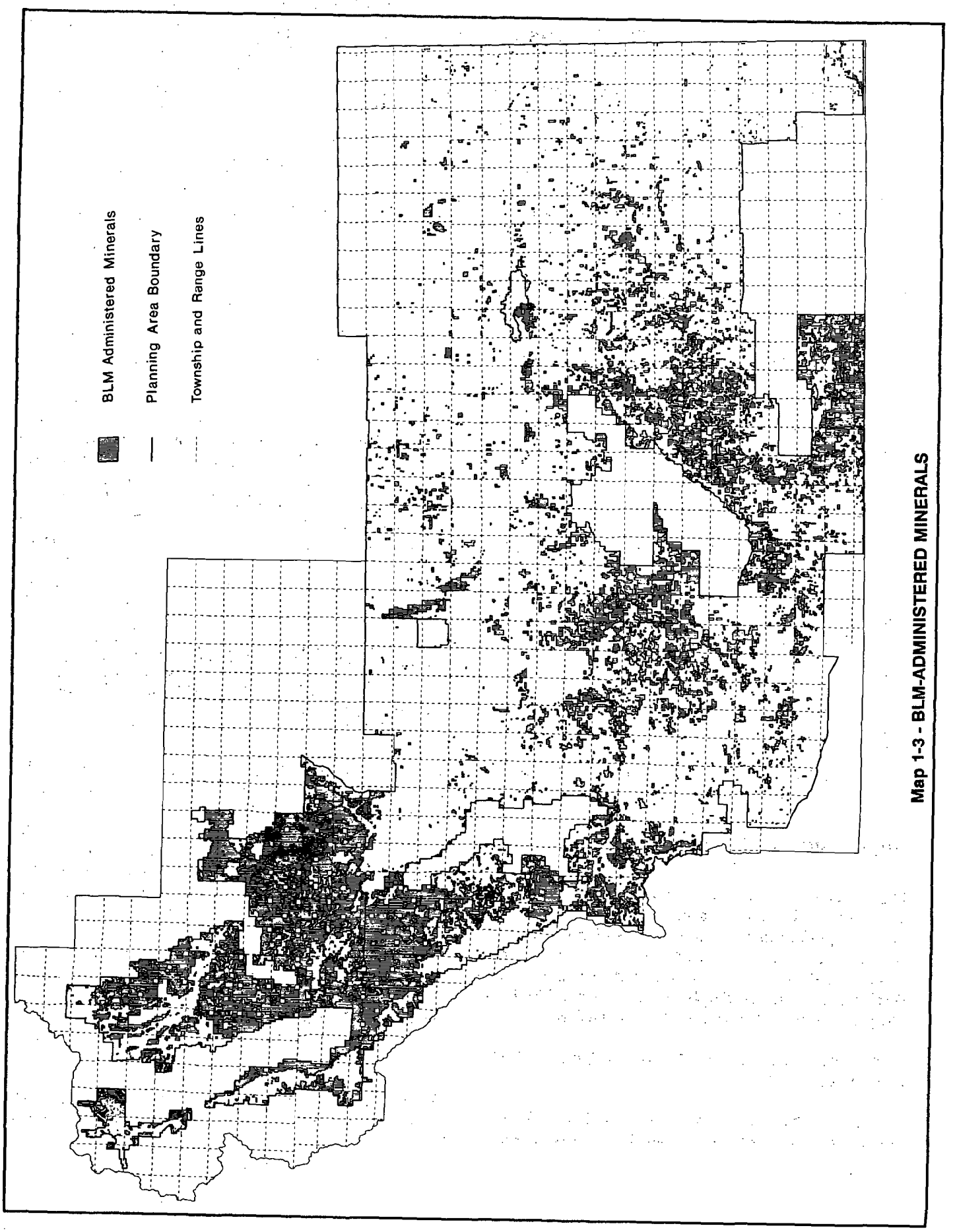
End 90-day public comment period.

Map 1-1


ROYAL GORGE RESOURCE AREA MAP
Colorado
Nebraska
Kansas
New Mexico
Oklahoma
Larimer
Weld
Logan
Sedgwick
Phillips
Morgan
Boulder
Washington
Yuma
Gilpin
Adams
Clear Creek
Denver
Arapahoe
Northeast
Planning Area
Jefferson
Douglas
Elbert
Lake
Park
CAÑON CITY DISTRICT
Kit Carson
Lincoln
El Paso
Teller
Cheyenne
Fremont
Cañon City
Custer
Pueblo
Crowley
Kiowa
Huerfano
Otero
Bent
Prowers
Las Animas
Baca
Costilla
Conejos
Alamosa
Rio Grande
Saguache
San Luis
Resource Area
Royal Gorge
Planning Area
State Office
District Office
Resource Area Office
Areas within the planning area



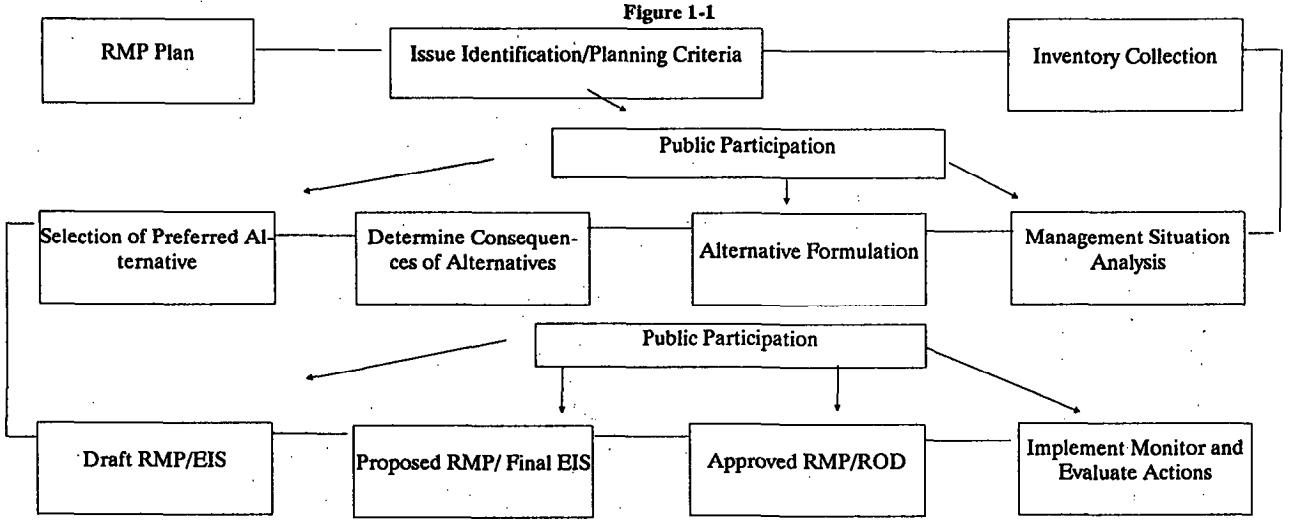
Map 1-2 - BLM-ADMINISTERED LANDS



Map 1-3 - BLM-ADMINISTERED MINERALS

BLM Resource Management Planning Process

Figure 1-1



April 29, 1994

Proposed RMP/Final EIS mailed out to public.

May 9, 1994

EPA/BLM publishes FR Notice and 30-day public protest period begins.

June 10, 1994

End 30-day public protest period.

June 27, 1994

End Governor's consistency review period.

August 12, 1994

Approved RMP/ROD mailed out to public and plan implementation begins.

Implementation of the Plan

Implementation will begin when the plan is approved and the record of decision is signed. This implementation will be accomplished as described in the Colorado Resource Management Plan User's Handbook completed in June 1986; the Cañon City District Plan Implementation System, developed in June 1991; and BLM Manual Section 1617/H-1617-1, Using the Resource Management Plan - Interim Guidance.

Implementaion of the RMP will be monitored, and the plan will be evaluated periodically.

During implementation of the plan, if any additional project analysis is needed, environmental documentation will be prepared. This can vary from a simple statement of conformance to the approved RMP/ROD to full use of the EA handbook outline. An EA is the document showing NEPA compliance of a site-specific action, including the record of decision. The amount of involvement, detail, and outline used depends on the resulting impacts of the action on the site-specific environment. If necessary, plan amendments will be prepared to update the approved RMP before implementation of the site-specific action.

ISSUES AND MANAGEMENT CONCERNS ADDRESSED IN THE PLAN

This plan defines and addresses the issues identified by BLM, other agencies, and the public. Issues and management concerns addressed in this plan were refined and presented to the public for comments. After comments were received, the issues/concerns were again refined and finalized, and planning criteria were developed for each one (details are in Appendix A). These issues/concerns were separated into two categories and are defined as:

Significant Managment Issues--topics that have conflict and will likely change in one or more of the plan alternatives.

Important Management Concerns--topics that may or may not have conflict or may or may not change in the plan alternatives.

These Significant Management Issues and Important Management Concerns are summarized in Tables 1-1 and 1-2.

TABLE 1-1
Summary of Significant Management Issues

Issue	Management Action
Land Ownership Adjustments	Identify lands suitable for acquisition or disposal
Land Access Acquisitions and Transportation Management	Provide access to BLM-administered lands for public and administrative purposes to improve utilization of the lands and resources
ACEC Designations	Consider special management designations for unique areas with special values
Wild and Scenic River Designations	Consider special designation of rivers/streams meeting elgibility/suitability criteria
National Conservation/National Recreation Area Designation	Consider special congressional designation for Arkansas River Corridor
Off-Highway Vehicle Use	Designate BLM-administered lands open, closed, or limited to OHV use.
BLM Lands and Regional Tourism	Provide for management to enhance/compliment regional tourism

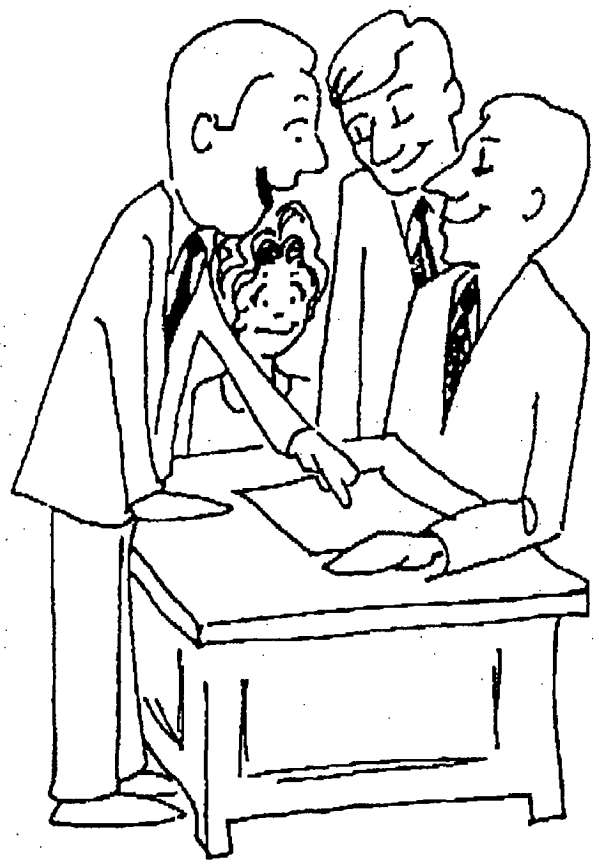


TABLE 1-2
Summary of Important Management Concerns

Concern	Description
Fluid Minerals Management	Identify fluid mineral potential and determine development and location.
Locatable Minerals Management	Identify development potential, areas to be closed, and discretionary/nondiscretionary closures.
Mineral Materials Management	Identify moderate and high development potential, areas to be open and closed, and discretionary/nondiscretionary closures.
Coal Minerals Management	Identify values and areas acceptable with and without stipulations and unacceptable, apply 20 unsuitability criteria to determine new tracts to be leased, identify other values to be considered in addition to unsuitability criteria, consult qualified surface owners regarding potential leasing of Federal minerals under their surface estate, meet consultation requirements with other agencies.
Recreation Management	Determine location and level of recreation sites/areas on BLM-administered lands, determine significance of these sites, analyze *Recreation 2000* goals as they relate to achievement through the RMP
Waterpower/Reservoir Resources	Determine the three categories of waterpower/reservoir potential (lands suitable for intensive management, lands suitable for restricted management, and lands unsuitable for management); categorize currently withdrawn sites as lands recommended for continuation of withdrawal or lands not recommended for continuation of withdrawal; prescribe management directions for sites (restricted or excluded development or activities, preferred or permitted activities, etc.).
Water Rights	Establish relationship, in conformance with state water laws, between water availability and demand based on existing and projected water uses.
Water Quality	Establish relationship between surface water quality and existing BLM management, identify opportunities to modify management to improve surface water quality.
Sensitive Soils	Identify areas vulnerable to degradation because of soil types related to Pikes Peak Granite.
Special Status Plant/Community Species Management	Inventory and designate BLM-administered lands with critical habitat; specify management to ensure long-term survival of these species/communities; determine special management options needed for management of these species/communities; consider cause and effect relationships between these plants/communities and other BLM resources/uses.
Special Status Animal Species Management	Inventory and designate BLM-administered lands with these species; specify management to ensure the long-term survival of these species; determine special management options needed for these species; consider cause and effect relationships between these species and other BLM resources/uses.
Historical Resources	Determine location, density, and diversity of historical areas/sites on BLM-administered lands; determine significance of the areas/sites regarding eligibility for listing on the National Register of Historic Places; determine potential of historical resources to provide for public information, public use, and conservation; determine management direction to achieve specific cultural resources management objectives; identify sites/areas for special management.
Archaeological Resources	Determine location, density, and diversity of the areas/sites on BLM-administered lands; evaluate the areas/sites for nomination to the National Register of Historic Places; determine potential of the archaeological resources to provide evaluation of information potential, evaluation of public values, and evaluation for conservation.
Paleontological Resources	Identify location of paleontological areas on BLM-administered lands suitable for classification as category 1, 2, 3, or 4; identify class 1 areas requiring special management (i.e., Garden Park); determine management required to achieve paleontological resource objectives.
Economic Conditions and Social Environment	Determine specifics of the social/economic climate, including general demographics data; determine specific existing relationships to resources and resource uses on BLM-administered lands; analyze future public expectations for resources and resource uses on BLM-administered lands; determine costs of existing programs and alternative programs potentially applied to BLM-administered lands; analyze the cost/benefit relationships of BLM programs for the various alternative management options.

TABLE 1-2 (Continued)

Concern	Description
Air Quality	Identify air quality conditions; determine effect of other resources and uses on air quality.
Vegetation Management	Analyze current ecological condition and trend study data for changes in plant communities; consider conducting an ecological site inventory for baseline data on ecological status.
Noxious Weeds	Consider doing a noxious weed and poison plant inventory; consider cause and effect relationships in noxious weeds and poison plants management; consider use of integrated pest management for noxious and poison plants control.
Riparian Area Management	Determine location, conditions, trends, and potential of each riparian zone to be enhanced; use ecological site inventory method to inventory, maintain, and monitor riparian zones; describe a desired plant community for each zone to support the desired uses and prescribe management to attain the desired plant community.
Livestock Grazing Management	Identify allotments adjacent to private subdivisions and address potential boundary problems; conduct monitoring studies on areas with questionable grazing capacity estimates and coordinate planning with SCS on non-AMP allotments; clarify and develop policy regarding subdivided base property; use vegetation management status instead of range condition and consider cause and effect relationships in deciding whether or not to issue grazing permits on rangeland with unacceptable vegetation management status.
Fishery and Wildlife Habitat Management	Consider specific goals and objectives outlined in BLM *Fish and Wildlife 2000* during planning process; consider public and special interest group input and requests for fish and wildlife management; manage habitat to maximize production if appropriate and in conformance with DOW strategic plan.
Forest and Woodland Management	Identify BLM-administered lands with timber or woodlands cover type; identify lands available and suitable for sustained production of timber, firewood, or other forest products based on supply/demand, management needs, stand location, site potential, stand conditions, and other resource values; identify and evaluate practices based on stand conditions, silvicultural treatment options, and environmental conditions present; identify harvest level that can be environmentally, technically, and economically sustained.
Wilderness Management	Develop land use decisions for WSAs not recommended for designation or not designated by Congress.
Visual Resource Management	Identify visual resources by class and determine locations of classes; develop range of protection/enhancement prescriptions in various plan alternatives to meet VRM objectives; determine areas of outstanding scenic values for special management of protection to maintain integrity of resource.
Fire Management	Identify and analyze fire management areas for full suppression, least cost suppression, and prescribed fire applications; identify necessary restrictions to fire suppression practices.
Hazards Management	Identify and map manmade hazards on BLM-administered lands; determine needed mitigation measures and corresponding monitoring steps for these hazards; work cooperatively with Colorado Mined Land Reclamation Hazard Abatement Project on sites; consider disposal of parcels with manmade hazard areas.
Lands and Realty Management	Consider public lands with multiple compatible ROWs for corridor designation; use the 1986 Western Regional Corridor Study (WRCS) to consider designated corridors; identify ultility corridors to optimize economic efficiency of ROW management as balanced by environmental/social concerns, identify areas to avoid or exclude ROW issuance, and establish necessary mitigation when appropriate; consider technical, public safety, and national security concerns in designating corridors.
Withdrawals and Classifications	Identify and map all withdrawals and classifications; determine purpose of withdrawal and if original purpose is still being served; identify lands to be withdrawn and why; determine if lands are suitable to be returned to multiple use management.

RELATIONSHIP TO OTHER DOCUMENTS AND DECISIONS

Existing Planning and Environmental Documents

Three land use management plans currently covering the Royal Gorge Resource Area are the Royal Gorge MFP, the Raton Basin MFP, and the Eastern Plains Planning Analysis. The resource management plan for the Northeast Resource Area (NERA), now administered by the RGRA, will be used for management of resources in that area. These plans provide management direction for most activities and decisions needed for implementation. In addition to the MFPs, several major BLM EAs and EISs have been completed in the planning area for various program activities. These documents are listed in Table 1-3, and the management directions are also incorporated into the "Resource/ Value Analysis" section of this document. Most of the decisions in the Royal Gorge Grazing EIS are incorporated in this document (Appendix E). Decisions not carried forward are no longer valid. On completion of the approved RMP, the record of decison (ROD) will incorporate all these previous documents into the new plan. After completion of the ROD, any new program directions will be changed by a formal plan amendment.

TABLE 1-3
Existing Planning and Environmental Documents for Program Activities Within the Planning Area

Plan or EA/EIS Title	Program Activity
Royal Gorge Management Framework Plan	Overall plan for (Lake, Park, Teller, El Paso, Chaffee, Fremont, Custer, and part of Pueblo Counties) a portion of the BLM-administered lands in the RGRA
Raton Basin Management Framework Plan	Overall plan for (Las Animas and Huerfano Counties) a portion of BLM-administered lands in the RGRA
Final Arkansas River Recreation Management Plan and Environmental Analysis	Activity plan for recreation management within the Arkansas River corridor
Eastern Plains Planning Analysis	A specific plan relating to BLM-administered lands in southeastern Colorado
Royal Gorge Grazing EIS	Area-wide program (updated in July 1988) direction for grazing on BLM-administered lands in the RGRA
Cañon City District Wilderness EIS	District-wide EIS analyzing the potential of wilderness study areas as additions to the National Wilderness Preservation System
Cañon City District Forest Activity Plan and Programmatic EA 1988-1997	District-wide document analyzing the forest and woodland management
Royal Gorge Oil and Gas Umbrella Environmental Assessment	Area-wide document analyzing oil and gas development in the RGRA, which is replaced by this RMP/EIS.
Cañon City District Ten Year Forest Management Allowable Cut Plan	District-wide timber management planning material
Cañon City District Fire Management Plan	District-wide fire plan prescription
Sangre de Cristo Distribution Management Plan 1992-1997 (Habitat Partnership Program)	Establish habitat prescriptions for the area

Support Documents Prepared During the Planning Process

The following support documents either provide background information or focus on a particular resource relative to this planning effort. These are available for review in the Royal Gorge Resource Area and the Cañon City District Offices (see addresses in the cover letter of this draft RMP/EIS).

The management situation analysis (MSA) summarizes the existing inventory data for each of the resources present on BLM-administered lands. This in-house document provides most of the background information for this plan and can be reviewed in the Royal Gorge Resource Area office.

The Oil and Gas Geothermal Technical Report provides additional background information and data for these activities and more detailed analysis of the oil and gas/geothermal resources than is presented in this plan. The report includes information on the fluid mineral resources in the area and provides documentation on history and trends of oil and gas development within the planning area. More details are also in Appendix F.

The Raton Basin Coal Unsuitability Analysis Report provides additional background information and data for these potential activities and more detailed anlysis of the coal resources. The report includes information on the surface owner consultations in the coal basin and provides documentation on history, trends, methods, etc., of coal development within the basin. More details are also in Appendix H.

The Wild and Scenic River Study Report for the Royal Gorge Resource Area (Appendix K) provides the background information for analysis to determine the eligibility of the river segments analyzed in the planning area. The study report includes maps, photos, and other documentation on the assessment of the river corridor as it relates to the national criteria for a potential wild, scenic, or recreation river. It provides the basic information on how eligibility criteria were applied, how the classification analysis was accomplished, and how the suitability was determined. It includes summaries of the study process, the public interaction, names of the study team members, as well as any agreements reached specifying a BLM recommendation or nonrecommendation of segments for potential inclusion into the National Wild and Scenic River System.

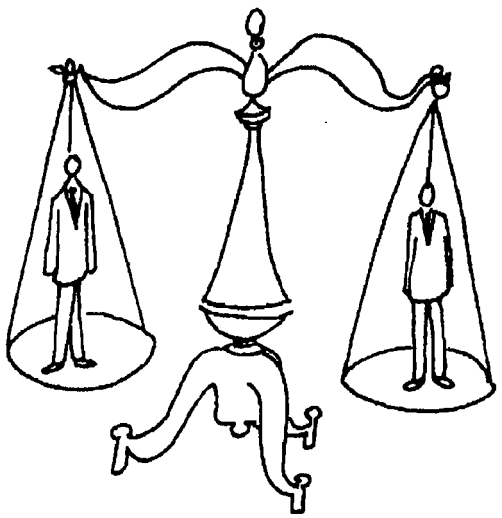
The environmental analysis required in the *Wild and Scenic Rivers Act* is included in this draft RMP/EIS. The affected environmental elements are analyzed in the draft EIS. All other elements and uses not affected by the wild and scenic river proposal are in Chapter 2 and Chapter 3. Also an analysis of how valid existing rights (i.e., mineral leases, waterpower/storage withdrawals, water rights) would or would not be affected by the proposal is included.

Other Related Documents

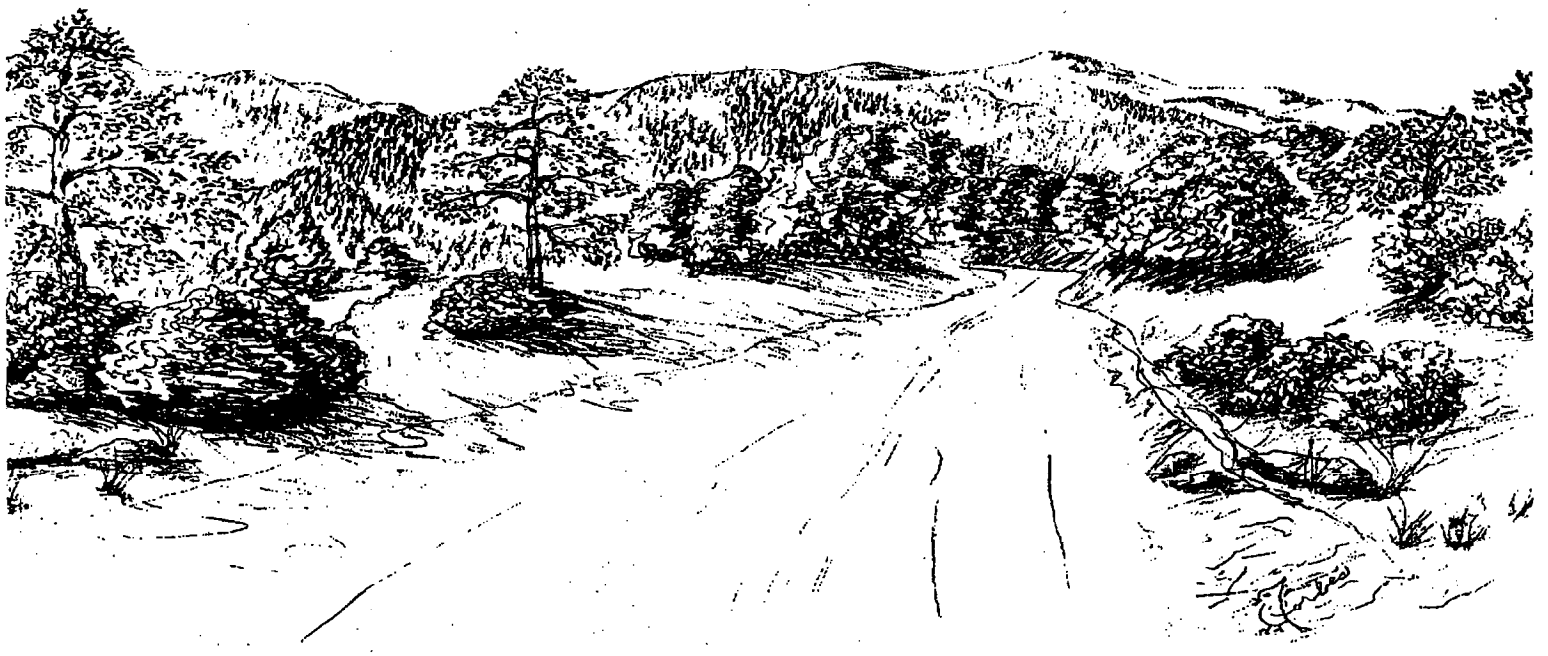
To reduce or eliminate conflict between BLM and other governmental agency land management or land use planning responsibilities in the Royal Gorge Planning Area, other agency documents have been closely reviewed and, where appropriate, information has been used in the preparation of this plan. In addition, land use plans for areas bordering BLM-administered land have also been reviewed and analyzed during the planning process to avoid conflicts in land management. These other related agency documents are described in Table 1-4.

TABLE 1-4
Other Related Documents

Agency	Type of Document	Title of Document
U.S. Forest Service	Resource management plan	Land and Resource Management Plan; Pike-San Isabel National Forest and plan amendments.
U.S. Forest Service	Oil and gas plan amendment	Fluid Minerals Management within the Pike-San Isabel National Forest and Commanche National Grasslands.
U.S. Forest Service	Regional plan	Rocky Mountain Region
U.S. National Park Service	Master and development plan	Bents Fort National Historic Site
U.S. National Park Service	Master and development plan	Florissant Fossil Beds National Monument Management Plan
U.S. Fish and Wildlife Service	Special concern plan	Endangered and Threatened Wildlife and Plants
Colorado State Forest Service	Directory	Colorado Forestry Forest Products Directory
Colorado StateDivision of Parks and Outdoor Recreation	Comprehensive plan	Colorado Statewide Comprehensive Outdoor Recreation Plan
Colorado Division of Wildlife	Wildlife plan	Colorado Strategic Plan
Upper Arkansas Regional Development Agency	Economic development plan	Overall Economic Development Plan
Pueblo Regional Council of Governments	Economoic development plan	Overall Development Plan
Lower ArkansasRegional DevelopmentAgency	Economic development plan	Overall Development Plan
BLM	Resource management Resource managment	San Luis Resource Area Management Plan Northeast Resource Area Plan
Western Utilities Group	Utilities planning	Corridor Plan
Colorado State Office-BLM	Resource management	Colorado Oil and Gas Leasing Final EIS/ROD
Various counties	Land use planning and zoning	County Plan, County Zoning Map



CHAPTER 2
AFFECTED ENVIRONMENT



CHAPTER 2

AFFECTED ENVIRONMENT

This chapter describes those physical, biological, social, and economic characteristics of the land, water, and air resources administered by the Bureau of Land Management (BLM), Royal Gorge Resource Area (RGRA), of the Cañon City District that affect, or are affected by, the issues and management concerns within this plan. Much of the material in this chapter summarizes information developed in the RGRMP Management Situation Analysis (MSA). This information is available for review in the resource area office in Cañon City. The Existing Management Situation Analysis, Resource Area Profile, and the Resource Capability Levels Analysis in the MSA are more complete, detailed discussions of the environment in the Royal Gore Resource Planning Area (RGRPA).

The purpose of this chapter is to serve as base line data for identifying and analyzing the impacts of the four alternatives in this plan. These alternatives are described in Chapter 3, and the effects of these alternatives on the environment are described in Chapter 4. The following material describes the 36 resources or resource uses affected by this plan within the planning area.

The overall BLM goal, in relation to ecosystem management and biological diversity, is to maintain and restore these for the benefit of various environmental, social, and economic needs. Managing BLM-administered lands under the new concepts of ecosystem management and biological diversity will be the principal requirement during the next 15- to 20-year lifespan of this land use plan. The two basic components of managing ecosystems in land use plans include:

Resource Management Plans (RMPs): Identify specific geographical reference areas (GRAs) that encompass all or parts of ecosystems. Incorporate within all land use planning decisions in those GRAs, in a comprehensive and reasonable manner, the principle that ensures ecosystem management and biological diversity goals are in place and are compatible with all future planned management activities on BLM-administered lands.

Integrated Activity Plans (IAPs): Establish coordinated efforts, partnerships, and cooperative relationships with adjacent landowners/managers to specifically affect the implementation of management solutions at the landscape level, which integrate human activities with conservation of the ecological system and provide for biological diversity.

Throughout this chapter, as well as in Chapter 3, are specific discussions of ecosystem management and biological diversity. These concepts are integrated, to the degree possible, into this land use plan.

CLIMATE

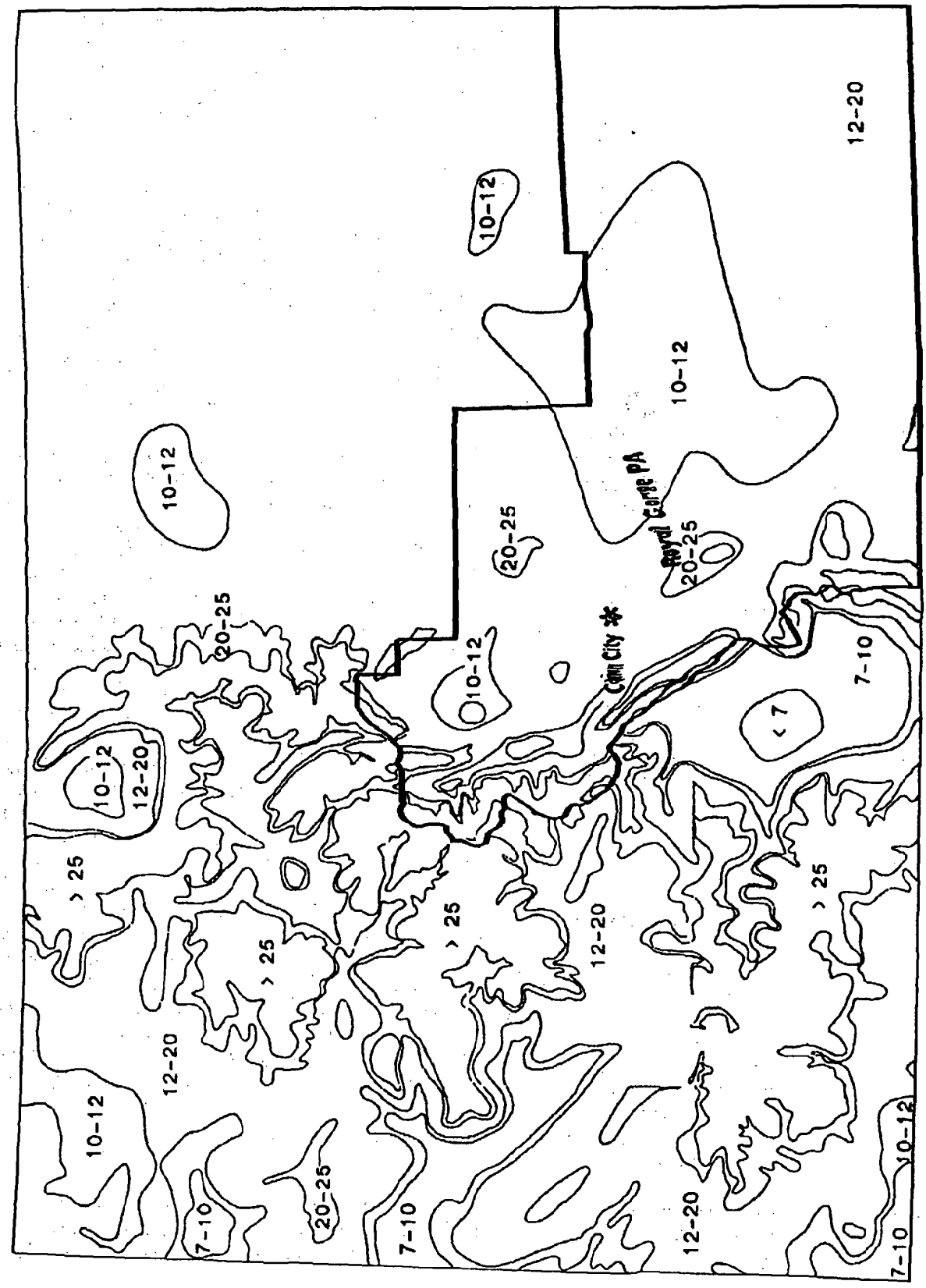
The RGPA is characterized by rugged mountainous/high valley terrain in the west and relatively flat high plains in the east. It consists of a typical continental climate with dry air, sunny days, clear nights, variable precipitation, moderate evaporation, and large daily temperature changes. Weather systems usually enter the region from the west and southwest, but because of the western mountains, occasional low pressure systems on the plains circulate gulf moisture from the east (upslope storms). Extremely frigid conditions and blizzards can occur throughout the planning area (usually because of continental arctic air masses), and tornadoes may occur on the plains; damaging floods occur.

The complex topography of the region causes considerable variation in site-specific temperature, precipitation, and surface winds. Because of this diversity, prolonged onsite monitoring is necessary to specify local conditions (especially in the mountainous areas). (Table B-1 in Appendix B summarizes monitored values for temperature, precipitation and frost-free periods). The following description represents the range of the climatic conditions throughout the planning area.

Temperatures (in degrees Fahrenheit) vary mostly with elevation, and to a lesser extent, local micro-climate. Summer temperatures usually range from lows in the upper 40s to highs in the 80s (mountains), and lower 60s to 90s (foothills and plains). In winter, cold air may sink down along mountains, filling the valleys. Winter temperatures typically range from around 10 degrees to the 40s each day in the mountains and eastern plains, and lower 20s to nearly 50 degrees in the foothills. Extreme temperatures have been as low as -55 degrees (Sugarloaf Reservoir/Turquoise Lake in 1962) and as high as 110 degrees (three locations including Eads in 1963). In the mountains, freezing temperatures are possible throughout the year, with snow accumulation likely from September to May. At lower elevations, freezing temperatures and snow accumulation are likely from October to April.

Annual precipitation (Map 2-1) is highly variable, primarily because of the orographic (mountain-related) effect of the Rocky Mountains. Annual precipitation ranges from less than 10 inches around Antero Reservoir to over 40 inches in the Spanish Peaks; most of the resource area averages 10 to 20 inches per year. Except for areas with high snowpack,

Map 2-1
ANNUAL PRECIPITATION - COLORADO
(inches)



most precipitation comes from late spring and summer thunderstorms. Snowfall amounts vary from around 25 inches on the plains and 40 inches along the foothills, to 118 inches at Leadville. Mountainous areas typically accumulate from 30 to 60 inches of snowpack.

Upper-level winds prevail from the southwest, but the varying groundcover, diverse terrain, and upslope conditions cause complex surface wind patterns. Persistent winds with little directional modification occur on the plains, but winds in valleys show strong drainage influences. Synoptic (pressure gradient) winds may be channeled or forced around hills, but without strong gradient flows daily upslope/downslope winds are predominant. Upslope winds usually occur on sunny mornings when the air at higher elevations heats rapidly and rises. Downslope winds occur when the air near the ground cools, becomes dense, and sinks along the drainage. Similar light winds will occur during the day along the Arkansas River.

The extent vertical and horizontal mixing takes place is related to the atmospheric stability and mixing depth. Unstable conditions normally result from strong surface heating, typical of summer afternoons, producing vertical winds. Neutral conditions reflect a breezy, well-mixed atmosphere. Stable conditions are enhanced by rapid radiative cooling and downslope drainage, producing the least amount of dispersion.

Because of the complex terrain, dispersion conditions vary throughout the resource area; however, dispersion is normally limited in the fall and winter. Inversions are formed under stable conditions, trapping pollutants within a layer of air. Moderate summer inversions are typical during the evening and dissipate at dawn. Winter inversions are stronger and last longer. Inversions are common in mountain valleys, and are enhanced by weak pressure gradients, cold clear nights, snow cover, and lower elevations. Seasonal stability data are presented in Appendix B, Table B-2.

AIR QUALITY

Air quality characteristics vary considerably throughout the planning area, and are routinely monitored only in towns and cities along the Front Range; therefore, the existing air quality can only be presumed. Air quality in the planning area, however, is believed to be typical of undeveloped regions in the western United States; ambient pollutant levels are usually near or below the measurable limits. Notable exceptions include high, short-term concentrations of total suspended particulates (primarily wind blown dust), inhalable particulates (primarily wood smoke), ozone and carbon monoxide, especially in nearby towns. Locations vulnerable to decreasing air quality from extensive development include the immediate operation areas (milling operations, powerplants, etc.), and local population centers (farm tilling, residential woodsmoke, etc.)

Air Quality Regulations

National ambient air quality standards (Appendix B, Table B-3) limit the total amounts of specific pollutants allowed in the atmosphere; carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, sulfur dioxide (SO_2), and particulate matter (total suspended particulates-TSP, and inhalable particulates-PM_{10}). State standards include these parameters, but may also be more stringent (i.e., Colorado 3-hour SO_2 standard). These standards were established to protect public health (primary standards) and public welfare (secondary standards).

For many years, the particulate matter standard included all size ranges of particulates (thus TSP). Measured values were dominated by fugitive (wind blown) dust particles, which are larger than those produced in combustion processes, settle relatively quickly, and present a minimal health threat. The Environmental Protection Agency (EPA) has recognized these limitations by setting new standards for particulates less than 10 microns in diameter, commonly called inhalable particulates and abbreviated PM_{10}. The TSP standards may be phased out over time.

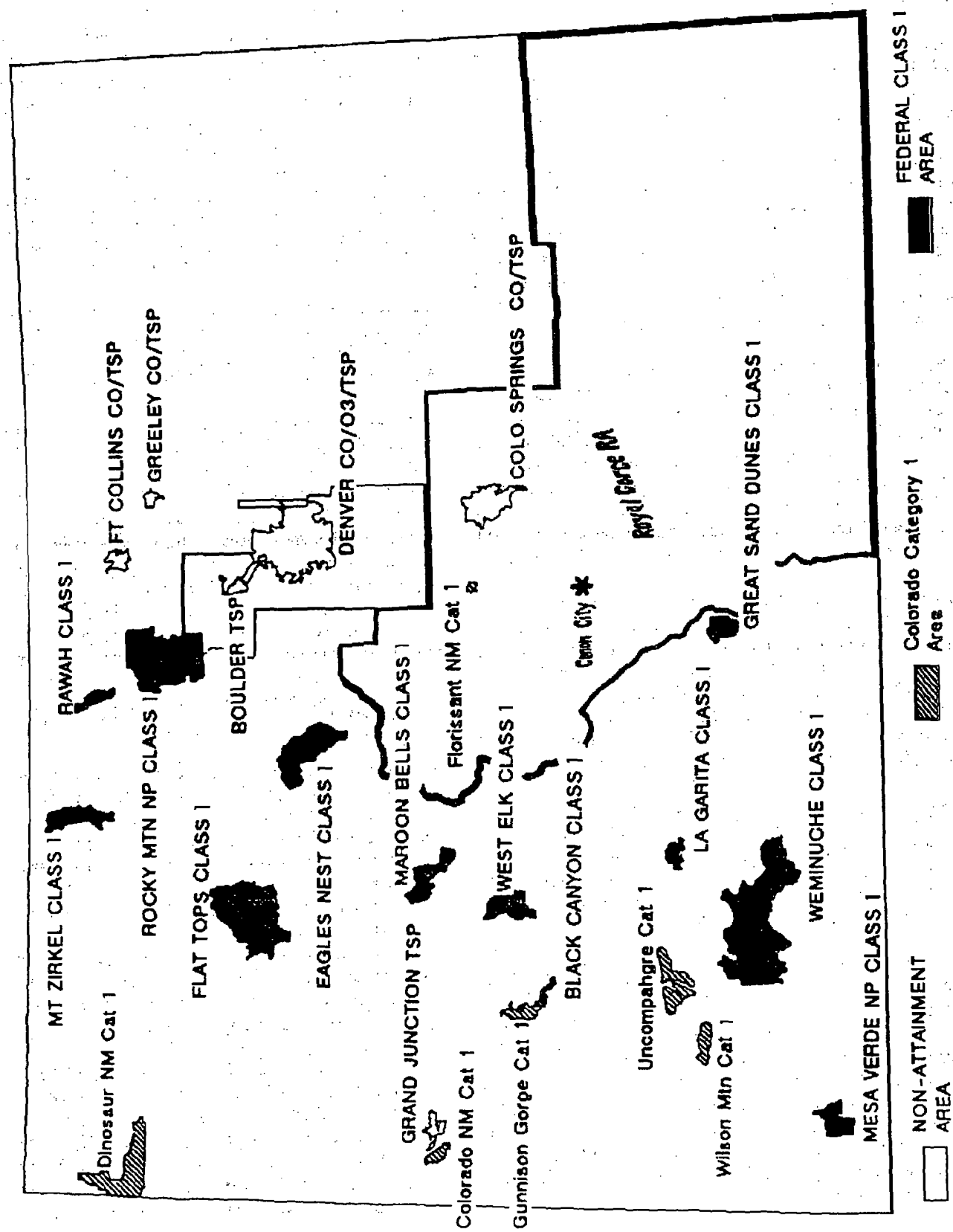
Areas that consistently violate minimum Federal standards because of man-caused activities are classified as "nonattainment" areas, and must implement a plan to reduce ambient levels below the maximum pollution standards. Under the EPA "Fugitive Dust Policy," areas that violate the TSP Ambient Air Quality Standards, but lack any significant industrial particulate sources and have a population less than 25,000, are designated as "unclassified" (i.e., neither "attainment" nor "nonattainment"). "Unclassified" areas are generally exempt from following the offset provisions, retrofit controls, and new source control requirements established for "nonattainment" areas by the *Clean Air Act*.

To protect areas not classified as "nonattainment," Congress established a system for the prevention of significant deterioration (PSD) through the *Clean Air Act Amendments* of 1977. Areas were classified by the additional amounts of TSP and SO_2 degradation that would be allowed. PSD Class I areas, predominately national parks and certain wilderness areas, have the greatest limitations; virtually any degradation would be significant. Areas where moderate, controlled growth can take place were designated as PSD Class II. PSD Class III areas are those areas that allow the greatest degree of impacts. Colorado established a similar program limiting additional amounts of SO_2; Colorado lands are classified Category I, Category II, and Category III (corresponding to greater permissible levels of SO_2).

Existing Air Quality

Most of the planning area is either "attainment" or "unclassified" for all pollutants, and is, therefore, designated PSD Class II (Map 2-2). "Nonattainment" areas have been identified for

MAP 2-2
Special Status Air Quality Areas



Colorado Springs (carbon monoxide and total suspended particulates), Cañon City (inhalable particulates) and Lamar (inhalable particulates). Colorado Springs has also established a monitoring program to determine if the inhalable particulates standards are consistently violated. Although there are no PSD Class I areas located in the planning area, Florissant Fossil Beds National Monument is a PSD Class II/Colorado Category I Area. In addition, the Great Sand Dunes Wilderness PSD Class I/Colorado Category I Area could be influenced by activities in the planning area.

Although there are few monitoring stations in the planning area, rural levels are estimated to be low and within standards. Particulate matter concentrations are expected to be higher near towns because of local combustion sources (PM_{10}) and unpaved roads (TSP); significant regional TSP levels are probably due to fugitive dust (primarily wind blown). Historic average and extreme particulate concentration data are presented in Appendix B, Table B-4.

Ozone levels in the Rocky Mountain west are relatively high but of unknown origin. Elevated rural concentrations may be a result of long-range transport from urban areas, subsidence of stratospheric ozone, or because of photochemical reactions with natural hydrocarbons. The true reason for elevated ozone values is uncertain, however. Occasional peak concentrations of CO and SO_2 may occur in the immediate vicinity of combustion equipment. Historic average and extreme gaseous pollutant concentration data are presented in Appendix B, Table B-5.

PSD Class I regulations also address the potential for impacts to air quality related values (AQRVs). These AQRVs include visibility, odors, and impacts to flora, fauna, soils, water, geologic, and cultural structures. A possible source of impact to AQRVs is acid precipitation. Visibility or atmospheric deposition data are currently collected in very few locations; Tables B-6 and B-7 in Appendix B summarize visibility and atmospheric deposition data collected throughout the region.

Visibility impacts can occur from atmospheric increases in small, light-scattering particles or increases in light absorbing gasses (typically NO_2). Mechanisms of acid precipitation formation are currently under study, but results have correlated ambient sulfuric and nitric acids with combustion by-products (sulfates and nitrates).

In summary, annual average concentrations (micrograms per cubic meter) in rural regions of the planning area range as follows: TSP - 10 to 35; SO_2 - 2 to 13, and NO_2 - 2 to 20. Twenty-four hour average values range: TSP - 65 to 110, and SO_2 - 5 to 60. One-hour average concentrations of ozone and CO range from 125 to 170, and 2,300 to 4,600 (respectively). Average lead concentrations are less than 0.05 quarterly. Developed areas have nearly the same values with the following exceptions: TSP - 55 to 95 annually and 110 to 235 for highest 24 hours, NO_2 - 20 to 40 annually, and 1-hour CO values may reach 4,600 to 28,600.

In general, all Bureau initiated or approved activities must comply with applicable Federal, state, and local air quality regulations. Specific areas have been identified that require special air quality protection (e.g., nonattainment, PSD Class I, and Colorado Category I areas). Site-specific project plans for proposals affecting BLM-administered and adjacent lands are assessed for compliance with existing laws and policies protecting these areas. Mitigation may be incorporated into project proposals when necessary to reduce potential impacts (i.e., compliance monitoring).

For example, prescribed burns must comply with BLM Manual Section 7723 - Air Quality Maintenance Requirements to minimize air quality impacts from resulting particulates (smoke). This procedure requires obtaining an approved open burning permit from the state prior to implementation.

Support is provided as needed by the Colorado State Office Air Resource Specialist, the Colorado Department of Health - Air Pollution Control Division, the U.S. Environmental Protection Agency - Region VIII, and the U.S. Forest Service - Region 2.

The "demand" for air quality is reflected in the degree of protection required (Federal and state air quality standards) and possible special local ordinances (i.e., wood burning restrictions). The "supply" of air quality varies with the amount of pollution Continued urbanization would likely lead to increased carbon monoxide, nitrogen dioxide, and particulate concentrations. Maintenance of good air quality is important to public health (both mental and physical), and welfare (local tourism economics, aesthetics, etc.), but industrial growth and expanding populations degrade the air resource. These concerns would be minimized through compliance with air quality.

WILDERNESS MANAGEMENT

Section 603(2) of the *Federal Land Policy Management Act* (FLPMA) directs the Secretary of the Interior and the Bureau of Land Management (BLM) to inventory lands under BLM jurisdiction and identify those with wilderness characteristics. Based on an evaluation of wilderness and other resource uses/values in each area determined to contain wilderness characteristics, the Secretary of the Interior reported his recommendations to the President, in January 1992, on whether or not areas should be designated wilderness. The President must report his final recommendations to Congress within 2 years. Congress will decide whether or not any of the areas are to be designated wilderness.

Wilderness study areas (WSAs) within the Royal Gorge Planning Area (RGPA) have been inventoried and identified under FLPMA, Sec. 603(2). (Table 2-1 and Map 2-3). A final environmental impact statement (EIS) was prepared by the BLM Cañon City District Office (CCDO) and signed by the state director (December 1987). This FEIS analyzes and describes the environmental, social, and economic effects of

designating or not designating as wilderness five WSAs in the RGRA.

All WSAs have outstanding opportunities for solitude, primitive, and unconfined recreation, including backpacking, hiking, camping, photography, hunting, viewing, and other back-country activities.

TABLE 2-1
WSAs in the Royal Gorge Planning Area

Unit	Name	Acres
CO-050-002	Browns Canyon	6,614
CO-050-016	Beaver Creek	26,150
CO-050-013	McIntyre Hills	16,800
CO-050-014	Lower Grape Creek	11,220
CO-050-017	Upper Grape Creek	10,200
Total		70,984

All wilderness characteristics identified and inventoried during the inventory phase (1978 through 1980) remain intact and stable. WSAs are monitored through ground and aerial observation to ensure wilderness characteristics are not degraded to the extent that would affect eligibility for wilderness designation. Some off-highway vehicle (OHV) use continues to occur on existing ways and trails within two of the five WSAs. This use appears to have remained constant with the majority occurring during the big game hunting season.

In accordance with Sec. 603(2) of the *Federal Land Policy and Management Act*, BLM is required to manage all lands under wilderness review so as not to impair suitability for wilderness designation. Specific guidance for interim management is provided in the BLM *Interim Management Policy and Guidelines for Lands Under Wilderness Review.*

Under the interim management guidance, a proposed activity in a WSA must meet three requirements before it is approved. The activity must (1) be temporary, (2) not cause an impact that will be substantially noticeable following reclamation, and (3) not impair the suitability of WSAs for wilderness designation. Under the interim management guidance, however, a proposed activity with valid rights does not have to meet the above three requirements. Activities with valid existing rights may impair wilderness characteristics in a WSA provided there is no unnecessary and undue degradation. Restrictions placed on activities having valid existing rights must not unreasonably interfere with the enjoyment or the benefit of the right. Valid existing rights such as mining claims, mineral leases, and right-of-way authorizations granted prior to October 21, 1976, the date of the passage of FLPMA would be allowed to continue.

Management of the WSAs will continue under the current *Interim Management Policy and Guidelines for Lands Under Wilderness Review* until Congress releases the area from further wilderness consideration.

SENSITIVE SOILS

Over 100 different soil types are in the Royal Gorge Planning Area (RGPA), which reflect a complex variety of geologic parent materials, climatic regimes, topographic positions, and vegetative cover.

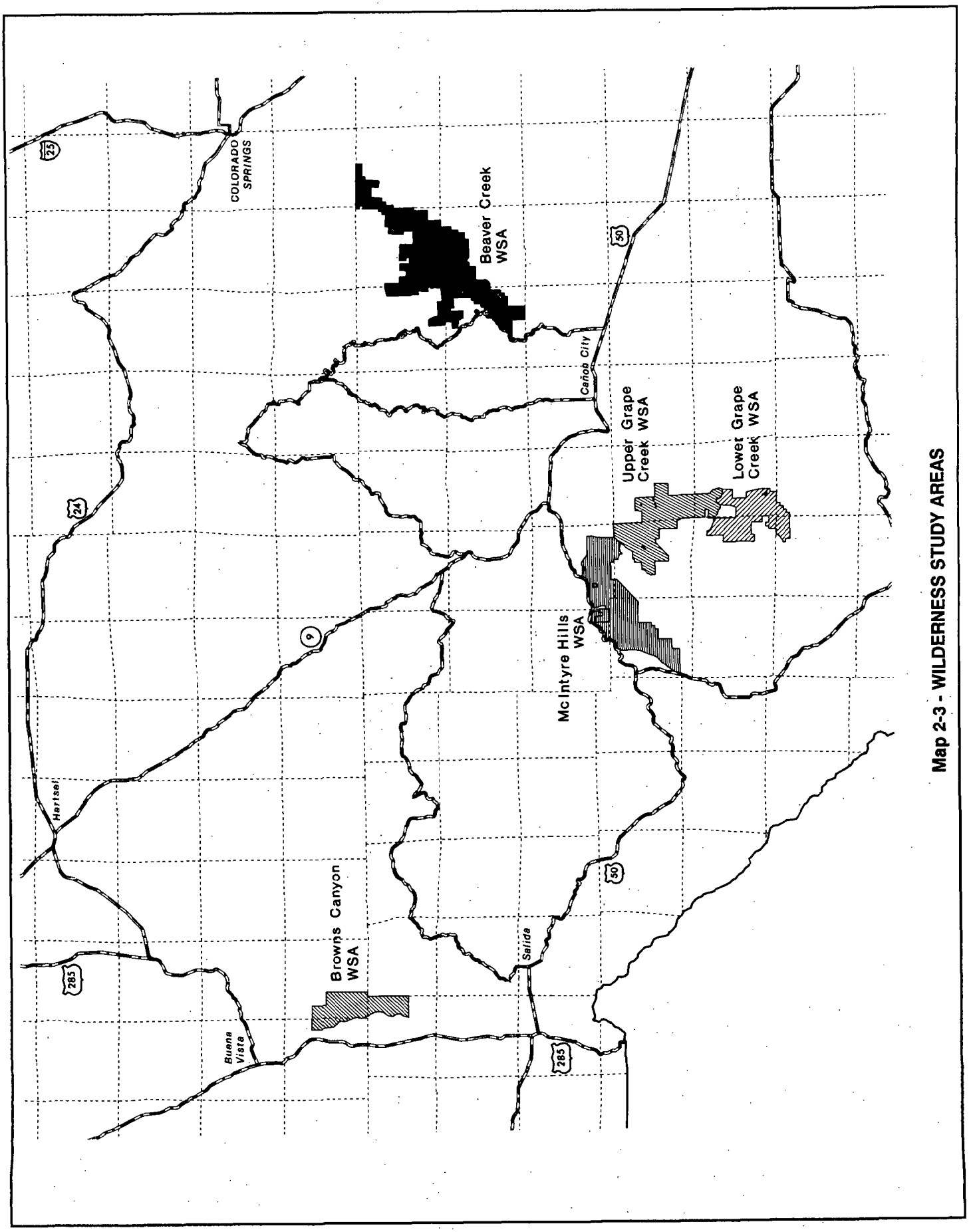
Soils of the eastern plains are derived primarily from sedimentary rocks and materials deposited by wind. Soils in the mountains are formed from glacial and alluvial deposits, and a variety of sedimentary, igneous, and metamorphic rocks. These soils are described in soil survey reports issued by the U.S. Soil Conservation Service (SCS). Each report is written for a given "soil survey area," which generally includes one or more counties. The status of soil surveys within the planning area boundary are listed in Table 2-2.

Soil surveys listed in Table 2-2 are known as "3rd Order" surveys. These surveys are designed for general planning purposes, yet they provide a wealth of information. Interpretations are made of various soil properties; e.g., rangeland productivity, characteristic plant communities, inherent erodibility, engineering properties, and suitability for recreation development, sanitary facilities, construction materials, homesite development, etc. The mapping scale is generally 1:24,000 (inch = 2,000 feet), and the minimum size delineation is about 5 acres; therefore, if site-specific information is required, an onsite investigation is usually necessary to verify conditions in the field.

Most soils in the planning area present no particular problems to BLM programs, since BLM has little involvement with construction or development activities where soils could be limiting factors. BLM soil management goals are to maintain or improve soil productivity, and to minimize soil erosion and sediment yield to streams.

All soils are subject to erosion from wind and water. Their inherent susceptibility to erosion depends on many factors, including soil structure, texture, chemistry, slope, exposure, depth, and vegetative cover. In the case of water erosion, slope and vegetative cover are the predominant factors. For wind erosion, exposure and vegetative cover are most important. Vegetative cover is the one variable highly susceptible to human manipulation and activities.

A healthy, vigorous vegetative cover is the key to maintaining or improving soil productivity and protecting the soil from the forces of erosion. Above ground, vegetation and litter provide protection from wind and the impact of raindrops. On slopes, runoff is retarded, as water is forced to find passage through the mass of vegetative material. The soil surface is protected from the direct rays of the sun and a microclimate is created that benefits insects and other organisms dwelling on or near the surface. These creatures till the soil, and in conjunction with soil microorganisms, decompose dead plant material and incorporate



Map 2-3 - WILDERNESS STUDY AREAS

TABLE 2-2
Status of Soil Surveys in the Royal Gorge Resource Area

Soil Survey Area	Status	Remarks
Baca County Area	Published 1973	
Bent County Area	Published 1971	
Chaffee-Lake County Area	Published 1975	Excludes National Forest land
Crowley County Area	Published 1968	
Custer County Area	Published 1982	Excludes National Forest land. Parts of Custer County are included in the Pueblo area report
El Paso County Area	Published 1981	Excludes National Forest land
Fremont County Area	Publication in progress	Field mapping available in BLM C.C. office. GIS output available from SCS
Huerfano County Area	Published 1983	Excludes National Forest land
Kiowa County Area	Published 1981	
Las Animas County Area	Ongoing survey	About 800,000 acres remain to be surveyed. Excludes National Forest land. Field mapping available from SCS
Otero County Area	Published 1972	
Park-Teller Area	Ongoing survey	Field work approximately 40% complete. Field mapping available from SCS. National Forest lands excluded
Prowers County Area	Published 1966	
Pueblo County Area	Published 1979	Includes parts of Custer County. Excludes National Forest land

it into the soil. This increases soil fertility and also creates conditions favorable for water to infiltrate into the soil. Below ground, roots bind soil particles together, making the soil more resistant to erosion.

In those parts of the resource area where precipitation is sparse or uncertain, nongrazed vegetation can become stagnant, and excessive amounts of litter can accumulate. Because of the lack of sufficient moisture, decomposition of dead plant material is retarded. When rainfall does occur, the excess amount of dead material can actually inhibit the infiltration of water into the soil. In addition, nongrazed plants form clumps of overmature vegetation, with areas of bare soil between the clumps. These conditions inhibit the potential productivity of the soil and increase the potential for wind and water erosion.

Grazing animals (including wildlife) can be used to improve the situation described above. Properly managed, animals will remove standing dead vegetation and stimulate new growth in stagnated plants. In the process, accumulated litter is spread around, mixed with dung and urine, and trampled into the soil. This, in turn, improves the ability of the soil to absorb and retain water, thus increasing biological activity. The end result is improved soil productivity, increased plant vigor and density, and decreased runoff and erosion.

On about one-third of the BLM-administered land in the planning area, soils are derived from Pikes Peak granite and related rocks. Generally, these soils have an abundance of rock outcrops and are shallow to bedrock. The soils are coarse textured, and lacking in fine materials (silts and clays). Rainfall is absorbed quite readily, but ability to retain moisture is low. Where soils are shallow, they quickly become saturated, and both surface and subsurface runoff occurs. Good vegetative cover is essential to hold these soils in place.

Vegetation (especially grasses) on these soils is easily disturbed. If vegetation is destroyed, revegetation is difficult. The main obstacle to revegetation is the low water holding capacity of these soils. Overuse of these granitic soils can have disasterous results. Some good examples are areas in the Rampart Range north of Colorado Springs, where OHV use (primarily motorcycles), has literally destroyed some hillsides. Another example is Badger Creek where livestock grazing has caused severe damage to the watersheds.

Many parts of the resource area were overused by livestock, miners, and woodcutters in the early part of this century. This resulted in much erosion and loss of soil productivity. By the 1950s, a good part of BLM-administered land was in a deteriorated, but stable condition. These conditions continued into the 1960s when BLM began a substantial erosion control program. This program consisted mainly of reseeding and small erosion control structures. These efforts were only marginally successful, but they were the beginning of a gradual trend toward

improvement. In the late 1970s, BLM began an aggressive program to improve grazing management practices. This program continues today, and there has been a noticeable improvement in soil productivity and decreased erosion on several grazing allotments.

Currently, the most active erosion on BLM-administered land is occurring along unstable banks of streams and gullies. These conditions, however, are also improving, as a result of BLM riparian and grazing programs. Riparian areas in Texas Creek, McCoy Gulch, Pass Creek, and Badger Creek have shown dramatic improvements resulting from intensive grazing management or rest from grazing. Vigorous desired plant communities improve and maintain soil productivity and reduce erosion, which will benefit water quality. Desired plant communities are also essential to prevent soil erosion in riparian zones.

Although there is an improving trend of soil productivity and erosion conditions in the RGPA, uses of the BLM-administered lands have also increased. Hunters, anglers, rock climbers, campers, hikers, off-highway vehicle enthusiasts, and others are beginning to damage soil resources. Motorcycles and all-terrain vehicles have the greatest potential to adversely affect soil resources. Care must be taken to sensibly manage all recreational activities so the current trend is not reversed. Improved and additional access will increase impacts on soils. Onsite soil investigations are needed to ensure that soils are suitable for any surface- or vegetative-disturbing activity. Road construction could create areas susceptible to severe erosion. Mineral development can damage soils, however, stipulations during the development stage and post-development reclamation can help alleviate most problems. Dumping or spills of hazardous materials cause contamination, resulting in soil loss during cleanup. Improper logging or woodcutting can damage soil resources. Stipulations for logging and woodcutting would alleviate most problems. Adverse effects of fire are usually short-lived; however, if heavy rain falls on a recently burned area, there can be a heavy flush of ashes and sediment. Fire often increases soil productivity as nutrients in ashes are incorporated in the soil; however, the availability of nutrients may result in loss of soil quality through leaching.

Soil, along with water and air, is a basic resource, on which life depends. Many of the management issues and concerns identified in this management plan either depend on "healthy" soil resources or can affect the "health" of soil resources. As human populations increase, more demands are put on the soils resource, and if these demands are to be met, erosion must be minimized. In these areas, restrictions of use may be needed to protect soil resources.

WATER RIGHTS

The Royal Gorge Planning Area (RGPA) covers parts of two major subbasins, the Upper Arkansas and the Upper South Platte.

Runoff from these river basins provides a major contribution to eastern Colorado surface water supply. The cities of Denver, Aurora, Thornton, Colorado Springs, and Pueblo depend heavily on these waters, which are supplemented by imports from the western slope. Numerous small cities and towns such as Trinidad, Cañon City, Salida, Leadville, Fairplay, Cripple Creek, and Victor (to mention a few), also obtain all or part of their municipal water from surface streams.

Currently, agriculture accounts for the largest amount of water used in these basins. Nearly 500,000 acres are irrigated in the Arkansas River drainage in Colorado. In the South Platte watershed, about 40,000 acres are irrigated inside the planning area. About 123,000 acre-feet of water per year flows out of the planning area and contributes to the irrigation of over 1 million acres in the South Platte valley below Denver. Most streamflow in the South Platte and Arkansas Rivers originates from snowmelt in the high mountains. The majority of this water-producing land is administered by the U.S. Forest Service in the Park, Sawatch, and Sangre de Cristo mountain ranges.

Runoff from BLM-administered land contributes little to the total water supply. The only perennial streams that receive significant flow from lands administered by BLM are Sacramento Creek and Mosquito Creek in the South Platte watershed, and the East Fork of the Arkansas, Hamilton Creek, and Badger Creek in the Arkansas watershed. For the most part, runoff from BLM-administered land is the result of short lived snowmelt or intense thunderstorms. Several live streams flow through these lands, and proper management of BLM-administered land within these watersheds is of prime concern. The most important of these streams are listed in the Fishery Habitat Management section.

Figures 2-1, 2-2, and 2-3 show the influence of snowmelt on annual streamflow hydrographs in the planning area. Halfmoon Creek is a high mountain tributary of the Arkansas River. The watershed above the stream gauge (elevation 9,830 feet) is unaffected by water diversions. The station on the Arkansas River at Portland (elevation 5,021 feet) is over 100 miles downstream. Streamflow at this station is modified by transmountain diversions, irrigation diversions, and upstream reservoir operations; yet the predominant influence of snowmelt runoff is readily apparent. Figure 2-3 shows a similar runoff pattern in the South Platte River above Elevenmile Reservoir.

Flows in both rivers are modified by numerous transmountain diversions. The Hoosier Pass Tunnel and the Boreas Pass Ditch bring water from the Colorado River Basin into the South Platte drainage. Water from the Hoosier Pass Tunnel is diverted a second time, from the South Platte into the Arkansas watershed, where it becomes part of the water supply for Colorado Springs. Eight diversions bring water from the Colorado River Basin into the Arkansas Basin. The largest of these are the Boustead Tunnel, the Homestake Tunnel, and the Twin Lakes Tunnel. Homestake water is further diverted from the Arkansas River to the South Platte River,

Figure 2-1

TYPICAL ANNUAL HYDROGRAPH

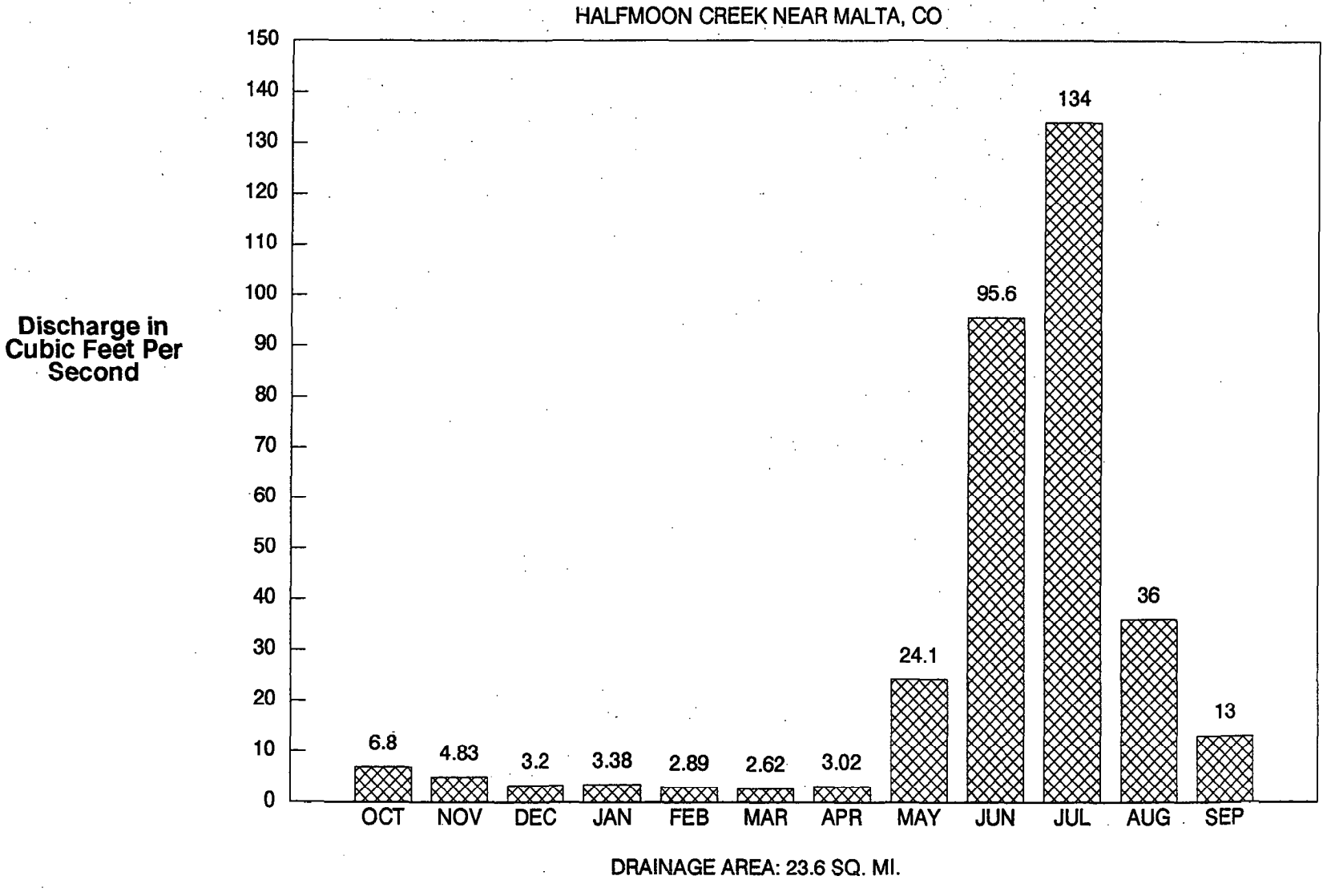


Figure 2-2

TYPICAL ANNUAL HYDROGRAPH

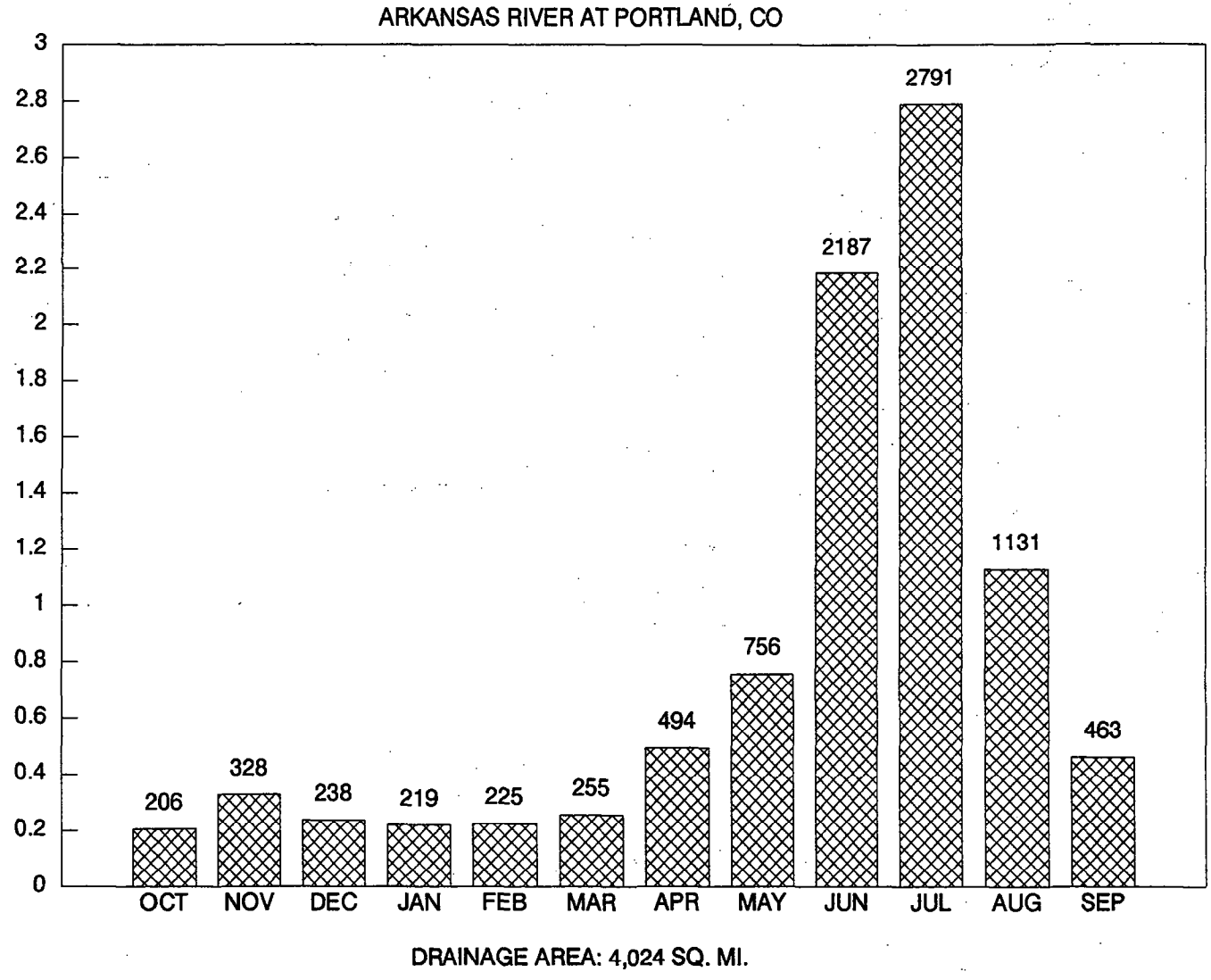
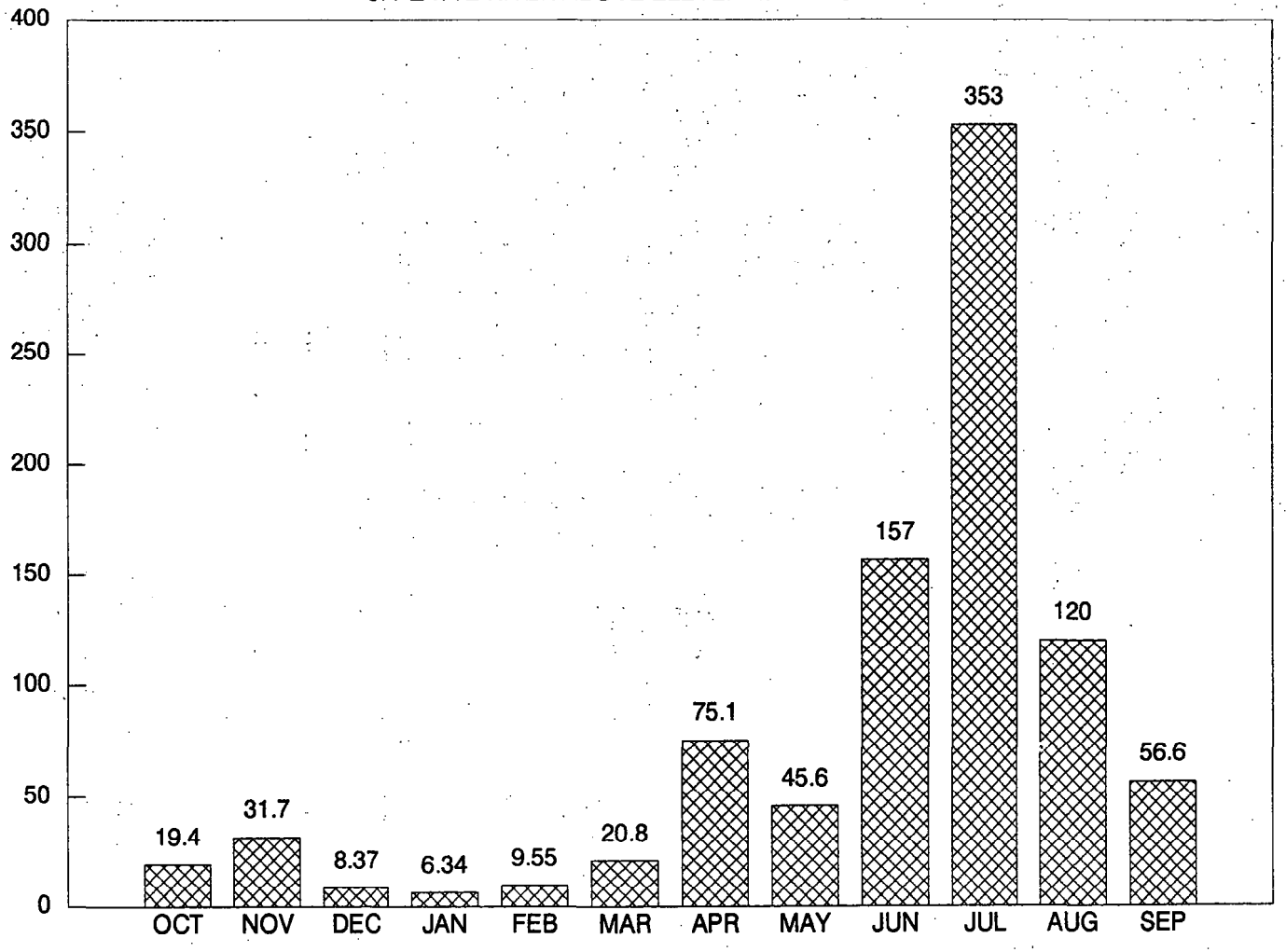


Figure 2-3

TYPICAL ANNUAL HYDROGRAPH

S. PLATTE RIVER ABOVE ELEVENMILE RES.



DRAINAGE AREA: 880 SQ. MI.

via the Aurora-Homestake pipeline. A portion of this water is diverted a third time, back into the Arkansas watershed, where it is finally used by Colorado Springs. These transbasin diversions, plus five smaller ones, are shown in Table 2-3.

TABLE 2-3
Transmountain Diversions Into The Arkansas River Basin

Diversion Name	Management Entity	Purpose	Diversion Via
Ewing Ditch	Pueblo Water Board	Municipal	Tennessee Creek
Columbine Ditch	Pueblo Water Board	Municipal	Chalk Creek
Wurtz Ditch	Pueblo Water Board	Municipal	Tennessee Creek
Homestake Tunnel	Colorado Springs andAurora	Municipal	Lake Fork (Turquoise Lake)
Boustead Tunnel	Frying-Pan Arkansas Project (USBR)	Irrigation Municipal Industrial Power	Lake Fork
Busk-Ivanhoe Tunnel	Pueblo Water Board	Municipal	Lake Fork (Turquoise Lake)
Twin Lakes Tunnel	Twin Lakes Reservoir and Canal Co., Pueblo Water Board	Irrigation Municipal	Lake Creek (Twin Lakes Res.)
Larkspur Ditch	Catlin Canal Co.	Irrigation	Poncha Creek

The natural flows of the South Platte and Arkansas Rivers are further modified by the operation of several storage reservoirs. These reservoirs are used to store and regulate water native to their own watershed, as well as water imported from other river basins. The principal reservoirs in the upper South Platte watershed are Montgomery, Antero, Spinney Mountain, Elevenmile Canyon, and Tarryall. There are 14 reservoirs with storage capacities exceeding 1,000 acre-feet in the Arkansas River watershed above Pueblo. The largest of these are Sugar Loaf (Turquoise Lake), Twin Lakes, Mt. Elbert Forebay, Clear Creek, and Pueblo. Trinidad is a large multipurpose (flood control, irrigation, and recreation) reservoir located on the Purgatoire River upstream from the city of Trinidad. The Purgatoire River joins the Arkansas River about 70 miles downstream from Pueblo. Table 2-4 shows reservoirs with more than 1,000 acre-feet capacity that are upstream from the planning area boundary in the South Platte drainage and upstream from Pueblo Reservoir in the Arkansas River drainage.

TABLE 2-4
Reservoirs in the Area with Capacities Greater than 1,000 Acre-Feet

Reservoirs	Drainage	Operator	Capacity in Acre Feet
Antero	S. Fork of S. Platte	Denver Water Board	85,564
Eleven Mile Canyon	S. Platte River	Denver Water Board	80,253
Montgomery	Middle Fork S. Platte	Colorado Springs	5,100
Spinney Mountain	S. Platte River	Aurora	54,500
Tarryall	Tarryall Creek	Colo. Div. Wildlife	13,135
Sugar Loaf (Turquoise Lake)	Lake Fork Arkansas	U.S. Bureau of Rec.	129,43
Mt. Elbert Forebay	Off Channel	U.S. Bureau of Rec.	11,530
Twin Lakes	Lake Creek	U.S. Bureau of Rec.	14,100
Clear Creek	Clear Creek	Pueblo Water Works	11,400
DeWeese	Grape Creek	DeWeese-Dye Co.	1,772
Wrights (Mt. Pisgah)	Fourmile Creek	Catlin Canal Co.	2,743
Brush Hollow	Off Channel (Beaver Creek)	Beaver Park Co.	4,186
Colo. Springs #4	Beaver Creek	Colorado Springs	1,965
Colo. Springs #5	Beaver Creek	Colorado Springs	2,050
Bison	Beaver Creek	Town of Victor	1,148
Rosemont-Penrose	Beaver Creek	Broadmoor Hotel	1,229
Skagway	Beaver Creek	Beaver Park Co. & Colo. Div. Wildlife	3,275
Pueblo	Arkansas River	U.S. Bureau of Rec.	357,00
Trinidad	Purgatoire River	U.S. Corps of Eng.	114,50

Neither the South Platte nor the Arkansas River is in natural condition. The flow of both rivers is modified by diversions, reservoirs, and imported water. Parts of the Arkansas River are greatly affected by mine drainage. Reaches of the South Platte have been modified by dredging operations. Whether these unnatural conditions are good or bad depends on the point of view. The South Platte River is highly regulated. From an environmental viewpoint, this is probably objectionable. On the other hand, this river and the associated reservoirs provide some of the best trout fishing in Colorado. In the Arkansas drainage, boating enthusiasts enjoy high streamflows resulting from imported water; however, fishermen generally object to these flows. In both watersheds, owners of water rights want to be free to move and use their water as needed. Sometimes their manipulation of flows are in conflict with other users of the rivers. These conflicts are bound to intensify, since the resource is limited, and the demands for its use are increasing.

Many different aquifers with a variety of hydrologic characteristics are in the planning area. These aquifers can be divided into three general categories, based on their general geologic properties: 1) unconsolidated rock deposits; 2) sedimentary rocks, and; 3) crystalline rocks.

Unconsolidated Rock Aquifers

The most productive aquifers in the planning area are unconsolidated rocks consisting of alluvial, glacial, and basin-fill deposits. Alluvial deposits occur along the Arkansas and South Platte Rivers, except in the canyon reaches. Glacial deposits occur in the mountains near Leadville, Buena Vista, Salida, Fairplay, and Jefferson. Thick, extensive basin-fill deposits of Tertiary age occur in the Leadville, Buena Vista, and Salida area, and in the Wet Mountain Valley.

The water yielding potential of these aquifers varies greatly, but generally increases with saturated thickness, increased sorting of rocks, gravels and sands, and a decrease in clay and silt content. Where clay or silt beds overlie sand and gravel units, artesian conditions may occur. Where the artesian pressure is strong enough, wells drilled into the confined (artesian) beds will flow above the land surface.

Sedimentary Rock Aquifers

Sedimentary rock aquifers of Cambrian through Tertiary age occur throughout the planning area. Depths to water, the water yield, and water quality vary greatly, according to geologic setting and the characteristics of the aquifer. The best known, and most productive, of these aquifers is the Dakota Sandstone, which occurs in the eastern parts of the planning area. Other significant sedimentary aquifers include the Purgatoire Formation, the Trinidad Sandstone, and the Niobrara, Morrison, Fountain, and Denver Formations.

Crystalline Rock Aquifers

The crystalline rock aquifers include volcanic and intrusive rocks of Tertiary age and Precambrian igneous and metamorphic rocks. Water in the volcanic rocks occurs in interstices of tuffs and fractures in the volcanic flows. Some water may be present in sand and gravel units that exist between individual flows and tuffs. Water in Precambrian rocks occurs only where the rock has been fractured. Generally, wells drilled into crystalline rocks yield small quantities (1-10 gallons per minute) of good quality water.

Crystalline rock aquifers occur in the mountainous parts of the planning area. BLM depends on these aquifers to supply most of the springs and wells used for management purposes. They are also important sources of water for ranches and subdivisions in Fremont, Custer, Chaffee, Park, and Teller Counties.

Water rights in Colorado are established and administered under a concept of water law called the *Prior Appropriation Doctrine*, or the rule of "First in Time, First in Right." This concept originated in the arid American west, where miners and farmers took (appropriated) water out of the streams, and put it to use at locations remote from the streams. In times of scarcity, the earliest appropriator has the first right to take water from the stream. This is in contrast to the principles of the *Riparian Doctrine*, which guide the rules of water law in the humid East. Under the riparian system, each person owning land bordering a waterbody (lake, stream, etc.) shares equal "riparian rights" to that water. The landowner is entitled to a "reasonable" use of the water, as long as his use does not interfere with the water rights of other riparian landowners.

Nineteen western states recognize the *Prior Appropriation Doctrine* as their official rule. Nine states, with some wetter land areas, include some elements of the *Riparian Doctrine* in their water law. Colorado is a pure appropriation state, and is the only state requiring a decree from a special water court to perfect a water right. Some salient features of the *Prior Appropriation Doctrine*, as applied in Colorado, are:

A water right is established by taking steps to put water to beneficial use. A "conditional" water right can be established by providing evidence of the *intent* to appropriate water. An "absolute" water right is established when the water is actually put to beneficial use.

Water rights are administered on the basis of seniority. The *priority* date determines the seniority of the water right. Priority is established by the date water was first put to beneficial use (or the *intent* to use was formulated), and the date the water right was adjudicated in court. In other words, if a senior appropriator neglects to have his right adjudicated in court, a junior appropriator may adjudicate ahead of the senior and obtain a better priority date.

Water rights are property rights, and can be sold. Any change in use or point of diversion, however, must be approved by the water court, and cannot result in injury to other water right holders.

Ground water that is hydraulically connected to streams is considered tributary to the streams, and laws governing surface water apply to ground water. Most ground water in Colorado is considered tributary.

In Colorado, nontributary ground water belongs to the owner of the land above the aquifer. By law, nontributary ground water ". . . is that which will not, within a period of 100 years, deplete the flow of a stream at an annual rate greater than one-tenth of 1 percent of the annual rate of withdrawal from the well being pumped."

Wells used for domestic or stockwater purposes (that pump less than 15 gallons per minute) do not have to be adjudicated. Permits to use such wells, however, must be obtained from the state engineer.

Long-recognized beneficial uses of water are for agricultural, domestic, municipal, industrial, and commercial purposes. Only recently, and with limited application, has water needed for environmental purposes been acknowledged as a beneficial use.

Under current law, rights to maintain streamflows for environmental purposes can only be held by the Colorado Water Conservation Board. Interested parties, however, can recommend the need for such flows, and can donate water rights to the board for environmental purposes.

Water can be diverted from one watershed to another. Water from the contributing basin is diverted in priority from that basin. In the receiving watershed, imported water can be used without regard to priorities existing in that basin.

Imported water can be used over and over to extinction. In contrast, water native to the basin of origin can be used only once, for the purposes it is decreed. The reason for this is to protect the rights of junior appropriators dependent on unused return flows from seniors.

Until about 1980, the water rights situation in the planning area was fairly stable. Starting in the 1970s, the population growth along the Colorado Front Range began to result in increasing demands on the water resources of the South Platte and Arkansas basins. Cities began to buy up agricultural water rights, which drove up the price of water. In South Park almost half of the irrigated land was dried up (in 1980, there were 79,000 irrigated acres in South Park; in 1990, there were 40,000 acres). In the Arkansas basin, Pueblo has acquired enough water to supply 300,000 people. Aurora has purchased water and dried up irrigated land downstream from Pueblo. An investment group is currently trying to buy more water in the lower Arkansas valley for eventual sale in the Denver area. This picture is not limited to the planning area, or even to the state of Colorado. Kansas wants a bigger share of the Arkansas River. Southern California wants more Colorado River water, which would affect future diversions from that basin to the eastern slope. Wastewater from Colorado irrigators flows across the state line and is used by farmers in western Nebraska and Kansas.

Other forces are at work to change the water rights picture. Environmental groups, such as The Nature Conservancy, are interested in buying water for instream flows, wetlands, and other environmental purposes. The Arkansas River above Pueblo is being studied for possible designation under the *Wild and Scenic Rivers Act* (Appendix L). This could lead to a Federal reserved junior water right in the river. Sec. 13(c) of the Act states that wild and scenic designation reserves water in the quantity necessary to accomplish the purpose of the Act (preservation of rivers in a free-flowing condition and preservation of the outstandingly remarkable values for the benefit and enjoyment of future generations). Existing water right owners are worried that a Federal reserved junior right would inhibit future water sales, exchanges, or transfers. This is a legitimate concern, since junior water rights cannot be injured by changes of use, or points of diversion, by senior appropriators.

During the 1980s, the rafting industry requested augmented water flows from the Bureau of Reclamation (BOR) on several occasions. After approval of the Arkansas River Recreation Management Plan, the industry asked DPOR and BLM to request flow augmentation from BOR, which was done in 1990. These flows were requested for July and the first half of August at a minimum rate of 700 cubic feet per second. Requests were also made to augment flows year-round to benefit fisheries. Colorado Trout Unlimited disagreed with this request as they believe elevated summer flows are detrimental to fish. The organization obtained a court injunction against BOR, which was ultimately dismissed. The request to BOR was slightly modified in 1991 to maintain flows at 700 cubic feet per second; the same request was made in 1992. Although neither the rafters nor the anglers own water rights, they did, to some degree, manipulate stream flows for their own interests.

At the present time, momentum is growing to change the existing hierarchy of Colorado water law. Increasing demands on a limited resource are resulting in calls to re-examine what constitutes beneficial use, and to what extent the rights of the public at large need to be protected.

Under the Constitution, the Federal government has the power to override any state water law. Historically, however, Congress has chosen to defer to state water laws and local customs of water use. In 1952, Congress enacted the *McCarren Amendment*, which waived sovereign immunity in regard to water rights. This Act allows the United States to

be joined in state water adjudications, so that agencies can quantify their water rights and fit them into the state administration.

In the late 1970s, BLM was joined under McCarren to quantify its reserved water rights in the Cañon City District. BLM has only one kind of reservation that applies to water rights. These are the Public Water Reserves, which are the result of executive orders that reserved the 40 acres surrounding a spring or waterhole from homestead entry. The purpose of these reserves is to "prevent monopolization of public springs and waterholes." The courts decided the uses of water necessary to fulfill the purposes of the reservations were domestic and stockwater.

In the Royal Gorge Planning Area, BLM filed claims on about 200 small springs for stockwater. BLM total water claims were only 2.83 cubic feet per second (cfs), and this included a 2.67 cfs claim in the Park Center Well. Practically speaking, BLM reserved water rights had absolutely no effect on senior water right owners, except in the case of the Park Center Well. In 1977, the Park Center Water District obtained a decree to this well, which was nullified in 1990 when the court awarded BLM a Federal reserved water right. Water from the Park Center well is decreed for domestic and irrigation purposes, and is leased to the Park Center Water District.

Within the planning area, BLM has about 50 stockwater wells. These wells all pump less than 15 gallons per minute, and are exempt from administration. BLM also owns 200 to 300 small dams built for stockwater. These small impoundments are located on ephemeral drainages, and are also exempt from administration. Possibly 50 springs were not included in the reserved filings, because they were not inventoried. All kinds of wildlife depend on water from BLM springs, wells, stockwater reservoirs, and streams flowing through BLM-administered land. BLM will work within the state water rights system to see that these water sources are protected for fish and wildlife needs.

Water needed for management purposes and the value of water rights may affect land disposal and acquisition decisions. If any streams in the planning area are designated for inclusion in the *National Wild and Scenic River System*, a Federal reserved water right could be potentially established. BLM would probably quantify the water right to ensure that the purposes of the designation are met. Quantification would involve a political process, since diverse interests would have to be reconciled. Where water is needed to meet recreation objectives, water rights would have to be acquired. The cost of acquiring water rights needed to meet BLM program objectives would need to be considered in cost/benefit analyses. A lot of controversy exists over the question of water rights for wilderness areas. This is a complex and highly emotional issue, which is not likely to be resolved soon. Water rights have not surfaced as a problem in the five wilderness study areas in the planning area. Further analysis disucssion would be required to determine if water availabiity in the wilderness study areas are sufficient to meet wilderness management objectives.

In Colorado, BLM would continue to claim water rights in accordance with state law. Most of these claims would be for stockwater out of springs. Where instream flows are needed, BLM would make recommendations to the Colorado Water Conservation Board, and work with interested parties to achieve mutual goals. The current emphasis is to perfect water rights on springs not included in BLM previous adjudication of its reserved water rights.

During 1992, the Royal Gorge Resource Area initiated a multi-agency effort called the Arkansas River Water Needs Assessment. This assessment involves an evaluation of the streamflows needed in the river to meet the objectives of various water-dependent resource values. Because of the relationships between streamflows and the levels of both upstream and downstream reservoirs, the scope of the assessment was broadened to include these reservoirs. The study area for the assessment includes Twin Lakes, Turquoise and Clear Creek Reservoirs; the mainstem of the Arkasnas River from Leadville to Pueblo; and Pueblo Reservoir. The resource values to be considered include fish and wildlife habitat, fishing recreation, boating recreation, water quality, riparian habitat, and esthetics. Speicalist teams are looking at these resource values in three groupings: water resources, recreation, and biological resources.

Decisions will not be made in the assessment. The data will be used by the involved agencies to make recommendations or decisions that affect the Arkansas River and the related reservoirs. The assessment is expected to take 3 to 4 years to complete. Joining BLM in this effort, through a memorandum of understanding, are the U.S. Forest Service, Bureau of Reclamation, and the Colorado Department of Natural Resources.

WATER QUALITY

Surface Water

The quality of surface water in the area is influenced by many factors, including geology, mine drainage, runoff from snowmelt or rainfall, ground water inflow, water imports, reservoir operations, and water use. These factors are present in both the South Platte and Arkansas River basins, but effects are more pronounced in the Arkansas River.

The Arkansas River exhibits distinct spatial and seasonal variations of water quality. There are spatial variations where stream quality is significantly influenced by mineralized drainage from mines. There is also a general downstream deterioration of water quality resulting from inflows from ground water and tributary streams, changes in geology and

chemical composition of rocks, and increased water use. Seasonal variations result from snowmelt runoff, releases of water from upstream reservoirs (during the irrigation season), and sediment-laden runoff from summer rainstorms.

In terms of water quality, the South Platte River is in good condition, and the trend is stable. Water quality in the Arkansas River is in need of improvement. Many agencies have studied this problem, including the Colorado Division of Wildlife, the Colorado Water Quality Control Commission, the Colorado School of Mines, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the U.S. Bureau of Reclamation, and the Environmental Protection Agency. Some studies are still underway, and new ones are being proposed. BLM is proposing a comprehensive water needs assessment of the Arkansas River, which will examine water quality as it relates to different levels of flow. As the demand for better water quality increases, more money and effort will go into solving these problems.

Some actual pollution abatement is being done. The Colorado Mineral and Geology Division recently completed a project to stabilize mine wastes and treat mine drainage in Chalk Creek. A large effort is underway to remedy pollution caused by the Leadville mine drainage tunnel, and the nearby Yak tunnel. New treatment plants are currently in operation for both these tunnels. All of these studies and projects indicate that the trend for water quality in the Arkansas River is toward improvement.

In the tributary watersheds, some streams flowing through BLM-administered lands are in a deteriorated condition. More details are in Fishery Habitat Management and Riparian Area Management sections.

Largely through improved grazing management, BLM is making progress towards improving vegetation on streamside and upland areas. Better vegetative cover results in less erosion and better infiltration of rainwater into the soil. This helps retard floods, and lowers the amount of sediment moving into the streams. Healthy desired plant communities in riparian zones prevent bank erosion, trap sediment, and dissipate flood water. Management of livestock is the main tool to achieve and maintain desired plant communities; therefore, proper grazing management enhances watershed condition. These continued efforts will result in improved water quality throughout the planning area. BLM-administered timbered lands and areas with piñon, juniper, and oak canopies provide optimum hydrologic conditions. Forests have great capacity to absorb intense rainfall, and to release runoff gradually. Runoff from forested land usually contains little sediment or dissolved minerals.

In some areas, accelerated erosion from OHV use could result in increased sedimentation in streams. Improper recreational and livestock use of riparian zones adversely affects water quality and stream condition. Overuse by livestock in riparian zones pollutes the water (from urine and feces), and destroys vegetation. The development of minerals resources has the potential to affect both surface and ground water quality. Pollution from mine drainage, excessive mineral levels, and heavy sediment loads are harming fisheries in the Arkansas River basin. Mismanagement of soils highly susceptible to erosion can result in increased sediment loads in streams. The use of chemicals can adversely affect quality of both surface and ground water, and should be avoided whenever possible. Moderate use of riparian areas is beneficial to vegetation, and water pollution is generally not a concern. Water quality and water flows have strong adverse effects on fisheries. Flooding and sustained high flows are problems on some streams, but minimum streamflows are needed in others. Woodlands are generally located on shallow, rocky, soils, and heavy rain on these areas usually produces muddy floodwater. Proper management of woodland areas is critical for good water quality. Existing and potential concentrations of hazardous waste could pollute surface and/or groundwater.

BLM must comply with Federal and state regulations governing water use and management. State water quality standards have been set that follow those formulated at the local level in Section 208 Water Quality Management Plans. By ensuring that BLM management actions enhance or maintain water quality, BLM conforms with state water quality regulations, as well as water quality provisions of the *Clean Water Act* and the *Federal Water Pollution Control Act*. Before any work is permitted in perennial stream channels, Section 404 permits are obtained from the Army Corps of Engineers, as required by Federal law. BLM periodically monitors water quality in perennial streams to make sure water quality is not impaired by any action on BLM-administered lands.

Except where water quality is strongly influenced by mine drainage, water in the South Platte and Arkansas Rivers is suitable for domestic, municipal, and agricultural purposes.

Ground Water

The quality of ground water in the planning area varies tremendously, according to the rate of ground water movement and the chemical composition of rocks in the aquifer. Generally speaking, the best quality (least mineralized) water comes from alluvial and crystalline rock aquifers.

Throughout most of the area, ground water is suitable for domestic and livestock watering purposes. In Park County, some wells yield water with nitrate levels exceeding the standard for drinking water. In parts of Park and Teller Counties, wells drilled into Pikes Peak Granite have fluoride concentrations that exceed drinking water standards. In isolated areas of western Pueblo and eastern Fremont and Custer Counties, ground water is contaminated by radioactive materials. Some wells in eastern Fremont County

produce water too mineralized for domestic purposes, yet still suitable for livestock consumption.

As the population increases, and more rural areas are subdivided, demands on ground water will increase. This may result in depletion of some aquifers. The quality of ground water could be adversely affected by overpumping of aquifers or by contamination from septic tanks and sewage lagoons.

HAZARDS AND HAZARDOUS MATERIALS MANAGEMENT

Currently, no inventory exists of hazardous materials or hazards to human health for lands within the RGPA. Inventory for these hazards was begun in 1993.

Physical hazards such as rivers, cliffs, etc., are not considered in this analysis.

Hazardous materials or human health risk can be expected to exist within the historic mining areas of the resource area. The most significant are likely to be the Leadville area, Cripple Creek/Victor area, Westcliffe/Silver Cliff area, and the coal mining areas around Trinidad and Walsenburg. The majority of these areas were patented sometime in the past. Isolated tracts and small slivers of BLM-administered land between patented claims remain in all of these areas.

Unauthorized dumping has occurred within the planning area. This dumping will likely increase as counties close their "free" landfills and dumps and begin to charge gate fees. Currently two unauthorized dumps have been identified, both associated with ranching operations adjacent to BLM-administered lands. Undoubtedly, additional sites will be identified during the inventory process.

Two authorized operating landfills exist in the planning area. These are regulated by the Colorado Department of Health and are managed by the county. Under the *Resource Conservation Recovery Act* (RCRA) Subtitle D requirements, both of these landfills will close by October 9, 1993.

All known closed landfills and dumps would be inventoried in the future to determine if hazardous materials are present. If hazardous materials are determined to be present, the sites would be further evaluated to determine the extent of contamination and necessary mitigation.

A contingency plan for the Cañon City District, including the resource area, exists for dealing with all manner of hazardous materials incidents. The plan details BLM response to reported incidents and includes provisions for safety of personnel, isolation, emergency response, and mitigations.

TOPOGRAPHY AND GEOLOGY

The geology of the Royal Gorge Planning Area is varied. The plains area is underlain by several large tectonic elements that have been revealed by deep drilling. Of commanding size is the Denver Basin, 11,000 to 12,000 feet deep, underlying all the plains area. The basin is markedly asymmetric with gentle dips on the eastern flank, but with a very steep western margin bordering the Front Range. At the southern end of the Front Range and northwest of the Wet Mountains, a narrow and shallow tongue of the Denver Basin extends westward along the course of the Arkansas River. It is known as the Cañon City embayment and is separated from the main part of the basin by a gently anticlinal threshold extending southeastward from the Front Range as an extension of the Red Creek Arch.

On the southwest, the Denver Basin is limited by the Apishapa Uplift, a feature which has Pennsylvanian ancestry. The southeastern end of the Apishapa Uplift joins the Sierra Grande Uplift, a structural arch with similar history that forms another bordering element of the Denver Basin and extends southward into New Mexico. Trending northeastward from the Sierra Grande Uplift is the broad Las Animas Arch. It appears to have been a weak but persistently positive structural element through much of geologic time, and now forms part of the eastern margin of the Denver basin. Topographically, the plains area slopes from about 6,000 feet elevation where it borders the Front Range to about 3,400 feet where the Arkansas River flows into Kansas.

Part of the shallow Hugoton Embayment of the Anadarko Basin lies in southeasternmost Colorado, east of the Sierra Grande and Las Animas Arches. The Raton Basin extends northwestward from New Mexico into Colorado on the southwestern side of the Apishapa Uplift. Topographically the Raton Basin appears as an area of raised tablelands capped by Tertiary sediments. This raised area of the Park Plateau and Raton Mesa varies from ranges of 500 feet higher than the plains below, to a maximum elevation of 13,623 feet at West Spanish Peak. The west flank, bordering the Sangre de Cristo Mountains, has a much steeper structural inclination than the eastern side. Northward, between the Wet and Sangre de Cristo Mountains, the Raton Basin connects with the narrow syncline underlying both the Huerfano Park and the Wet Mountain Valley.

The Front Range and the Wet Mountains, a southern prong of the Front Range, are anticlinal in nature modified by faulting. The Front Range reaches an elevation of 14,110 feet at Pikes Peak. These ranges are bordered on the west by a discontinuous series of valleys or parks. The Wet Mountain Valley-Huerfano Park borders the Wet Mountains, connects with the Raton Basin on the south, and is bordered by Precambrian to the north. This valley is not a simple synclinal valley, but involves complex structural

modifications. The elevation of the Wet Mountain Valley at Westcliffe is 7,888 feet.

South Park borders the Front Range on the west and consists of complexly folded and faulted rocks of Precambrian, Paleozoic, and Mesozoic rocks, intruded and covered in the southern part by Tertiary volcanics. Erosional remnants of Precambrian reach elevations of 11,000 feet in the Tarryall Mountains. The valley floor ranges from 8,800 feet at Hartsel to 9,850 feet at Fairplay. The long chain of mountains making up the Park and Sangre de Cristo Ranges border South Park and the Wet Mountain Valley on the west. These ranges, generally anticlinal in structure, are modified by folding and faulting and have peaks greater than 14,000 feet.

The upper Arkansas River Valley is a long narrow valley ranging in elevation from 7,050 feet at Salida to 10,200 feet at Leadville. This valley is structurally a northward extension of the Rio Grande Rift Zone and is bordered to the west by the Collegiate range, which reaches elevations of over 14,000 feet. Precambrian rocks underlie the Great Plains and are exposed in all of the mountain ranges in the Royal Gorge Planning Area. They outcrop on the western sides of the Sangre de Cristo and Park Ranges, and comprise most of the Wet Mountains and Front Range. These rocks are mostly granites, schists, gneiss, and undivided metamorphic rocks.

Widespread intrusion and extrusion of igneous rocks accompanied the tectonism of late Cretaceous to recent time. These rocks are highly variable in composition. A notable area of Tertiary intrusions in the northern Raton Basin near Trinidad contains the Spanish Peaks and their radiating dikes. Other important areas of Cretaceous to Cenozoic igneous rocks include (1) the Mesa de Maya area where volcanics cap large plateaus rising from the Great Plains along the southern boundary of the state, (2) a large area south of South Park and north of the Arkansas River, which is covered by Tertiary volcanics, and (3) the eastern portion of the Wet Mountain Valley.

NOXIOUS WEED MANAGEMENT

Noxious weeds are not a resource nor resource use. They are a serious ecological and economic problem. Four plants are listed as noxious weeds in Colorado. These are diffuse knapweed, spotted knapweed, Russian knapweed, and leafy spurge. All except spotted knapweed are on BLM-administered land in the Royal Gorge Planning Area. Leafy spurge occurs on disturbed sites at middle elevations and in riparian areas at lower elevation. At this time, the only known location on BLM-administered land in the planning area is along Tallahassee Creek. The knapweeds are in Copper Gulch and a few more locations scattered throughout the planning area. So far, knapweed infestations are limited to areas adjacent to roads. The seed has probably been spread by heavy equipment.

Noxious weeds have only recently become an issue in the planning area and not much is known about condition or trend. An inventory of noxious weeds has not been done nor is one currently planned because of the expense involved. BLM has relied on field-going personnel, ranchers, SCS employees, and county employees for location information. New reports of noxious weeds continue to come in from these sources. It appears that weeds are on the increase; however, this is hard to quantify since information is not available on how long the weeds have been in these areas and whether any change has occurred. Noxious weeds on BLM-administered land invade existing vegetation then degrade it to a point where it loses much or all of its ability to support values such as livestock grazing, wildlife habitat, and watershed protection. Noxious weeds provide a seed source that causes infestation on adjacent high value private cropland. Chemical treatment of noxious weeds poses a real or perceived threat to nontarget vegetation and water quality.

Lands identified for acquisition could be infested with leafy spurge, which would increase the cost of managing these lands. Also, problems could be caused by disposal of noxious weed infested BLM-administered land because the new owner would be liable for expensive control costs.

Disturbed sites (e.g., new road construction, trails, OHV use, mineral exploration and development, etc.) are particularly susceptible to invasion of noxious weeds. Precautions should be taken immediately to reclaim these sites. The existing leafy spurge infestation in Tallahassee Creek started with uranium exploration. Noxious weed control also needs to be addressed in reclamation plans.

There are concerns about using weed control methods such as chemicals and grazing in areas with sensitive plants. Real and perceived threats to the sensitive plants exist with these control methods. A threat to sensitive plants also exists from not controlling noxious weeds because the weeds could invade sites that contain special status plants and, because of competition, prevent seedlings from becoming established.

All concerns are important in relation to the management of noxious weeds because they all have a significant effect on plant community succession over large areas. Disturbance is the most important factor in the establishment of noxious weeds. These should be managed in such a way that large areas are not exposed to the threat of invasion by noxious weeds.

County, state, and Federal agencies all have mandates to manage noxious weeds cooperatively. As the public becomes more aware of the weeds and the threat they pose, it is expected that the public will demand more government involvement in the control and management.

Noxious weed infestations on BLM-administered land in the Royal Gorge Planning Area are relatively rare and are a much greater problem in other parts of Colorado and the nation. In North Dakota, Wyoming, and other states, millions of dollars are spent on noxious weed control. The capacity of the land to produce livestock forage and wildlife habitat has been greatly reduced. Similar problems are expected to develop in the planning area if weeds are not controlled while they still occupy a relatively small area.

Currently, chemical treatment of noxious weeds is the only method being used on BLM-administered land in the planning area. BLM is responsible for spraying leafy spurge on BLM-administered land in the Tallahassee area. The treatment being used is 1 pound active ingredient of Tordon per acre. Application is by backpack sprayer and all spraying is done by certified BLM employees. The area has been treated 3 years in a row. Application is in September when plant food reserves are being translocated from the leaves to the root stalks. The chemical enters the leaves and is also translocated to the roots at which time it severely weakens or kills the roots.

Fremont County is responsible for controlling knapweed in the right-of-way of the Copper Gulch Road. Tordon is also being used as the control method. The Colorado Department of Agriculture has begun biological control efforts on leafy spurge. Releases of control insects have been made on private land in Fremont County. If this control method is successful, it will be tried on BLM-administered land.

All control methods are in compliance with the Northwest Area Noxious Weed Control Program Final EIS, 1985, as supple-mented 1987, and the Vegetation Treatment Final EIS, 1991.

Desired plant communities in activity plans would generally have as much nonnoxious vegetation basal cover as possible. This type of plant community, besides being the most productive for a given site, would be the most resistant to invasion of noxious weeds.

NATIONAL CONSERVATION AREA DESIGNATIONS

National conservation areas (NCAs) typically contain a great diversity of uses and values. The general purpose for establishing NCAs is to protect and conserve nationally important natural and cultural resources and still allow compatible uses. These areas are usually large enough to protect and properly manage the nationally significant resources and values; however, no size limit has been established. Previous NCAs have had a minimum of 20,000 acres and have consisted of large blocks of contiguous public lands. These areas usually do not contain a large percentage of privately-owned lands within the boundaries. NCAs can only be established by Congress through a specific act, which identifies specific resources and values to be protected, conserved, and enhanced to maintain the dominant uses for each NCA. Multiple use is an important aspect; however, the specific resources and values identified in each act determine what other uses or activities are compatible with the management of the specific NCA. Legislation would direct BLM to prepare a management plan for the use, development, and protection of each NCA.

Currently, there are no designated NCAs within the RGPA. Three areas were identified for possible future designation; Arkansas River Corridor, Gold Belt Tour National Back Country Byway, and the Garden Park Fossil Area. Following is a brief discussion of these areas:

Arkansas River Corridor: This area is characterized by rugged steep canyons, mixed with broad open valleys. Vegetation ranges from riparian areas along the river and tributaries to piñon-juniper woodlands in the middle ground and ponderosa pine forests at the higher elevations. The Arkansas River flows through the corridor and provides the majority of the recreational opportunities.

The river receives the highest commercial river use in the nation and is an excellent cold water fishery. Recreational use along the corridor is predominantely water-based activities, although minor mineral activity and livestock grazing also occur. Opportunities for upland recreation, including mountain biking, hiking, camping, and four-wheeling exist and should continue to expand. A variety of exposed geological formations make this area a haven for many college and university summer field camps.

The land pattern on the Arkansas River is mixed between private, state, USFS, and BLM. Only approximately 40 percent of the corridor is BLM-administered, and 65,000 acres or more could be available for inclusion in an NCA. Much of that land would be substantially removed from the river and water-based recreation.

The Arkansas River corridor is an outstanding area for recreational opportunities; however, the area does not offer natural and cultural features necessary for NCA designation.

Gold Belt Tour National Back Country Byway: This area is currently managed as the Gold Belt Special Recreation Management Area (SRMA). Use is predominately automobile touring although a variety of other uses occur, which include hunting, camping, mountain biking, hiking, and rock climbing.

The land ownership pattern in the area now and for the foreseeable future is heavily mixed with private and some state land. BLM-administered lands constitute approximately 40 percent of the area.

Since the majority of activity occurring on BLM-administered lands is recreation related, and the current land pattern is mixed, this area is not conducive for management as an NCA.

Garden Park Fossil Area: A paleontology activity plan completed subsequent to the management framework plan for the resource area suggests that the Garden Park area (approximately 4,000 acres) be considered for some future national designation. The fossil area has some of the best examples of large type specimen dinosaurs in the world. The cultural significance of the fossil area makes it an excellent candidate for an NCA.

Based on the national and international significance of this area and the possibility of future land exchanges that would block up the BLM-administered lands, NCA designation could be considered in the future.

FIRE MANAGEMENT

The Royal Gorge Planning Area has a low rate of fire occurrence. Since records have been kept (19 years), the BLM-administered land has had an average of 12 to 14 fires per year. Most fires occur in June and July, with an average of 1.2 fires per week. Multiple fire days are rare. Monsoon moisture from the southwest typically enters the the area in July and August and reduces the fire danger through the remainder of the summer.

Thirty percent of fires are recorded as class A in size (up to .25 acre). Sixty percent of fires are recorded as class B in size (.25 acre to 10 acres). A review of fire reports shows that most class B fires are 1 acre or less. When class A and B fires are combined, almost 90 percent of RGRA fires are 1 acre or less in size. Ten-acre fires (class C) typically occur between 5,000 and 7,000 feet in elevation in piñon/juniper fuel type. Ten percent of area fires exceed 10 acres in size. Average annual occurrence is approximately one fire, class C or larger each year. These fires are often at higher elevations in the piñon/ponderosa pine fuel type.

The largest recorded fires in the RGRA are a 580-acre fire (1981) in the Poverty Mountain area in piñon and ponderosa pine and a 2,400-acre fire on Cooper Mountain (1988) in piñon. Higher than average precipitation occurred across the planning area in the 1980s. This was in contrast to the prolonged drought recorded through much of the 1970s. In 1990, because of drought conditions and above average lightning activity, two fires exceeded 10 acres. A 70-acre fire occurred in ponderosa pine in Phantom Canyon, and a 205-acre fire burned in piñon and ponderosa pine in the Copper Gulch area.

Over 50 percent of resource planning area fires occur within a 20-mile radius of Cañon City; 25 percent of the fires occur between Cotopaxi and Salida along the Arkansas River. These fires are typically railroad related and have little potential to develop into large fires. Eight percent of fires in the planning area occur between Buena Vista and Leadville. No fire in this area has ever escaped initial attack. By mutual agreement, the U.S. Forest Service has assumed suppression responsibility through the first burning period in this area.

Sixty-five percent of all fires in RGRA are lightning caused and 25 percent are human-caused. These are typically railroad or campfire related. The remaining 10 percent are of unknown origin.

Increased precipitation has resulted in increased volumes of dense brush. Fuel buildups have occurred principally at higher elevations where ponderosa pine begins to appear. Dense brush volumes are also somewhat higher in piñon/juniper understories but are still light enough that it is very difficult for a surface fire to carry and increase in size. As a result, the numbers of annual fires have not increased. Lightning activity levels and human use levels are still at "average" levels. The size of fires occurring at the elevation where ponderosa pine appears may have increased to a degree. The resulting fires have a slightly better chance to grow to a larger size. As a result, approximately five fires have grown to a size class C or larger (in excess of 10 acres) in the past 5 years. The danger of large fires within the RGRA is still low. The large majority of fires (90 percent) occur in piñon/juniper.

The grazing EIS for the resource area recommends prescribed fire over 5,000 acres of piñon/juniper to increase herbaceous vegetation for livestock forage. The wildlife biologist has also promoted prescribed fires within piñon/juniper to improve wildlife habitat. Two successful prescribed fire projects have been completed in Arizona fescue dominated grasslands in the north-central part of the planning area. The objective was rejuvenation of overgrown, wolfy grasses by fire to produce young, nutritious growth on elk winter range. Two other prescribed projects have been attempted to deter vegetative succession to a grass/shrub seral stage to improve livestock and wildlife rangeland. An attempt was made to use fire in the Penrose Chaining and Big Hole areas to improve both range conditions and wildlife habitat; however, little success was obtained. Prescribed fire may continue to be carried out on a case-by-case basis within the planning area, although there are no specific plans at the present time.

There is a conflict between suppression of all fires and the need for vegetative manipulation. This conflict is compounded by the need to suppress fires that threaten private property or developments. Fire management is a support activity. The resource specialists and location determine whether fire is detrimental or beneficial to resources such as forestry, range, recreation, wilderness, or archaeology.

District response to a reported fire has been complete suppression as soon as possible, which includes wilderness study areas. A district strength-of-force consisting of approximately 12 seasonal employees is employed through the fire season (April 1 through September 30) to accomplish suppression actions.

In 1987, a district comprehensive fire management plan was completed in an effort to integrate fire management and resource management. Although the fire plan describes full and conditional suppression, full suppression action has been determined to be the only appropriate response in all cases.

ECONOMIC CONDITIONS AND SOCIAL ENVIRONMENT

Economic data is available only by county; therefore, an affected area for economic analysis has to be defined in terms of whole counties. The area for this analysis consists of 16 Colorado counties; Baca, Bent, Chaffee, Crowley, Custer, El Paso, Fremont, Huerfano. Kiowa, Lake, Las Animas, Otero, Park, Prowers, Pueblo, and Teller. These make up the economic study area (ESA). Appendix C has additional information.

The residents within and immediately adjacent to the ESA, along with the users and potential users of the area, constitute the groups that would be affected by the proposed action and alternatives. Population trends and social attitudes of these groups are also described in this section.

Population Trends

The total population for the ESA has increased about 15 percent over the 10-year period from 1980 through 1990. Teller County has experienced the largest increase in population (53 percent). The next largest increase is Park County with 32 percent, El Paso County with 27 percent, and Custer with 25 percent. Eight counties experienced increases; on the other hand, eight counties have experienced decreases. The largest decrease in population was in Lake County with a 32 percent decrease. El Paso has the largest population in the ESA.

The ESA population is projected to increase to 895,983 (55 percent) from 1980 to 2014. For the same period Teller County is projected to have a 165 percent increase, the largest in the ESA; population is expected to increase 112 percent in Park. Projected increase for El Paso is 99 percent and 93 percent for Custer. In all, seven counties are expected to increase in the ESA and nine are expected to decrease. Table 2-5 shows population changes expected in the ESA for the period 1980 to 2014.

TABLE 2-5
ESA Population 1980-2014

ESA County 1980/2014	1980[1/]	1985	1990[1/]	Percent Change 1980/1990	1995	2000	2014	Percent Change
Baca	5,403	4,814	4,556	-16	3,917	3,362	1,717	-68
Bent	5,946	5,742	5,048	-15	4,693	4,142	2,391	-60
Chaffee	13,289	12,271	12,684	-5	13,231	13,854	15,414	16
Crowley	2,994	3,256	3,946	32	4,501	4,440	4,336	45
Custer	1,537	2,130	1,926	25	2,265	2,433	2,959	93
El Paso	311,974	368,904	397,014	274	49,401	491,825	621,319	99
Fremont	28,794	30,305	32,273	12	32,572	34,515	40,242	40
Huerfano	6,435	7,251	6,009	-7	6,671	6,492	5,977	-7
Kiowa	1,949	1,891	1,688	-13	1,604	1,449	943	-52
Lake	8,871	6,980	6,007	-32	5,498	4,815	2,531	-71
Las Animas	14,944	14,297	13,765	-81	3,105	12,177	9,277	-38
Otero	22,579	22,221	20,185	-11	20,025	8,773	14,746	-35
Park	5,436	6,066	7,174	32	7,295	18,362	11,550	112
Prowers	13,063	14,144	13,347	21	3,177	12,957	12,204	-7
Pueblo	125,974	127,074	123,051	21	34,089	133,911	128,809	-2
Teller	8,128	10,628	12,468	53	13,569	15,578	21,568	165
Total	577,316	637,974	661,141	15	725,613	769,085	895,983	55

[1/]1990 U.S. Census
SOURCE: Colorado Division of Local Government, Demography Section

Homesteading in Baca and Otero Counties helped this area develop in the 1880s. Overfarming and overgrazing contributed to drought conditions that resulted in the "Dust Bowl" from 1932 to 1936. The area now depends on Federal agriculture programs.

Bent County lies in the middle of the Colorado Arkansas Valley, and agriculture is a major source of income. The area is accessible for year-round recreation, fishing, water sports, sightseeing, picnicking, camping, and hunting.

Initial settlement in Chaffee County was a result of mineral discovery; however, ranching, crop farming, and tourism are also important.

Crowley County was established in 1911. This county is agricultural in nature; however, because most of the irrigation water has been sold in the last 20 years, the majority of the cropland, about 5,800 acres, has reverted back to dry cropland. The dominant land use in the county is for pasture, grassland, and grazing.

Settlers came to Custer, Fremont, and Pueblo Counties because of gold, silver, lead, zinc, and other minerals; others came for the agricultural prospect of farming and livestock raising. Custer is quite sparsely populated, rural, agricultural and tourist oriented. Fremont includes a variety of communities and lifestyles. Pueblo has a varied economic base. At one time in its history, Pueblo was called the largest smelter city.

In El Paso County, military and government jobs dominate the area.

Huerfano and Las Animas Counties originally attracted people for trapping and hunting. Very large Spanish land grants played an important part in the history of settlement and agricultural development of Huerfano County. Ranching and livestock and hay production are the primary agricultural activities in this area.

Kiowa County, with Eads as the county seat, has the largest source of earnings from farming.

Lake County is located in the mountains. Leadville is the main city. Mining activities have been and are still important to the area economy. In recent years, however, there has been a scaling back of mining operations. Recreation is important to this area.

In Park County, agriculture and ranching have been of major importance to the area, however, the amount of land devoted to those activities continues to decline. The area offers many outdoor recreation opportunities.

Farming is the largest source of earnings for Prowers County.

Teller County is dependent on mining and tourism.

Subdivisions for vacation and retirement homes are continuing to be a major social land use trend along the Front Range and mountain coummunities. This social change has been a problem in managing BLM-administered land in the recent past and appears to be increasing. This trend will have a strong effect on management of BLM-administered lands over the next 15 to 20 years.

Employment and Income

Employment in the ESA from 1980 through 1988 increased about 24 percent. In Teller County employment increased 46 percent, employment in Lake County decreased 64 percent, and in Las Animas County employment decreased 13 percent during the period 1980-1988.

Unemployment for the ESA averaged about the same as the state has experienced. The unemployment rates for the ESA ranged from 3.7 percent for Baca County to 15.9 percent for Lake County during 1988. The average rate during 1988 was 7.9 percent.

During 1988, the largest nonfarming employment sectors in the ESA occurred in retail trade (17 percent), services (25 percent), and government (27 percent) or 69 percent of total employment related to these three sectors. Because of disclosure problems, information on many sectors is blank; therefore, the smaller sectors of employment in the ESA in 1988 cannot be described. In considering the individual counties, a similar pattern emerges. In all cases the majority of employment for all ESA counties is in these three sectors. Farming represents about 2.6 percent of total employment for the ESA; however, for the following ESA counties, farming represents greater than 10 percent of total employment: Baca 38 percent, Bent 21 percent, Crowley 35 percent, Custer 23 percent, Huerfano 15 percent, Kiowa 43 percent, Las Animas 12 percent, Otero 11 percent, and Prowers 13 percent. Table 2-6 shows employment and employment sectors in the ESA. Information for individual counties is in Appendix C.

The leading source of household income in Baca, Bent, and Otero Counties is agriculture; for Chaffee County recreation, tourism, mining, and agriculture; for Crowley County agriculture and Colorado Department of Corrections; for Custer County agriculture, tourism, real estate, and retirement; for El Paso high tech and military; for Fremont County Colorado Department of Corrections, mining, and agricultural business; for Huerfano County government services and retail trade; for Kiowa County agriculture and ranching; for Lake County mining, government, and tourism; for Las Animas railroad, government, mining, and agriculture; for Park County tourism/recreation, mining,

and construction; for Prowers County bus factory and agriculture; for Pueblo County manufacturing and public administration; and for Teller County mining and tourism.

Unemployment percentage rates for 1980, 1984, and 1988 were 7.65, 6.94 and 7.92 respectively. For the same years, total personal income (M$) was 5,120.44, 7,393.47, and 9,414.47.

Retail Sales

Retail sales for the ESA counties increased 41 percent during 1980 through 1988. Custer County had a 193 percent increase, the largest in the ESA, and Baca, Huerfano, Lake, and Pueblo Counties had decreases during this period. The other counties all had increases. Table 2-7 depicts retail sales in millions of dollars for the ESA.

TABLE 2-6
Employment

ESA	1980	1984	1988	Percentage of Total 1980	1984	1988
Mining				0	0	0
Construction	14,368	20,551		5	7	0
Manufacturing		32,369		0	11	0
Transportation				0	0	0
Wholesale Trade				0	0	0
Retail Trade	44,940	51,883	56,198	17	17	17
Finance/Insur/R.Estate	19,075		27,359	7	0	8
Services		69,160	84,268	0	23	25
Government	75,921	79,464	88,563	29	26	27
Misc. Agricultural Svcs				0	0	0
Not Classified Elsewhere	110,189	47,109	74,419	42	16	22
Total Nonfarming	264,493	300,536	330,807	100	100	100
Farming	8,903	8,582	8,794			
Total Employment by Place of Work	273,396	309,118	339,601			

Source: Colorado Division of Local Government County Profile (Blanks indicate suppressed data to avoid disclosure of confidential information.)

TABLE 2-7
Total Retail Sales in Millions of Dollars

County	1980	1984	1988
Baca	44.68	34.69	36.99
Bent	18.48	20.87	21.17
Chaffee	94.61	108.31	116.86
Crowley	5.81	8.81	12.83
Custer	4.01	6.69	11.73
El Paso	2,099.12	3,422.57	3,785.05
Fremont	135.11	180.48	203.33
Huerfano	32.16	35.08	29.97
Kiowa	9.19	9.76	9.10
Lake	52.74	38.10	39.80
Las Animas	66.70	72.50	108.59
Otero	150.93	153.92	169.58
Park	15.87	19.43	26.41
Prowers	139.35	263.75	165.26
Pueblo	1,404.50	1,185.12	1,282.98
Teller	33.80	50.68	63.83
ESA Totals	4,307.06	5,610.76	6,083.48

Source: Colorado Department of Revenue

Housing

Housing vacancy rate in the ESA is over 10 percent for 1980 and 1988. Vacancy rates less than 10 percent are indicative of a housing shortage. Although Table 2-8 appears to show that all counties could absorb light and perhaps heavy growth with existing housing, the vacancy rates shown may not take into account building conditions or whether they are year round or seasonal units. Two counties in the ESA have rates in 1988 lower than 10 percent; Pueblo at 4.16 percent and Crowley at 4.63. These counties, therefore, could have some difficulty in accommodating new growth.

Economic Sectors Related to Resource Management

Agriculture: The local livestock industry is influenced by the grazing management program, which is outlined the grazing section.

Manufacturing/Forestry: Only small amounts of sawtimber currently come from the Royal Gorge Planning Area.

Retail Trade and Service/Tourism: Retail trade and service are the largest economic sectors in the ESA providing employment for 40 percent of the ESA workforce. Tourism (travel) economic impacts in the ESA for 1988/1989 are quantified and shown in Table 2-11. Travel generated employment represents about 5.5 percent of the total ESA employment. In 1988/1989 Chaffee County had the highest travel related employment at 14 percent of the total county work force, and Park County had 13 percent employment related to travel. The counties with the lowest percent of employment related to travel include Crowley with less than 1 percent, Baca 3 percent, Bent 4 percent, Kiowa 3 percent, and Pueblo 2 percent.

TABLE 2-8
Housing Units and Vacancy Rates by County and the ESA

	1980 Total Housing Units	1980 Vacant Housing Units	1980 Housing Vacancy Rate	1988 Total Housing Units	1988 Vacant Housing Units	1988 Housing Vacancy Rate
Baca	2,480	433	17.46	2,630	794	30.19
Bent	2,367	368	15.55	2,571	633	24.62
Chaffee	5,781	1,023	17.70	6,5722	2,138	32.53
Crowley	1,361	231	16.97	1,405	654	4.63
Custer	1,108	536	48.38	1,313	492	37.47
El Paso	117,571	9,780	8.32	165,354	19,923	12.05
Fremont	11,485	1,427	12.42	13,897	3,067	22.07
Huerfano	3,466	1,063	30.67	4,302	1,580	36.73
Kiowa	835	117	14.01	834	137	16.43
Lake	3,753	753	20.06	3,803	1,650	43.39
Las Animas	6,426	1,059	16.48	6,833	1,374	20.11
Otero	8,847	910	10.29	9,324	1,329	14.25
Park	4,873	3,016	61.89	7,145	4,932	69.03
Prowers	5,452	794	14.56	6,188	980	15.84
Pueblo	49,095	4,000	8.15	52,116	2,170	4.16
Teller	5,100	2,218	43.49	7,488	3,221	43.02
ESA	230,000	27,728	12.06	291,775	44,485	15.25

Source: Division of Local Government, Demography Section Local Government Survey

Changes in recreation management could have localized economic impacts in the ESA. The planning area derives benefits from expenditures made for recreational activities, many of which are not presently quantified.

Table 2-9 showing county revenues and expenditures for 1990 represents data on the sources of revenue and expenditures in the ESA counties. El Paso and Pueblo have the largest revenues and expenditures. Table 2-10 presents PILT payments to ESA Counties for Fiscal Year 91. PILT revenues represent about 1 percent of the ESA County revenues.

TABLE 2-9
County Revenues and Expenditures for 1990
(In Thousands)

	Baca	Bent	Chaffee	Crowley	Custer	El Paso
Total Revenue	3,502	3,177	5,561	2,251	1,834	112,614
Taxes - Total	1,158	1,109	1,905	783	495	58,983
Licenses and Permits	19	-	81	-	15	638
Charges for Services	117	231	448	72	118	5,308
Fines and Forfeits	-	-	-	-	-	94
Miscellaneous - Total	317	223	509	53	91	6,726
Intergovernmental - Total	1,891	1,614	2,618	1,343	1,115	40,865
Total Operating Expenditures	3,192	2,689	4,689	1,932	1,439	101,692
General Government	700	471	1,195	327	423	21,020
Judicial	44	38	167	38	17	4,260
Public Safety	241	196	682	248	891	6,797
Public Works	1,443	628	1,153	335	456	11,667
Health	209	224	249	64	43	6,186
Culture and Recreation	112	93	59	11	2	3,529
Welfare	376	860	1,114	834	360	37,867
Miscellaneous	67	179	70	75	49	366
	Fremont	**Huerfano**	**Kiowa**	**Lake**	**Las Animas**	**Otero**
Total Revenue	11,346	5,491	2,510	5,241	7,357	8,597
Taxes - Total	3,775	1,896	1,259	3,167	2,045	2,549
Licenses and Permits	114	10	7	13	2	-
Charges for Services	983	215	98	221	267	260
Fines and Forfeits	-	-	-	-	2	4
Miscellaneous - Total	788	560	147	559	368	467
Intergovernmental - Total	5,686	2,810	999	1,281	4,673	5,317
Total Operating Expenditures	10,742	4,811	2,041	4,350	6,229	8,215
General Government	2,491	1,372	463	1,250	1,156	1,465
Judicial	360	51	15	153	107	163
Public Safety	1,338	557	117	792	436	415
Public Works	1,806	943	1,003	681	1,750	1,181
Health	245	171	46	198	158	514
Culture and Recreation	19	64	74	219	24	50
Welfare	4,372	1,600	284	625	2,557	4,287
Miscellaneous	111	53	39	432	41	140
	Park	**Prowers**	**Pueblo**	**Teller**	**ESA**	
Total Revenue	6,913	6,019	56,189	6,106	244,709	
Taxes - Total	2,338	2,140	24,219	2,713	110,532	
Licenses and Permits	93	3	43	151	1,192	
Charges for Services	543	340	1,390	373	10,986	
Fines and Forfeits	3	-	-	28	131	
Miscellaneous - Total	826	239	2,305	323	14,498	
Intergovernmental - Total	3,111	3,297	28,232	2,518	107,370	
Total Operating Expenditures	6,057	4,946	48,849	5,477	217,348	
General Government	1,831	1,128	10,217	1,516	47,026	
Judicial	67	107	1,351	75	7,013	
Public Safety	905	523	6,331	1,121	30,787	
Public Works	2,254	877	2,106	991	29,273	
Health	346	262	789	163	9,867	
Culture and Recreation	157	89	230	190	4,920	
Welfare	497	1,806	27,461	1,375	86,275	
Miscellaneous	-	154	364	46	2,187	

TABLE 2-10
PILT (Payment in Lieu of Taxes) in ESA
FY 91

County	Dollar Amount
Baca	113,471
Bent	2,054
Chaffee	322,898
Crowley	443
Custer	75,388
El Paso	59,634
Fremont	315,632
Huerfano	20,992
Kiowa	820
Lake	119,879
Las Animas	208,569
Otero	98,018
Park	202,106
Prowers	-
Pueblo	43,548
Teller	98,738
ESA Total	1,682,190

It should be kept in mind that the economic data presented here does not reflect any changes to Teller and surrounding counties from gaming. Gaming related activities started in October 1991 in Cripple Creek, which is located in Teller County. It is too early to report the actual magnitude of growth that has come to Teller County and surrounding counties, but estimates have been made by the Regional Planning Commission in a July 1991 Report "Teller County, Cripple Creek, Visitor Regional Plan and Gaming Impacts Study." Future studies for the area will assess actual impacts to Teller and surrounding counties.

The report, however, estimates that gaming revenue would be $71,300,000 during a 1-year period. The number of new employees would be 350 as of October 30, 1991, and would rise to upwards of 1,650 when the market stabilized over time. The number could rise to 2,430 employees in gaming and related sectors. It was estimated in the report that 50 percent would live in Teller County by the time gaming stabilized. The 1,215 new employees for Teller County would represent an increase of 30 percent over the 1988 workforce. Thus, the data discussed above on impacts on travel on some ESA counties will be changing significantly.

Government/BLM Budget Management Costs: Table 2-12 provides information on the BLM budget in the Royal Gorge Resource Area and a general breakdown of budgeted items. The split between labor and expendituresfor operation and maintenance is about 55 percent for labor and 45 percent for other.

TABLE 2-11
Impact of Travel on ESA Counties - 1988
(Dollar Amounts in Millions)

County	Jobs	Annual Wages	Local Taxes	Overall Expenditures	Percent of Workforce
Baca	63	0.523	0.019	2.620	3.0
Bent	101	0.817	0.056	3.978	4.0
Chaffee	848	6.761	0.687	32.295	14.0
Crowley	2	0.033	0.000	0.226	0.1
Custer	46	0.386	0.014	2.061	6.0
El Paso	13,103	112.537	9.905	517.564	6.0
Fremont	729	5.847	0.502	27.688	6.0
Huerfano	274	2.196	0.154	10.526	11.0
Kiowa	35	0.288	0.010	1.404	3.0
Lake	155	1.253	0.123	6.170	7.0
Las Animas	631	5.048	0.199	24.112	12.0
Otero	469	3.757	0.275	17.814	45.0
Park	272	2.299	0.090	2.242	13.0
Prowers	603	4.802	0.445	22.947	8.0
Pueblo	891	7.435	0.938	34.882	2.0
Teller	301	2.577	0.101	13.947	8.0
Total ESA	1,8523	156.559	13.518	730.476	5.5

TABLE 2-12
Royal Gorge Resource Area BLM Budget
FY 1991

Budget Item	Dollars
Minerals	100,886
Lands	126,121
Forest Management	32,607
Range Management	21,554
Cultural	57,384
Wilderness	11,901
Recreation Management	353,184
Soil and Water	34,474
Wildlife	100,362
Wild Horse and Burro	407,147
Other	261,576
Total	1,707,196

The fiscal year 1991 budget for the Royal Gorge Resource Area was about $1.7 million. Amounts in the table do consider funding support for the district office in Cañon City.

VEGETATION MANAGEMENT

Vegetation management is the process of describing and achieving the plant community that would best support a desired resource use and resource condition on a site-specific basis. The variable climate, elevation, and soils of the Royal Gorge Planning Area are conducive to extremely varied vegetation. In this document, the vegetation in the planning area is classified into three major groups: grassland, shrubland, and forestland. These groups are broken down as follows:

Grassland Group

This group includes the grass and meadow types and covers approximately 260,000 acres of BLM-administered land or 39 percent of the planning area. Types within the grassland group are blue grama at 5,000 to 9,000 feet; mountain muhly at 8,000 to 10,000 feet; and Arizona fescue at 9,000 to 11,500 feet. These types intergrade with each other and exist throughout the resource area within specific elevational zones. Each occurs as extensive acreages or as very small parks within shrub or forest types. The grassland type provides forage for big game and is critical for the survival of grassland adapted species. Typical species are pronghorn antelope, coyotes, ferruginous hawks, and prairie dogs. Severely disturbed sites are dominated by annual weeds or shrubs, but these are not extensive and generally occur in creek or canyon bottoms, around water, or in small parks within forest or shrub types.

The meadow type includes the sedge-rush and brome meadow subtypes. Sedge-rush meadows are mostly in South Park, and brome meadows are at mid to high elevations throughout the resource area.

Shrubland Group

This group includes the piñon/juniper type at 5,000 to 10,000 feet elevation and covers approximately 300,000 acres of BLM-administered land or 45 percent of the planning area; the mountain shrub type at 6,000 to 9,500 feet; sagebrush at 7,500 to 10,000 feet; and saltbrush at 5,400 to 5,500 feet.

Piñon/juniper is the most significant shrub type because of the large area it covers. It grows in shallow rocky soils on ridges, in deep soils in valleys, and on benches. Piñon dominates at higher elevations, juniper at lower. Relative forage production depends mainly on the successional stage of the vegetation. Mature stands support little or no understory vegetation. Young stands support a productive and diverse plant community that includes grasses, forbs, and shrubs and has a higher percent of the soil surface covered by live plants than does the mature stand. In certain areas this type provides winter range for elk and mule deer. Species such as piñon jays and piñon mice are dependent on this type.

The mountain shrub type is dominated by Gambel oak and mountain mahogany. These occur predominately in the Arkansas Canyon area or on shallow rocky soils. This type is less extensive than the piñon/juniper type, but it is important because it contributes a significant amount of forage and cover where it occurs. It is important yearlong range for many big game animals, and its variety of plant life makes it critical for many other species. Many shrub-nesting birds are dependent on this type. Gambel oak is often an early successional stage following fire in forest types.

The sagebrush and saltbrush types are less important since they occupy relatively little area on BLM-administered lands. Elk and mule deer use the sagebrush on winter ranges as winter browse.

Forestland Group

The conifer and deciduous forest types make up the forestland group. These cover approximately 100,000 acres or 16 percent of the BLM-administered land in the planning area. The major conifers include ponderosa pine at 5,000 to 9,000 feet, lodgepole pine at 9,000 to 11,500 feet, Douglas-fir at 6,000 to 10,000 feet, and Engelmann spruce at 9,000 to 11,500 feet. Major deciduous types are aspen at 5,000 to 11,500 feet, narrowleaf cottonwood at 5,000 to 8,000 feet, and plains cottonwood at 5,000 to 6,000 feet. These areas provide important summer habitat for elk and mule deer and in some areas also serve as calving and fawning range. Black bear, blue grouse, snowshoe hare, and short-tailed weasels are common in this type.

Ponderosa pine occurs in open stands with productive understory of grasses, forbs, and shrubs. Other conifer types are less abundant in the planning area.

Aspen usually occurs within the conifer types where moisture and light are favorable. Aspen generally has a highly productive grass-forb understory.

The two cottonwood types are limited in size and distribution but are important to livestock and wildlife. These types are associated with streams, springs, or high water tables and usually support productive grass or meadow understories.

Monitoring and Studies

In 1977 and 1978 an inventory was conducted to determine range condition, trend, and grazing capacity for each grazing allotment. The method used for evaluating range condition is similar to the one used by the Soil Conservation Service in which the concept of climax is a measure of optimum range condition. Similarity to climax is judged by similarity to maximum species diversity in addition to production of usable forage species. The range condition rating was lowered when production was lower than what would be expected considering current growing conditions.

The following guide was used to break down range condition classes:

Excellent: More than 75 percent of the total vegetation is composed of the potential natural vegetation. An evenly distributed mixture of grasses, forbs, and shrubs are present. Major native forage grasses occur on open unprotected areas. Undesirable vegetation is absent.

Good: 50 to 75 percent of the total vegetation is composed of the potential natural vegetation. An evenly distributed mixture of grasses, forbs, and shrubs are present. Major native forage grasses occur on open unprotected areas. Undesirable vegetation is nearly absent.

Fair: 25 to 50 percent of the vegetation is composed of the potential natural vegetation. Moderate variations of grasses, forbs, and shrubs exist. Some major native forage grasses occur in open, unprotected areas. Limited amounts of undesirable vegetation are present.

Poor: Less than 25 percent of the vegetation is composed of the potential natural vegetation. Poor variation exists among grasses, forbs, and shrubs with an overabundance of undesirable vegetation. Major native forage species are generally protected by shrubs or rocks.

Permanent condition and trend studies were established on 77 management units in 1981 and 1982 to monitor progress in improving condition after implementing changes in season of grazing use, grazing capacity, and grazing system. Since 1981 actual use and utilization data have been collected on 77 Improve and Custodial Category allotments. Actual use is the number of animal unit months used in an allotment in a given year; utilization is the percent of available forage removed from an allotment in a given year. Actual use is derived from ranchers' records; utilization is estimated by BLM personnel at the end of the grazing season. Study exclosures have been monitored for 10 years on Wilson and Tallahassee Creeks and Bighole and Mt. Shavano allotments. The exclosures show long-term effects of protection from grazing on vegetation. Current (1991) condition and trend as reported to Congress is as follows:

Ecological Condition (in acres)

Excellent	Good	Fair	Poor	Unclassified
347	195,493	148,753	169,514	12,378

Apparent Ecological Trend (in acres)

Upward	Static	Downward	Unclassified
2,882	387,879	80,754	181,485

As more condition and trend data is collected and evaluated on Improve and Maintain Category allotments, information will be updated. It is expected that this new data will show more land in good and excellent ecological condition and in an upward tend. This is due to improved range management such as changes in season of use and a new concept of vegetation condition relating existing vegetation to the uses and values determined appropriate for the site. The new concept is called "desired plant community" (DPC) and is the central feature in the BLM 1986 vegetation management initiative. DPC is an expression of the site-specific vegetation management objectives instead of the more common way of stating objectives such as changing vegetation from "poor" to "fair" or from "fair" to "good" conditions. The description of the characteristics of the DPC (species composition, production, cover, structure, etc.) is based on those of a real documented plant community occurring on the same or like site in another area.

DPC goals and objectives would be developed by interdisciplinary teams for geographic reference areas. Each unit is a geographic area similar in land, vegetation, and issues.

An ecological site inventory (ESI) is being conducted in the planning area at the rate of approximately 15,000 acres per year. To date, approximately 55,000 acres have been inventoried. Data collected during an ESI includes delineation of ecological sites, species composition, cover, and production. Completion of an ESI in the Royal Gorge Planning Area will take at least 30 years at the present rate. This is being done first on areas where there are issues involving vegetation. Ecological site inventory has been completed on BLM-administered lands in the Badger Creek Watershed and Three Mile Watershed. Data from the ESI is being used to describe a desired plant community to protect these watersheds. BLM is cooperating with other

agencies on these two watersheds to develop plans to improve water quality.

Ecological site descriptions have not been developed for piñon/juniper woodlands and riparian areas. DPCs will be developed after ESI is completed on Improve and Maintain Category allotments.

Some types of vegetation treatment such as burning, chaining, and firewood harvesting result in a short-term increase in bare ground, which is susceptible to invasion by noxious weeds.

Riparian management is another example of special management of vegetation and is currently applied on pastures in McCoy Gulch, Badger Creek, and Pass Creek. This concept is the practice of managing grazing in riparian areas separately from upland areas.

Demand for vegetation on BLM-administered land as forage for wildlife and livestock is high because of increasing numbers of elk on both public and private land. Also the amount of private land available for livestock grazing has decreased because of subdivison. BLM-administered land acreage remains fairly constant and is not being converted to nonforage producing status, except in very small areas such as developed recreation sites. Since BLM-administered land makes up only about 3 percent of the planning area, vegetation management and use on this land is not of great importance. In Fremont County, however, 34 percent of the county land is administered by BLM; therefore, uses of vegetation on these lands are important.

Recreationists, environmental interests, and BLM policy all support improved management of riparian vegetation to enhance woody riparian vegetation along stream sides.

LIVESTOCK GRAZING MANAGEMENT

The Royal Gorge Planning Area consists of approximately 653,000 acres of BLM-administered land. Grazing is currently managed in accordance with the Royal Gorge Grazing EIS, Raton Basin MFP, and the Eastern Plains Planning Analysis. At present, 337 grazing operators are authorized to graze on 454 allotments. These allotments vary in size from 10 to 35,852 acres of land administered by BLM. Current grazing capacities range from 1 to 1,263 animal-unit months (AUMs). Seventy-six allotments are managed under 69 existing allotment management plans (AMPs). BLM authorizes a maximum of 30,000 AUMs for livestock grazing use; however, the average active grazing use each year is 28,000 AUMs, with the balance in nonuse because of fluctuating livestock market conditions and operations. Of all forage production in the planning area, approximately 3 percent is contributed by BLM-administered land, about half of which is on the larger more manageable tracts.

BLM-administered land is concentrated in the foothill areas of five counties (Chaffee, Fremont, Huerfano, Park, and Teller). Grazing on these lands is most important in Fremont County where most of the large tracts are located. Most of the grazing allotments with allotment management plans are also located in Fremont County. These five counties contain a total of 1,460,855 acres of National Forest land, much of which is also grazed by livestock. Cattle also graze state and private land.

Demand for livestock forage in the planning area is high with only 6 out of 454 unallotted because of subdivisions. When an allotment becomes vacant or when private land is acquired by BLM, there are always applications filed for grazing. Cattle grazing continues to be a dominant use in the planning area.

Of the 337 grazing operators in the Royal Gorge Planning Area, 16 are dependent on land administered by BLM to provide them with a viable ranching operation. The remaining operators either have small amounts of BLM-administered land in their operation, or they have such a small operation they are considered part-time ranchers, and they must supplement their income with other jobs. The stability of the livestock industry in the region as affected by grazing management on BLM-administered lands is indicated by the relative amount of forage provided on lands administered by BLM compared to private lands, the number of operators dependent on these lands, and the number of those operators dependent on livestock for their livelihood.

Presently, the elk population is at or near the Colorado Division of Wildlife (CDOW) Strategic Plan Objectives. Competition for forage between elk and cattle exists on both private and BLM-administered land; however, most of the conflicts are on private land. On allotments where livestock grazing is deferred until mid- or late summer to allow forage plants to develop and complete a life cycle, elk sometimes move in and graze during the deferment period. This results in a shortage of forage for livestock during the grazing season. On some allotments with summer cattle use and elk winter use, inadequate forage remains for elk after cattle use occurs.

Seasonal competition for forage between deer and cattle occurs mostly on private land. During winter and spring, mule deer concentrate on private irrigated hay fields and meadows along Currant Creek and Texas Creek and in the Coaldale, Howard, and Garden Park areas. This concentration results in loss of forage for cattle and damage to actively growing hay fields. During other seasons cattle and deer use are compatible.

Adequate winter range exists on BLM-administered land for cattle and deer. On BLM-administered winter range areas, deer prefer mountain mahogany; however, cattle eat mostly grass. Spring deer forage on lands administered by BLM is limited because much of the vegetation is late seral stage piñon/juniper type, which produces very few preferred forbs.

Grazing use occurs year round in the planning area except at high elevations, which are only used during the summer. A significant amount of the BLM-administered land is only grazed during the dormant season. Most operators on these allotments need to feed hay to sustain their cattle through the winter.

Generally, most operators try to move their cattle off private irrigated hay fields by May 1 to prevent damage to actively growing plants.

Most ranchers in the planning area are involved in cow/calf operations, but yearling operations are increasing. Generally, calving occurs in late winter and early spring, but some operators calve year round. Many operators are part-time ranchers and lease base property from absentee landowners or corporations.

Between 1969 and 1987, cattle numbers changed as shown in Table 2-13. These counties contain 86 percent of the land administered by BLM in the planning area. Table 2-13 shows that in five counties of the planning area, cattle numbers have dropped by about 14 percent. This decrease is probably due to a variety of reasons such as lower cattle prices, restrictions on government grazing permits, deeded land being converted to nonagricultural use, and competition with elk for forage. Elk numbers in the planning area have risen from approximately 10,000 to approximately 30,000 since 1980.

TABLE 2-13
Beef Cattle[1/]

Counties	1969	1974	1982	1987
Chaffee	3,984	3,242	5,422	6,069
Custer	7,066	7,881	5,355	5,648
Fremont	11,488	9,782	6,239	7,847
Park	6,127	6,437	6,873	5,709
Teller	2,364	2,078	1,480	1,451

1/Figures obtained from Fremont County Extension Service. No data available after 1987.

Table 2-14 shows the percentage of BLM-administered land in counties with 86 percent of these lands in the planning area. An average of 13 percent of land in these counties is administered by BLM.

TABLE 2-14
BLM-Administered Land Within A Five-County Area

County	Total Acres	BLM Acres	BLM Percent of County
Chaffee	665,600	52,509	8
Fremont	999,680	338,888	34
Huerfano	1,011,200	70,695	7
Park	1,393,920	73,541	5
Teller	355,200	32,902	9
Total	4,425,600	568,535	13

Several alternatives for rangeland management were analyzed in the grazing EIS, which was completed in 1980. Livestock management under the alternative selected was based on management framework plans (MFPs) of the Royal Gorge and the Raton Basin Planning Areas. Three objectives were defined for rangeland management: (1) improve livestock grazing habitat; (2) provide additional livestock forage on intensively managed allotments above the 1977 through 1978 range survey level; (3) provide livestock forage on a sustained-yield basis to allotments where intensive management is not possible.

The overall goal for range management in the Royal Gorge Planning Area is to develop cost-effective management of 454 grazing management allotments to meet the primary long-term Bureau objectives of improving the resource condition and enhancing environmental values as well as providing livestock forage to help meet the demands of the area and local communities.

As an aid to AMP implementation, BLM developed a system in 1984 that places each allotment into one of three descriptive management categories; maintain (M), improve (I), or custodial (C). Determination of a category depends on resource conditions in the allotment, potential for resource improvements, and amount of BLM-administered land in the allotment. Category M allotments have moderate to high resource production potential and are producing near their potential. No major resource use conflicts nor controversies exist. Opportunities may exist for positive economic return from public investments, and present management is accomplishing the desired results. Those allotments in Category I have a definite potential for improvement and could further approach that potential with more intensive management, range improvements, or a change in use. Those in Category C either do not lend themselves to intensive management or lack the potential to improve under current economic conditions.

Allotments are subject to changes in management category as conditions change in regard to management objectives on a case-by-case basis. For example, an allotment presently in Category I may be changed to Category M if:

Monitoring studies indicate satisfactory progress toward achievement or complete achievement of management objectives outlined in the AMP after a complete evaluation, and;

Evaluation indicates that any existing resource conflicts have been resolved, and;

Present level of cooperation from the operator is expected to continue.

Conversely, a Category M or C allotment may be changed to Category I if it is noted that the present level of management is leading to resource deterioration, new resource conflicts occur, or changes in present management and user cooperation are likely to produce new conflicts or result in resource deterioration. No changes in categorization will be made without consultation and coordination with permittee.

Allotment management plans (AMPs) have been written and signed on 57 Improve category allotments and 12 Maintain category allotments. Originally, 77 allotments were to receive intensive management. Seven allotments were changed to Custodial category after detailed analysis indicated that resource data could not justify further expenditures of money because of the low potential of the grazing lands. Two allotments were changed from Custodial to Improve category after detailed analysis indicated that resource conflicts existed or there was potential for improvement. Two allotments were placed in Maintain category without a written AMP because after detailed analysis the lands were determined to be at an acceptable level of management potential. Twelve Improve category allotments were changed to Maintain categories after satisfactory progress toward achievement of management objectives was accomplished. Two Improve category allotments were combined into one Improve category allotment (see Appendix E).

Actual use and utilization studies have been conducted on all AMP allotments since the completion of the EIS. These studies are conducted on a yearly basis as part of a basic monitoring plan (see Appendix E). The actual use and utilization studies are used to help determine the carrying capacity of these allotments. Adjustments shown to be necessary were implemented by decision letter in 1986. Three AMPs were reduced, 10 AMPs were increased, and 56 AMPs are at the correct stocking rate.

There are 259 Category C allotments. These are mostly small scattered tracts of BLM-administered land in areas mostly privately owned. Grazing permits are issued specifying the period of use, kind and number of livestock, and any other necessary stipulations. There are 203,266 acres with 9,011 AUMs available for use.

The livestock operator or the district grazing advisory board generally pays for all necessary range improvements on Category C allotments with the use of the Murphy Act Funds. Range improvements on Category I allotments are generally paid by BLM with appropriated funds. Generally no improvements occur on Category M allotments, by definition.

Adjustments in stocking rates were made by decision letter in December 1981 to more accurately reflect the estimated grazing capacities on those allotments. These allotments are usually monitored once every 10 years.

Table 2-15 shows the rest standard used in the development of grazing systems on the AMPs.

Range improvement projects are being developed on Improve category allotments to help implement the grazing management program. It is the policy of BLM that range improvements be maintained by those who benefit in a manner consistent with multiple use management. Maintenance of all improvements constructed solely for the benefit of the livestock operations have been turned over to the operators. Maintenance by the operator is required in each AMP and cooperative agreement for that project. Range projects completed from 1980 to the present include: 58 spring developments and 10 water troughs; 18.75 miles of rebuilt or new fence construction; 2 rainfall catchments; 2 miles of water pipeline; 9 cattle guards; 1 windmill; 6 reservoirs; 4 three-way exclosures; 41 piñon/juniper clearcuts for a total of 257 acres; and 3,796 acres of piñon/ juniper thinnings. New technology in range improvements has been developed; solar powered fences and stock water pumps are becoming important range improvements because of the reasonable cost and ease of maintenance.

In the grazing EIS, 18,530 acres of woodland were identified for woodcutting to improve forage production. Since 1977, 35,193 cords of firewood have been sold from approximately 5,028 acres.

Approximately 2,340 acres were identified for prescribed burning; to date two burns have been completed totalling 380 acres. Additional acreage will be burned as plans are approved in accordance with the approved RMP/final EIS.

Management framework plans (1977, 1979), the grazing environmental impact statement (1980), the Rangeland Program Summary (1980), and subsequent updates (1981, 1983, 1987, 1992) are available in the Royal Gorge Resource Area for review. Each successive document updates the rangeland program in the resource area. Decisions in the final RMP will replace these documents.

Special grazing management on BLM-administered lands includes new grazing methods that meet the rest standard, new technology in range improvement projects, and cooperative management involving other agencies. Holistic resource

TABLE 2-15
Tolerable Utilization in Managed Grazed Pastures

Species	Percent Utilization Tolerable in Grazed Pastures[1/]	Crucial Rest Period	Percent Utilization Tolerable in Grazed Pastures[2/]	Crucial Rest Period
Arizona fescue *Festuca arizonica*	80	4/25 through 8/25 2 years in 3	50	None
Mountain muhly *Muhlenburgia montana*	75	5/5 through 9/152 years in 3	40	None
Indian ricegrass *Oryzopsis hymenoides*	75	4/20 through 7/52 years in 3	40	None
Needle-and-thread *Stipa comata*	70	4/20 through 7/10 2 years in 3	30	None

[1/]Type of grazing would be high intensity, low frequency. These are maximum levels of utilization allowable on an area in good or excellent condition. These levels would be lower on areas in poor or fair condition, and in years of below normal precipitation. Period of use would also change allowable utilization levels. Heavy utilization (60 to 80 percent) can be tolerated by plants if given 2 years rest following the growing season (Hyde, et al., 1979).
[2/]Type of grazing would be yearlong. Grazing cannot exceed moderate use (50 percent) if pastures are used every year during the growing season.

management (HRM), short-duration grazing, and time-controlled grazing are some of the new methods of livestock grazing being used in the planning area. HRM stresses holism in the management of resources as opposed to managing individual resources. The concept of time management, as opposed to animal numbers, is used to control overgrazing, overrest, and other plant, soil, and animal relationships. HRM provides a model that outlines goal setting, ecological principles that need to be addressed, and guidelines for selecting management tools. HRM involves constant planning, monitoring, replanning, controlling, and testing. This management approach would only be allowed if total commitment for the program is obtained from the permittee. HRM is being practiced on one allotment.

Short-duration and time-controlled grazing are management tools often used in HRM but can also be used in traditional grazing systems such as rest rotation and deferred rotation. Both short-duration and time-controlled grazing limit the amount of time plants are exposed to grazing. In short-duration grazing, periods are set with a predetermined grazing schedule. In time-controlled grazing, periods are determined by monitoring growth rates on forage and constantly checking utilization of forage. When growth rate or utilization level warrants it, cattle are moved to the next pasture. A few other AMPs are incorporating short-duration grazing or time-controlled grazing into existing deferred rotation grazing systems.

Riparian pastures are being developed by fencing manageable units of land from the rest of an allotment. The riparian pastures contain both riparian vegetation and upland vegetation. Short-duration grazing is usually practiced in the riparian pastures. Riparian pastures exist on McCoy Gulch, Two Creek, Elevenmile Canyon, Rattlesnake, Badger Creek; Hamilton Creek, and Texas Creek Allotments. More riparian pastures will be developed as funding allows.

Cooperation with other agencies to improve livestock grazing management on land units with mixed ownership is ongoing. Watershed improvement plans involving numerous Federal and state agencies have been developed for Badger Creek and Three Mile Creek. Private landowners, Colorado Division of Wildlife, and BLM are cooperating in the Habitat Partnership Program to solve elk-livestock conflicts in parts of the planning area. BLM manages allotments that contain Forest Service pastures through a cooperative agreement with the San Isabel National Forest. The agreements exist on Kerr Gulch, Howard Creek, and Stirrup Ranch AMPs.

RIPARIAN AREA MANAGEMENT

Riparian areas are defined as areas of land directly influenced by permanent water, which has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and streambanks are typical riparian areas. Some sites are excluded, such as ephemeral streams or washes that do not exhibit the presence of vegetation dependent on free water in the soil.

Riparian areas make up about 1 percent of the land in the planning area, but these lands are disproportionately more important than other land types because of their high value for wildlife, recreation, and livestock grazing.

In the 11 western states, there are 47,010 miles of streams on BLM-administered land and 1,258,610 acres of riparian areas. Colorado has 3,750 miles and 67,850 acres of this total. The planning area has 267 miles of streams and approximately 2,550 acres of riparian area. This consists of

1,980 acres along 131 perennial rivers and streams, and 570 acres around 10 lakes and reservoirs.

Most riparian vegetation on BLM-administered land in the planning area is along the Arkansas River and its tributaries between Cañon City and Buena Vista. Most of the riparian areas on BLM-administered land, associated with ponds, lakes, and reservoirs, are adjacent to irrigation reservoirs in the lower Arkansas River Valley.

Currently, condition and trend data is available on 122 streams and rivers covering 1,500 acres and 215 miles, and on 5 lakes, ponds, and reservoirs covering 150 acres (data collected in 1989 and 1990). The inventory procedure used was in compliance with BLM Manual 1737, Riparian Area Management. The inventory was mostly an aquatic inventory with estimates of riparian condition and trend taken at each reach along a stream (Table 2-16).

A complete list of riparian areas in the Royal Gorge Planning Area is in Appendix F.

Livestock grazing, mineral development, recreation, road construction, and off-highway vehicle use can result in disturbance of vegetation and streambanks. When the disturbance is repeated or extensive, the damage can be severe.

Livestock grazing use causes the most extensive damage in riparian areas. Most of these areas in the resource area are located in grazing allotments with allotment management plans, most of which have no riparian objectives. Season of use and grazing systems were designed to provide periodic rest from grazing for upland species. Implementation of AMPs have resulted in improvement to some riparian areas and probably degradation to others, mainly because vegetation in these areas has different growth rates and a different growing season than upland vegetation. A grazing system that works on upland species may degrade a riparian area, if riparian issues are not addressed in the AMP.

Some type of grazing management occurs on 175 miles of riparian areas in the planning area. The minimum amount of grazing management on these areas is a set season of use

TABLE 2-16
Riparian Condition and Trend on BLM-Administered Land[1/]

Stream Name	Miles On BLM Administered Land	Riparian Condition[2/]	Riparian Trend
Arknsas River (Browns Canyon)	10.25	Fair	Stable
Arkansas River (Heckendorf)	6.00	Good	Stable
Arkansas River (Echo)	20.00	Good	Stable
Arkansas River (Lower)	4.50	Fair	Stable
Badger Creek (Lower)	4.25	Fair/Poor	Downward
Barnard Creek	3.25	Excellent	Stable
Cottonwood Creek	6.25	Good	Upward
Cucharas River	2.75	Fair	Upward
Crooked Creek	1.25	Poor	Stable
Currant Creek	4.25	Good/Excellent	Upward
East Fork Arkansas River	4.75	Excellent	Stable
East Fork West Beaver Creek	1.25	Good	Stable
Eightmile Creek	7.00	Good	Upward
Four Mile Creek	6.00	Fair	Stable
Grape Creek	19.00	Poor	Downward
Grape Creek (Temple Canyon)	3.25	Fair	Upward
Hamilton Creek	2.50	Excellent	Stable
Low Pass Gulch	1.25	Excellent	Stable
Muddy Creek	1.25	Fair	Stable
Poncha Creek	1.25	Good	Upward
Purgatoire River	1.50	Good	Upward
Tallahassee Creek	3.25	Good	Stable
Tarryall Creek	1.75	Fair	Stable
Texas Creek	.75	Good	Upward
Total	117.50		

1/Criteria includes at least 1 mile of stream length and contains a fishery
2/BLM Manual 1373, Riparian Area Management has complete definition.

and a set number of livestock. Some allotments have more complex grazing systems.

Uncontrolled, season-long use during the spring and summer usually results in overgrazing of the streambanks. During high water events, unprotected banks offer less resistance to erosive effects of flowing water and inhibit the natural function of riparian areas such as bank building, silt filtering, and water storage. The result often times is down-cutting and lateral movement of the streambed, which results in loss of riparian vegetation. Grazing in the fall can also damage riparian areas. Grasses are least palatable in the fall so livestock tend to shift grazing pressure to woody riparian vegetation such as cottonwoods and willows. The smaller trees and shrubs are heavily browsed, sometimes to a point where all regeneration stops. When the mature trees and shrubs eventually die out, the streambank is unprotected.

Damage to riparian areas from recreation, road construction, mineral development, and OHV use tends to cause some of the same consequences as improper livestock grazing, only on a smaller scale.

Riparian areas are very important because of their high value for fish and wildlife habitat, livestock forage, watershed, water quality, and recreation use. This high demand combined with the fact that riparian areas make up only about 1 percent of BLM-administered land results in most user conflicts taking place in riparian areas. Public support for improved riparian management is widespread, and BLM policy places riparian management as a high priority.

Riparian projects; i.e., willow and cottonwood plantings, have been completed on the Arkansas River and most of the major tributaries.

Since 1987, BLM policy has been that each resource area will have at least one riparian demonstration area; four of these have been established in the Royal Gorge Planning Area (Texas Creek, McCoy Gulch, Pass Creek, and Badger Creek). These demonstration areas show the effects of various types of grazing management ranging from exclusion of grazing to short-duration grazing on riparian areas typical of the planning area. These areas are managed by a method called the riparian pasture concept. Monitoring studies have shown significant improvement in riparian areas that have been shifted from a standard grazing method like deferment to the riparian pasture concept.

Currently, management of riparian areas is guided by 77 allotment management plans and 3 habitat management plans. Ten AMPs have specific riparian objectives.

FOREST AND WOODLAND MANAGEMENT

Thirty-eight percent (248,762 acres) of BLM-administered land in the Royal Gorge Planning Area is occupied by forest cover types that can be grouped into commercial forest land or into woodlands. Total commercial forest land (CFL) consists of 97,062 acres (39 percent) and woodlands (piñon/juniper) 151,700 acres (61 percent). All commercial and woodland forest acres are then assigned to one of the following four management categories:

Lands Available for Intensive Management of Forest Products (LIFP): Forest management in these areas is one of many uses; however, other uses or resource values are not emphasized. The acreage consists of 44,569 acres of suitable CFL and 48,285 acres of productive operable woodlands (92,854 acres total). The woodlands acres projections are from lansat (land satellite).

Lands Available for Restricted Management of Forest Products: Multiple use or resource values are emphasized in these areas, and selective harvesting and extended rotation are generally applied. No forest acres were inventoried in this category.

Lands Where the Forest will be Managed to Enhance Other Uses: Forest management is tailored in these areas, and forest products are harvested specifically to benefit other identified resource values or uses. The acreage consists of 54,822 acres of CFL not currently economical to harvest or are biologically unsuitable for sustained forest management. Also 103,415 acres of nonoperable woodlands are included (158,237 acres total). Forested acres now in wilderness study area status are presently assigned here.

Forest Lands Not Available for Management of Forest Products: Forest management is excluded in these areas. This category would include forested acres in designated wilderness or primitive areas. No acres have been inventoried in this category at the present time.

The allowable harvest level for this planning period will come from the forest types assigned LIFP. These acres are currently operable with existing equipment and technology.

The "Cañon City District Ten-Year Forest and Woodland Management Activity Plan and Programmatic Environmental Assessment" is the decision document that established the present harvest levels within the resource areas in the Cañon City District. It was approved November 19, 1990. The Cañon City District was established during the early 1970s as one sustained-yield unit, and harvest levels are established district-wide then allocated to the resource areas. The approval of the 10-year plan was to coincide with the publication of the draft San Luis Resource Management Plan and after approval of the Northeast Resource Management Plan.

The primary objective of the Cañon City forest and woodland management plan is to increase or maintain the productivity of the forest ecosystem as reflected by the condition of the soil, water, and vegetation to avoid long-term adverse effects on productivity. The forest practices used must be biologically, economically, and environmentally feasible.

The 10-year plan provided for an extended, or long rotation, even-age forest management process on the forest lands presently classified as either suitable CFL or productive operable woodlands acres in the Cañon City District. Uneven age management is not precluded, but is not planned to be used in significant acreage. The plan provided an area control regulation system involving harvesting forest products from 253 acres of suitable CFL and 215 acres of woodlands (in the RGPA) annually, rather than a "volume control" allowable cut calculation.

During the early 1970s, BLM accomplished an inventory of the forested lands within the Cañon City District. Approximately 200 MMbf (million board feet) of softwood lumber were produced from Colorado forests annually, both public and private, during the 1970s. The RGPA harvest level set by the MFP was 1.0 MMbf. During 1978 a total of 2.7 MMbf sold from forest lands within the RGPA represented 1.3 percent of the statewide harvest and 12 percent of the 23-MMbf demand (at the time) within the 10-county area. Since 1983 the average has been much less. In 1984, with the culmination of the first stand-by-stand inventory, this harvest level was changed to 1.7 MMbf since acres within the resource area were counted, not just sampled. With the 1990 approval of the 10-year plan, this has been reduced again to about 1.4 MMbf.

Funding for the district forestry program has steadily decreased since the early 1980s from a peak of 118 workmonths in 1981 to 21 workmonths in 1991. In part because of these funding constraints, the available harvest level for sustained yield has not been met for several years. The FY 1991 available sale quantity (ASQ) was set at 550 Mbf.

Commercial Forest Land (CFL)

All forest land capable of yielding at least 20 cubic feet per acre per year of commercial tree species is included in this category. The following tree species are those valued as important by the local forest industry: ponderosa pine (PP), Douglas-fir (DF), Engelmann spruce and subalpine fir (ES), lodgepole pine (LP), white fir (WF), and aspen (A). The acreage distribution by county and species is shown in Table 2-17.

The suitable commercial forest lands (S-CFL) are capable of producing between 20 and 49 cubic feet per acre per year. These forest acres are commonly an ecotone between the valley floors and the more continuous forest environment on the adjacent national forest land or isolated mountains, for example, Waugh Mountain. Many of the stands are narrow stringers or isolated patches averaging about 50 acres in size. Sparse, patchy groups of trees and small isolated stands less than 10 acres in size were not typed nor included as suitable forest land.

S-CFL are those lands capable of sustaining long-term wood fiber production. The nonsuitable commercial forest lands are those incapable of sustained long-term wood fiber because of their fragile nature or inability to adequately reforest under existing harvesting or reforestation technology. These could

TABLE 2-17
Total Forested Acres (CFL)

County	Forest Land	ES	LP	PP	DF	WF	A	Total
Chaffee	CFL	32	2,042	2,601	2,723	-	123	7,521
015	S-CFL	-	1,832	1,257	1,082	-	123	4,294
Custer	CFL	-	-	2,010	812	-	25	2,847
027	S-CFL	-	-	1,375	235	-	25	1,655
El Paso	CFL	25	-	1,370	1,160	-	-	2,555
041	S-CFL	-	-	-	-	-	-	-
Fremont	CFL	4,809	145	28,697	12,361	349	6,176	52,537
043	S-CFL	3,345	113	8,945	4,291	249	3,965	20,908
Huerfano	CFL	599	720	4,205	2,214	83	1,650	9,471
055	S-CFL	110	136	2,122	577	83	845	3,873
Lake	CFL	559	5,318	-	209	-	17	6,103
065	S-CFL	317	3,877	-	62	-	-	4,256
Las Animas	CFL	-	-	541	-	-	-	541
071	S-CFL	-	-	520	-	-	-	520
Park	CFL	1,124	162	2,347	1,380	-	2,151	7,164
093	S-CFL	921	162	1,877	785	-	2,143	5,888
Teller	CFL	1,187	-	4,626	1,428	-	1,082	8,323
119	S-CPL	385	-	686	17	-	280	1,368
Total	CFL	8,335	8,387	46,397	22,287	432	11,224	997,062
	S-CFL	5,078	6,120	16,782	7,069	332	7,381	42,762

also be isolated patches of timber, over 10 acres in size, where road construction for physical access would be economically impossible (an example could be a 15-acre tract surrounded by several miles of unroaded, generally steep slopes, mainly filled with rock outcrops). Nonsuitable forest lands were identified during the Timber Production Capability Classification Inventory (TPCC) completed 1983.

Approximately 35 percent of the conifer commercial forest acres have had some type of harvest entry during the past 20 to 25 years. Additionally, 7 percent of the aspen stands have been entered. Many of these areas cut prior to 1980 appear to have had diameter-limit timber sale contract stipulations that allowed removal of all trees greater than a given diameter. Unfortunately, the residual stands are now poorly stocked with smaller, suppressed or intermediate trees, and a few low-quality sawlog size trees per acre, which are commonly infected with dwarf mistletoe.

The regeneration occurring naturally in these stands is highly vulnerable to infection by the dwarf mistletoe present in the overstory. At present, the western spruce budworm is the most damaging insect pest to the Douglas-fir and white fir. The aspen stands are mature and appear generally healthy. Aspen clones, however, begin deteriorating in vigor and volume after age 80. If aspen is to be regenerated vegetatively, it should be harvested between ages 80 and 120 so adequate sprouting is possible. White trunk rot is responsible for nearly 60 percent of the decay loss in aspen. Several canker and leaf diseases are also common. White pocket rot, rust-red stringy rot, and red-brown butt rot are very common decay loss pathogens in the conifer stands. Because of the extent of the cutover acres, the predominantly mature age classes, and the presence of forest pests, the commercial forest lands are in fair to poor condition and in a deteriorating trend.

Table 2-18 summarizes the operable productive forest land in the planning area.

TABLE 2-18
RGPA Timber Summary
Suitable Commercial Forest Land

Size Class	Sawtimber/Conifer Stocking	Acres Treated (Effective 1/15/90)	Acres Untreated (Effective 1/15/90)
1. (.1 - .0")	0 (unstocked)	36	-
	1 (poor)	10	-
	2 (medium)	-	-
	3 (well)	111	-
2. (1.0 - 4.9")	0	60	-
	1	105	-
	2	162	50
	3		76
3. (5.0 - 8.9")	0	-	-
	1	1,680	1,917
	2	3,060	4,842
	3	822	2,599
4. (9.0 - 15.9")	0	-	-
	1	1,598	6,029
	2	1,564	7,471
	3	172	2,572
5. (16" +)	0	-	-
	1	82	348
	2	-	-
	3	-	15
Subtotal Conifer		9,462	25,919
	Aspen Summary		
1.	0	7	-
2.	2	-	142
	3	262	1,327
3.	1	-	30
	2	213	1,664
	3	10	3,726
Subtotal Aspen		492	6,889
Total All Forest		9,954	32,808
Areas Without Access		3,986	20,106

Historically, the demand for both firewood and sawlogs has been good for all conifer species (Douglas-fir, ponderosa pine, spruce, white fir, lodgepole pine), but generally poor for aspen except for small quantities for the domestic firewood market. Recent trends in the loss of primary manufacturing facilities (sawmills) within the resource area may have dramatically reversed this demand. The *Colorado Forest Products Directory* lists 16 firms in the 10-county area that are primary processors of sawlogs from conifers. As of June 1990, only 11 of these still remain with a total mill capacity of about 14 MMbf (down from approximately 23 MMbf). The forest products produced include timbers, fencing, dimension, house logs, paneling, siding, ties, posts and poles, fuelwood, and shavings.

Eighty-four percent of the commercial forest land in the Cañon City District is in the planning area. Calculated on a uniform number of acres available each year (area regulation), an allowable harvest of 301 acres for the entire district needs to be harvested annually. The 84 percent of this calculation that needs to harvested from the RGPA is approximately 253 acres or approximately 1.4 MMbf. This is 11 percent of the local demand; however, it represents 36 percent of the demand from the area surrounding Fremont, Chaffee, Lake, and Custer Counties where 72 percent of the commercial forest land in the RGPA exists.

To accomplish the forest management goals in the MFP, harvesting is based on a 5-year timber sale plan. Areas scheduled for treatment are chosen first if the stand is being affected by an insect or disease problem. The next stands chosen are those where multiple resource benefits can occur; e.g., the Jack Hall Mountain Timber Sale of 1988, which met an objective of the allotment management plan (AMP), forest management plan (FMP), and habitat management plan (HMP) of thinning in a particular Engelmann spruce stand. The last stands chosen for treatment are those where the benefit is mostly for the timber management of that stand. An example would be a decadent stand (where net loss exceeds net growth of wood fiber) with regeneration as a timber management decision.

Firewood sales, where the average stem diameter removed does not meet the minimum acceptable to be used for lumber, have been an extremely effective tool for regenerating stands of lodgepole pine infected with mistletoe. Species other than lodgepole pine or piñon/juniper have been harvested as sawtimber sales, usually followed by a commercial or family firewood entry to achieve the best utilization within the limited resource available.

Forest management plans exist for the Mt. Elbert and Tallahassee Forest Management Areas and for the Kerr Gulch and Waugh Mountain Areas. These areas account for a total of 25,485 acres or roughly 25 percent of the forest land in this resource area. Management of the remaining 75 percent is directed only through site-specific environment analyses, the 10-year plan, or the MFP.

Woodlands

Juniper is normally the first occurring tree species at the lowest elevation. As elevation increases, piñon becomes more common and the typical piñon-juniper woodland becomes prevalent. Piñon-juniper communities usually have an understory of grasses and shrubs adapted to arid conditions. Precipitation averages 10 to 15 inches annually, and elevations range from 5,000 to 9,000 feet. The few stands of limber pine or bristlecone pine would be treated as woodlands. They are generally located on shallow, rocky exposed ridges at or near timberline. Gambel oak (no acreage included as woodlands since they rarely attain heights of more than 20 feet) is normally in the upper portion of and just above the piñon-juniper woodlands. It commonly forms large, dense thickets on many sites, which impedes the establishment of conifers. Plains cottonwood, narrow leaf cottonwood, Rio Grande cottonwood, and peach-leaf willow may occur in some drainages. No harvesting of forest products is planned in these drainages or in riparian areas. Productive, operable woodlands are those stands located on slopes of 35 percent or less that in January 1980, the date of the lansat flight used, had a crown closure averaging 40 percent or more. Nonoperable woodlands are those stands that on January 1, 1980, existed on slopes greater than 35 percent, or had crown closures averaging less than 40 percent.

The piñon-juniper woodlands generally exhibit a wide range of diameters and stocking density. Most of the stands are, however, mature or approaching maturity. Mature stand volumes range from 7 to 10 cords per acre for the productive operable acres. Insects and diseases are rare in the piñon-juniper cover type, although a few small, scattered pockets of mortality caused by various root rots (primarily shoestring root rot) are present especially in the Cotopaxi area. Generally the woodlands can be described as healthy and fully nourished.

The bidders list for firewood sales, both in commercial or noncommercial, has decreased from 240 names in 1983 to 26 names at present. Most current contracts should remain under 100 cords to ensure qualified bidders for the sales. Several sawmills and fuelwood producers in the Cañon City area have regularly bid on forest product sales offered by the Bureau. Although three to four contractors who (by observation) tend to use products on BLM-administered land more regularly than others, none depend on these sources exclusively for their wood.

The available sale quantity (ASQ) for woodlands was set by using an area regulation plan utilizing a 1983 inventory of the piñon woodlands. The inventory was completed from computer interpretation (correlated by aerial photo interpretation) of digital information from lansat. An annual harvest of 215 acres of woodlands would allow for a 175-year growing period (for the average tree to reach 10 inches in diameter) and a 25-year regeneration lag.

Approximately one-half million cords of fuelwood are produced from lands within the state of Colorado annually. During 1983, 6,220 cords of fuelwood sold from both the suitable CFL and the woodlands represented a significant contribution to the fuelwood demand in the state. Since 1983 this contribution has declined sharply for many reasons.

The woodlands program has consisted of chaining maintenance through sales of transplants, Christmas trees, and firewood sales. Firewood sales in the woodlands consist of piñon pine and juniper sold to families as individual permits, or as large commercial sales to the highest bidder using timber sale contracts. Demand for forest products, both commercial and private, has dropped off from what it was in the early 1980s, but there is still considerable demand for firewood and Christmas trees.

Regeneration Methods

Clearcutting is the removal of a stand or a portion of a stand in one cutting, which would be used as the primary method of harvesting lodgepole pine and aspen stands. Regeneration in lodgepole pine stands would be obtained from seed left on slash from trees cut in the harvest operation, and from natural seeding from adjacent stands (approximately 50 acres per year). In aspen stands, regeneration from vegetative sprouting would be featured (approximately 78 acres per year). Another variant of clearcutting is the seedtree method, which leaves a small number of trees either singularly or in small groups as a source of seed for natural regeneration. This could be very useful in areas where visual resources are important. The danger of losing the seed trees to windfall would prevent the heavy use of this system.

Shelterwood method (frequently a two-stage system) involves removing enough of an existing stand in one operation to enable a new stand to be established under the remaining mature overstory. The two-stage shelterwood harvest system would be predominantly used in the mixed conifer types (ponderosa pine, Douglas-fir, white fir). In spruce stands, group selection (10 to 20 tree groups) and very small clearcuts (1 to 3 acres in size) would be used. The harvest entry would generally consist of removing dead, dying, and damaged trees as well as those trees susceptible to attack from insects and disease. This first operation combines the preparatory cut and the seed cut (approximately 165 acres per year). The percentage of the original stand to be left as the seed source and shelterwood would vary from site to site depending on the incidence of pests, the susceptibility to windthrow, the harshness of the site, and the seeding characteristics of the species involved. Normally 20 to 40 percent of the original stand would be left until regeneration occurs, then the overstory removal cut would occur. Approximately 10 to 15 years would normally elapse between the initial entry step and the final harvest of the overstory volume. By utilizing a two-stage shelterwood system rather than a three stage, more volume is removed in each operation, and the chance of a more profitable sale is improved. Also, a slightly heavier removal during the initial entry should result in additional site preparation resulting from the movement of more logs over the soil surface. To emphasize biodiversity, the final removal step can be omitted or reduced, and the residual shelterwood left to provide visual mitigation, wildlife trees, source of coarse woody material (snags and down logs) and maintenance of vertical stand structure in the next stand.

Selection cutting is a third cutting method, which would be used rather infrequently. Trees would be removed in very small groups or singularly to maintain or create an uneven-age stand. This method would be most appropriate in situations where a relatively continuous green canopy is desirable such as areas of high visual quality or areas where no harvesting is planned (such as withdrawn areas or riparian areas) and direct forest pest control is necessary. This system is very difficult and costly to implement because of the difficulty in preventing logging damage to reserve trees, damage to advance regeneration, and the requirement of numerous entries by logging equipment (Table 2-19).

TABLE 2-19
Piñon Juniper Summary

Resource	Total	Acres WSA	Operable Without WSA
Nonoperable PJ	24,538	6,302	18,236
Operable Acres			
15 - 24 percent crown closure	8,895	197	8,698
25 - 39 percent crown closure	79,345	10,443	68,902
More than 40 percent crown closure	63,460	15,175	43,285
Total	151,700	25,815	125,885

WILDLIFE HABITAT MANAGEMENT

The Bureau of Land Management has responsibility for managing wildlife habitat on BLM-administered lands and the Colorado Division of Wildlife (CDOW) has the responsibility to manage resident wildlife populations.

Recent Bureau initiatives such as *Fish and Wildlife 2000* and the *Watchable Wildlife Initiative* have focused more management attention to fish and wildlife resources.

The planning area contains essential habitat for many wildlife species. This plan encompasses a large area, and all Colorado habitat types are represented, from plains shortgrass prairie to alpine tundra. The most prominent species are the large mammals such as elk, mule and whitetail deer, pronghorn antelope, and bighorn sheep. Other groups of species are waterfowl, small game animals and birds, predators, rodents, amphibians, and reptiles.

Elk

Elk numbers in the planning area are at an all-time high according to the CDOW. Elk occur in all the suitable habitat in the western portion of the planning area and are expanding into areas where previously they did not exist. Elk are now inhabiting vegetation types such as piñon-juniper and mountain shrub, often spending the entire year there. A small population of 65 animals has been established along the Cimarron River in the extreme southeastern part of Colorado. This herd is doing well utilizing the sand sagebrush and riparian habitat in this area. Currently elk numbers in the planning area fluctuate between 29,000 and 32,000 animals.

For the purpose of managing elk populations, the CDOW has divided the planning area into data analysis units (DAU) and game management units (GMU). A DAU is a unit of land that provides needs for elk year round. The GMU is a smaller area within the DAU and aids in administration of the state hunting license program. Elk populations usually intermingle between GMUs but there is little mixing between DAUs. The planning area has 9 DAUs that encompass 24 GMUs (Table 2-20).

The planning area is divided into summer, winter, and yearlong use areas. Several important calving areas are also located on BLM-administered lands. Lands administered by BLM in the upper Arkansas valley from Leadville to Salida provide winter range; calving and summer habitat occur near Jack Hall, Waugh Mountain, and the Sheep Mountains. The most important winter range in terms of elk numbers and the amount of BLM-administered lands is west of Black Mountain, northwest of Cañon City. At least half of a DAUs herd winters in this area (Map 2-4).

The condition of elk habitat varies within the planning area but in most cases it is good. Overall, elk numbers are within the herd objectives established by the CDOW in their DAU plans. Browse transects monitored in high use areas have shown no severe overutilization. Winter range habitat conditions have been monitored in the Black Mountain area for several years and are currently sustaining herd levels in that area.

Concerns in the planning area regarding elk and their habitat are the development of private lands for homesites in elk habitat, a recurring problem with elk and loco weed ingestion, and the problems of attaining adequate harvest because of the lack of access to BLM-administered and USFS lands during the hunting seasons. The lack of harvest results in conflicts on private winter patures where elk consume forage reserved for livestock. The recently formed Habitat Partnership Plans are addressing these types of problems.

Deer

Mule deer occur throughout the planning area from the eastern plains to the high mountain peaks. They inhabit virtually all vegetation types throughout the area. Current deer population in the planning area ranges from 86,000 to 88,000 animals. This number has remained relatively stable for the past 10 years, and the CDOW population goals have been attained in most areas. Yearly fluctuations occur within some units, and adjustments in numbers are to be expected as the need arises.

The CDOW manages deer populations based on the DAU and GMU system described earlier for elk. There are 12 DAUs in the planning area that include 55 GMUs. DAU plans have been completed for most of the planning area with population goals and objectives approved by the Wildlife Commission (Table 2-21).

Mule deer habitat in the planning area is in good to excellent condition. Browse utilization transects have not shown any areas of severe use, although some areas have moderate to heavy use. Winters in the planning area are seldom severe, and heavy use on browse rarely occurs in successive years.

Whitetale deer in the planning area are primarily in the riparian habitats east of highway I-25. Numbers have been increasing and their range expanding for several years. Most whitetail habitat occurs on private land, although BLM-administered lands around the Great Plains reservoirs provide good habitat for these animals.

Large areas of the mountain shrub type, especially in the western part of the planning area, provide excellent habitat, and in these areas the majority of the mule deer population is located (Map 2-5).

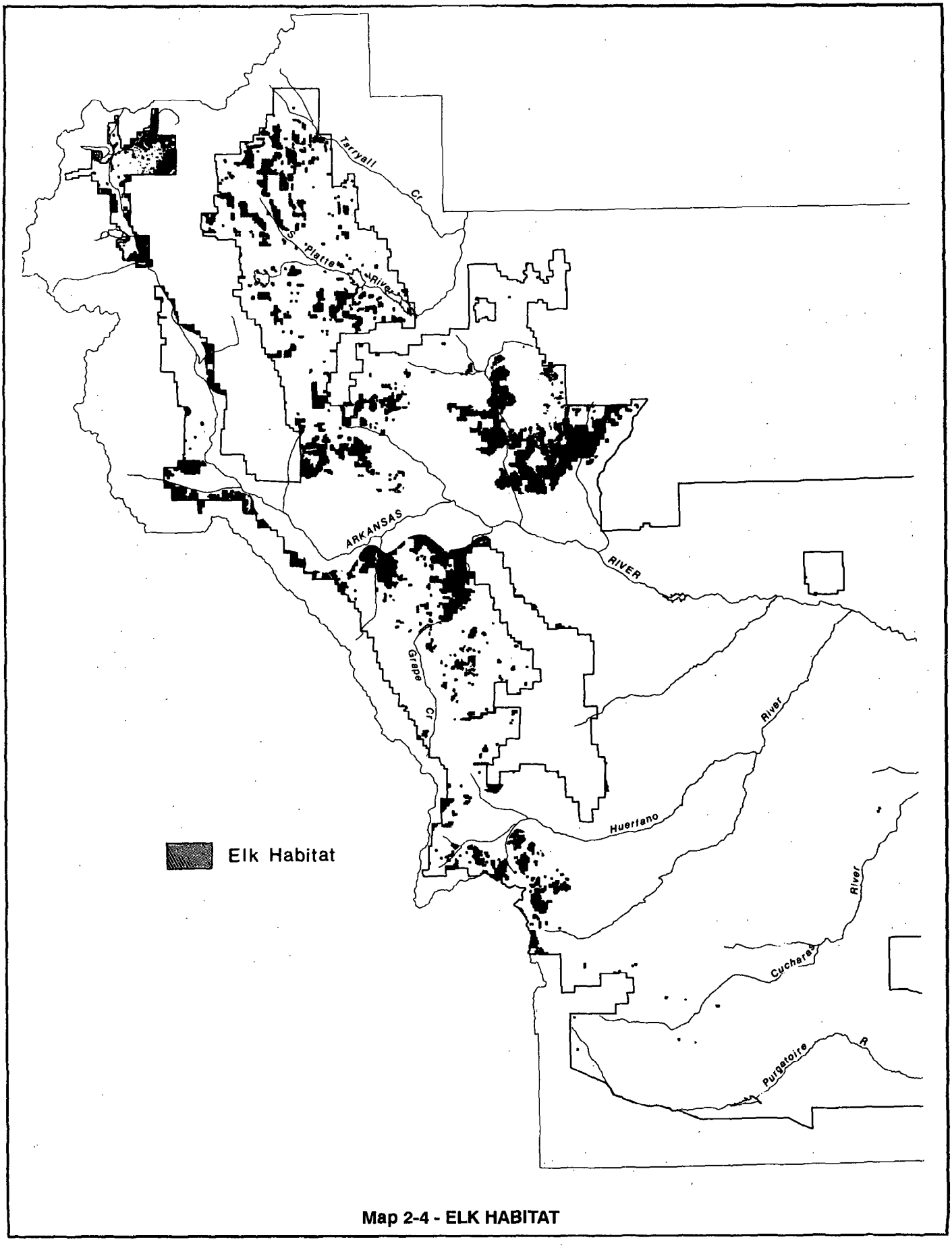
Concerns for mule deer are related primarily to the development of mountain subdivisions in mule deer habitats. Intermingled private lands and BLM-administered lands throughout the planning area, and the lure of the mountain setting make the area attractive to developers. Acquisition of mule deer habitats and blocking of the lands administered by BLM are a priority for management.

Bighorn Sheep

Bighorn sheep are common in the planning area because of reintroductions, which have restocked most all suitable, historic habitats in this area. Very few unoccupied habitats

TABLE 2-20
Planning Area Elk Habitat and Populations
1991 Data

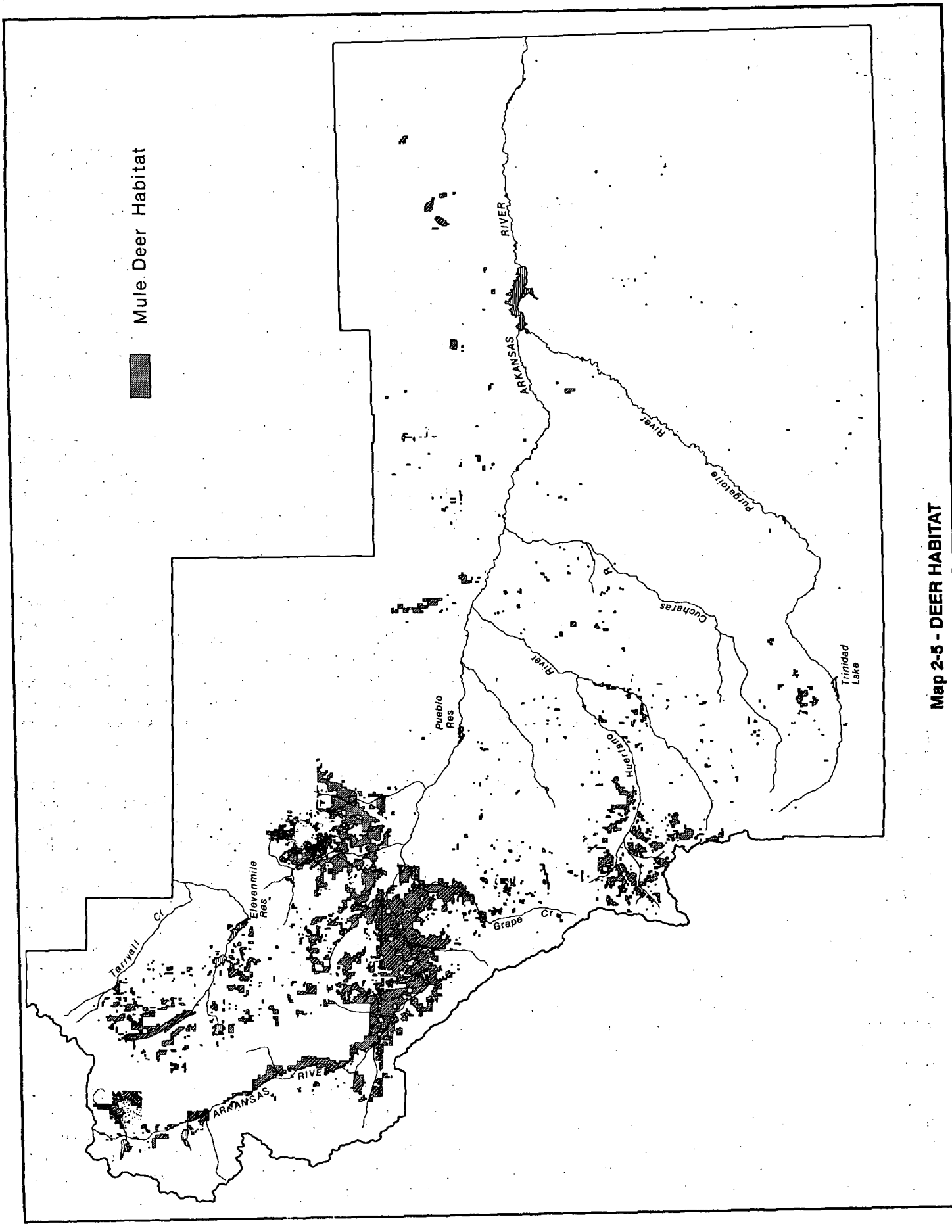
DOW Data Analysis Unit (DAU) #	Game Management Units (GMU)	Current Population	Estimated Population Using BLM	Acres Yearlong Range	Acres Winter Range	Acres BLM Winter Range	Number Critical Areas/Acres	BLM Critical Areas/Acres	Number Elk Winter BLM
E17	48,481,56,561	2,100	600	77,771	60,609	17,710	13/35,662	35/7,049	250
E18	50,500,501	1,600	600	269,559	23,887	16,532	9/24,957	18/5,612	500
E22	49,57,58	3,150	2,000	435,950	71,327	65,744	14/66,811	93/11,971	1,200
E23	511,581,59	1,200	500	762,567	24,330	21,158	21/71,032	7/8,186	250
E27	69,86,861	1,400	1,000	271,819	38,510	33,233	11/39,416	22/10,654	250
E28	69,84	1,200	600	326,057	59,372	51,008	12/48,002	45/7,587	250
E33	83,85,851,140	20,000	1,000	240,267	2,694	2,694	5/11,480	3/2,174	250



Map 2-4 - ELK HABITAT

Table 2-21
Planning Area Deer Habitat and Populations
1991 Data

DOW Data Analysis Unit (DAU) #	Game Management Unit (GMU)	Current Population	Estimated Population Using BLM	Acres BLM Winter Range	Acres BLM Fawning Range	Acres BLM Critical Winter Range	Number Deer Winter BLM
D15	48, 481, 56,561	9,700	5,000	12,446	316	13,776	1,000
D16	49, 57, 58, 581, 59	29,500	18000	114,005	797	17,363	15,000
D28	125-127, 130, 132, 136-139, 146	3,600	250	0	0	0	250
D32	85,851, 140	10,000	1,000	14,668	0	0	1,000
D34	69, 84, 86	16,600	10,000	90,914	0	399	8,000
D38	50, 500, 511	2,500	250	8,222	0	497	250
D45	128, 129, 133-135, 141, 142	3,400	500	0	0	0	500
D48	110, 111, 118, 119, 123, 124	3,200	100	0	0	0	100
D50	511, 512	2,710	150	124	0	0	150



Map 2-5 - DEER HABITAT

currently exist. There are 21 sheep management units in the planning area that contain an estimated 3,065 animals (Table 2-22). Of the 21 herds, 6 herds almost exclusively inhabit BLM-administered lands. These herds are the Beaver Creek, Arkansas Canyon, Browns Canyon, Grape Creek, Mount Mestas, and Shelf Road herds. With the exception of the Mount Mestas herd, all are low elevation herds inhabiting rough, rocky canyon habitats.

The six herds that occupy BLM-administered lands total 615 animals. Four of the six herds are transplanted herds, which are increasing in numbers and are supporting limited hunting permits. The Arkansas Canyon herd has recently been declining because of a lack of lambs being born. A study is underway to attempt to determine the cause of this decline. Two years of no lamb crop have caused managers to cancel hunting of this herd.

Concerns with bighorn sheep in the planning area are centered around the increased recreational activity in habitats occupied by these herds. The Mount Mestas herd is the only herd that is not currently being affected (Map 2-6).

Recreational boating and associated uses could potentially affect the Arkansas Canyon, Browns Canyon, and Grape Creek herds. The Gold Belt Back Country Byway may impact the Shelf Road herd, and increased use in the Beaver Creek Wilderness Study Area may affect that herd.

Pronghorn Antelope

Pronghorn antelope occur throughout the planning area in suitable habitats. The planning area encompasses the southeastern plains of Colorado where the majority of the pronghorn are located. Several herds are present in the open parks of the mountains often using lands administered by BLM. There are 10 antelope DAUs, which include 46 GMUs. Herd estimates for these management units range from 22,000 to 23,000 animals. Although there are small scattered parcels of BLM-administered lands east of I-25 used by antelope, most units are private land. DAUs PH-20 and PH-30 contain significant acreage of BLM-administered lands that support antelope. PH-20 is the Wet Mountain DAU located north and south of Westcliffe and PH-30 is the South Park DAU. An estimated 2,000 antelope depend on the BLM-administered lands in the planning area (Table 2-23).

Pronghorn habitat for this part of Colorado is shortgrass prairie, which typically consists of blue grama, buffalograss, fringed sage, yucca, rabbitbrush, and a variety of forbs. Habitat conditions are good throughout the planning area.

Concerns for pronghorn and their habitat include subdivisions in the South Park area, fences in some areas, and antelope migrating to private lands near Cañon City during the winter. Scattered lands administered by BLM also complicate harvest objectives by restricting hunter access (Map 2-7).

Small Game and Waterfowl

The occurrence of upland birds in the planning area is not great but a few species do occur and are worth mentioning. The most significant species that occur and utilize the BLM-administered lands are Merriam's turkey and blue grouse. Other species located in this area, but using BLM-administered lands to a lesser degree, are pheasant, scaled and bobwhite quail, white-tailed ptarmigan, and mourning dove.

Merriam's turkey utilizes the ponderosa pine, oakbrush, and piñon-juniper habitat types in the planning area. Approximately 1,500 turkeys are on BLM-administered lands at various times of the year. The Rio Grande turkey has recently been transplanted along the Arkansas River and is expanding its range, using habitats along the river that are administered by BLM.

Blue grouse occur throughout the area in the mixed conifer and ponderosa pine/oakbrush habitats. They are scattered in many areas but not in great numbers. Ptarmigan can be seen on Mosquito Pass in the alpine tundra and use BLM-administered lands in that area. Pheasants and scaled and bobwhite quail are located mostly in the eastern plains where there is very little land administered by BLM.

Small game mammals in the planning area include cottontail rabbit, snowshoe hare, and pine and Abert squirrel. Cottontails exist throughout the area, but concentrate in riparian areas and in the mountain-shrub habitat types. Snowshoe hares are not common, but are present in suitable habitats in the spurce-fir forests at higher elevations. Pine squirrels are common in the forested areas of the planning area, and Abert squirrels are in almost all areas dominated by ponderosa pine.

The planning area is located in the Central Flyway and the eastern portions act as a major migration route for ducks and geese. Waterfowl use in the western part of the planning area is restricted to the major valleys and parks such as South Park and the Wet Mountain Valley. These areas are utilized primarily as nesting areas as opposed to winter or migration routes. The Arkansas River and the eastern plains reservoirs attract thousands of wintering ducks and geese every year. BLM-administered lands around the Queens State Wildlife Area are extremely important to the management of waterfowl in this area.

Raptors

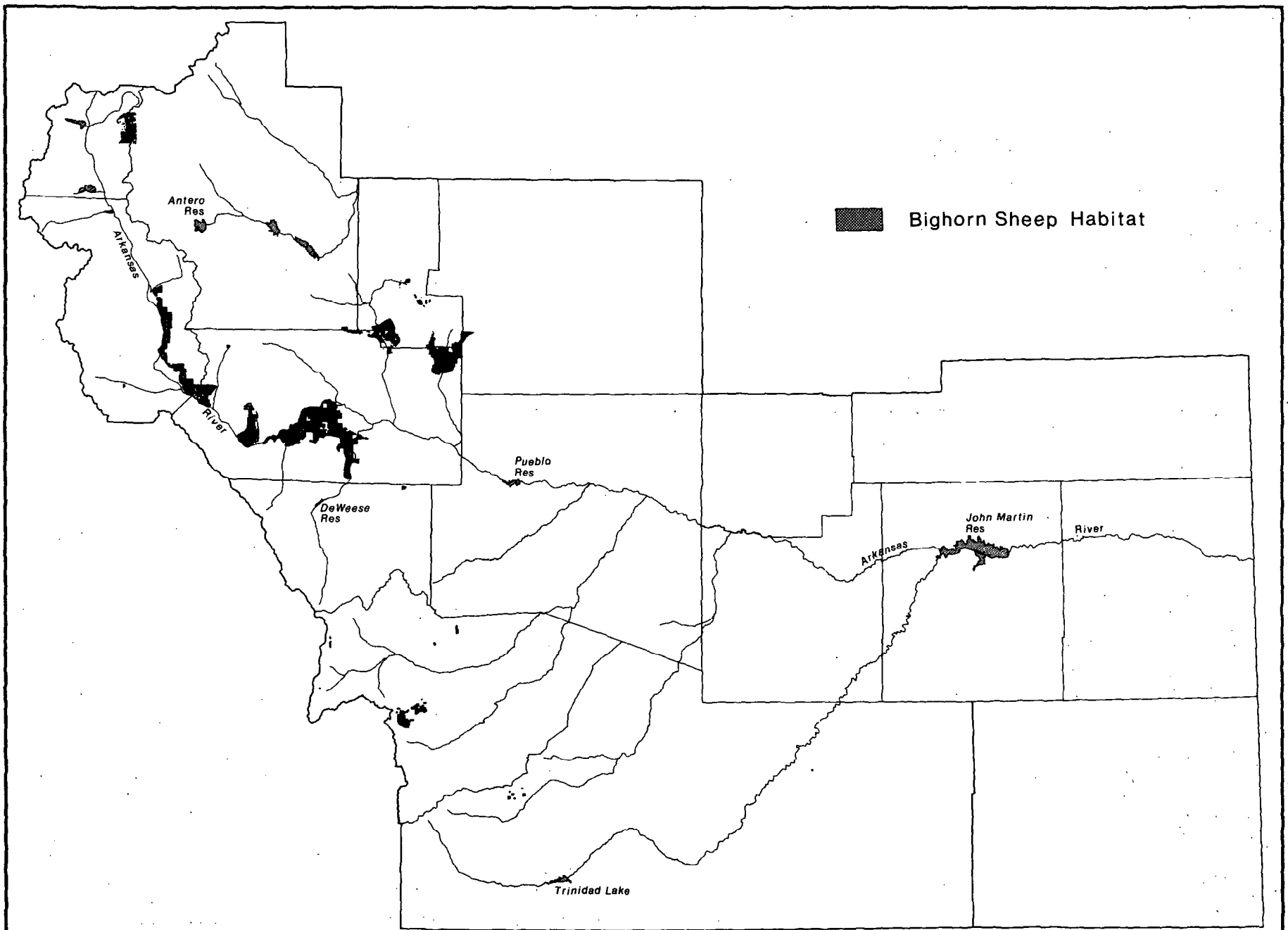
Predatory bird populations are stable in the planning area. Nesting species include peregrine and prairie falcons, red-tailed hawk, goshawk, sharp-shinned hawk, Cooper's hawk, marsh hawk, ferruginous hawk, Swainson's hawk, golden eagle, great-horned owl, burrowing owl, and American kestrels. Wintering migrants include bald eagle, osprey, and

TABLE 2-22
Planning Area Bighorn Sheep Habitat and Populations
1992

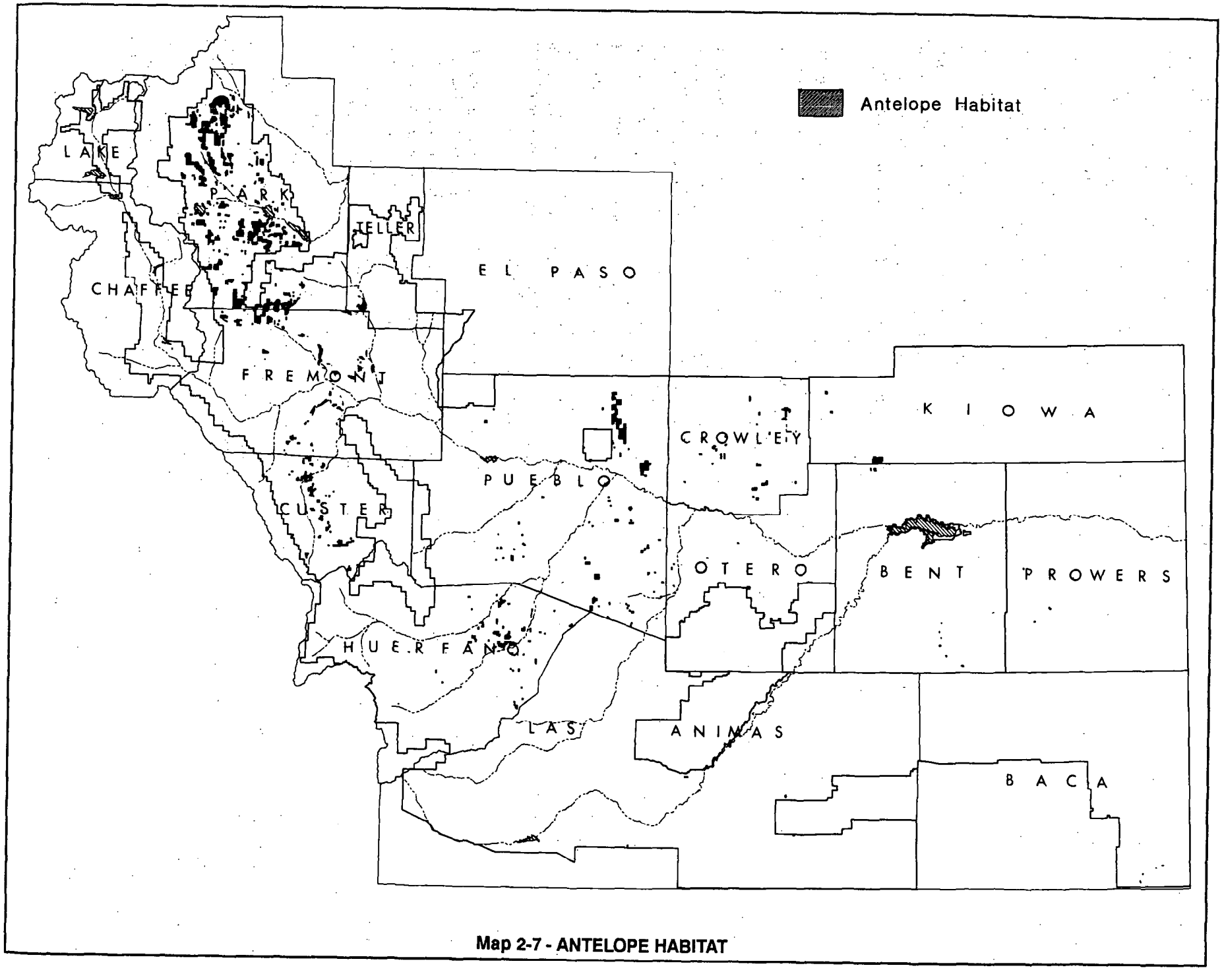
DOW Data Analysis Unit (DAU) #	Game Management Unit (GMU)	Current Population	Estimated Population Using BLM	Acres BLM Yearlong Range	Acres BLM Critical Winter Range	Number Bighorn Sheep Winter BLM
N/A	S6 - Pikes Peak	225	0	3,500	1,000	0
N/A	S6A - Beaver	80	80	12,500	1,500	80
N/A	S7 - Arkansas (North)	120	100	21,700	1,200	60
N/A	S12 - Buffalo	150	40	5,000	760	40
N/A	S46 - Dome Rock	125	0	2,400	500	0
N/A	S47 - Browns	125	0	21,415	3,115	75
N/A	S49 - Arkansas (South)	100	100	35,000	1,270	100
N/A	S50 - Measta s	150	100	5,900	80	100
N/A	S51 - Spanish Peaks	100	0	960	0	0
N/A	S60 - Shelf Road	100	90	21,500	1,280	90

TABLE 2-23
Planning Area Antelope Habitat and Populations
1991

DOW Data Analysis Unit (DAU) #	Game Management Unit(GMU)	Current Population	Estimated Population Using BLM	BLM Acres Yearlong Range	BLM Acres Winter Range	BLM Acres Fawning Range	Number Antelope Winter R\BLM
PH7	128, 129, 133, 134, 135, 140, 141, 142	7,500	800	11,452	0	0	800
PH20	69, 84, 85, 851, 86	800	600	9,123	653	0	400
PH30	50, 57, 58, 581	800	600	76,443	9,342	5,583	400



Map 2-6 - BIGHORN SHEEP HABITAT



Map 2-7 - ANTELOPE HABITAT

the rough-legged hawk. Formal surveys for raptor nesting in the planning area have been limited to those required for coal unsuitability and other site-specific environmental analyses. Raptor nest sites, however, have been documented by CDOW and BLM wildlife biologists for several years, and records are maintained on nest locations. Suitable raptor habitats are located throughout the planning area where topographic features such as cliffs and rock formations occur. Three particularly significant sites are identified in the BLM Raptor Habitat Management publication as key raptor areas. The sites are Beaver Creek, Browns Canyon, and Table Mountain, all of which have key habitats and a variety of species.

Nongame Mammals, Birds, Reptiles, and Amphibians

Nongame mammals such as moles, mice, bats, and ground squirrels are common and widespread in the planning area in suitable habitats. These animals provide an important food source for many predatory species. Densities and population data is not available although general distribution patterns are known.

Nongame birds are common in all habitat types. Each habitat type supports its own variety of species dependent on that type for all or part of their life cycle. Songbirds, shorebirds, woodpeckers, and hummingbirds are all in this area. Recent interest in the breeding status of nongame migratory birds has resulted in plans for BLM surveys of spring breeding birds in many areas. These surveys will provide information on status and trend of these migrating birds.

A variety of amphibians and reptiles are known to occur in the planning area, although no recent surveys have been completed to document abundance or distribution. Amphibians generally occur in the wet riparian areas, and reptiles in the drier upland areas.

FISHERY HABITAT MANAGEMENT

Inventories conducted in 1989 and 1990 in preparation for the RMP identified 131 rivers, creeks, and streams in the planning area that involve BLM-administered lands. The recently developed Colorado fish habitat inventory and monitoring procedure was used during the inventory phase, which provided guidance and standards for conducting aquatic habitat surveys on public lands. The 131 streams were analyzed by inventory levels I, II, or III depending on several important criteria. Level I surveys were conducted on all the streams and included a general description of the amount and values of an aquatic resource and a summary of existing information. Streams with known fisheries, significant BLM-administered lands, good access, high use, management potential, etc., were analyzed by level III, which is the intensive level requiring quantitative measurements of aquatic habitat components. Inventory completion and summarization of the data showed the 131 streams covered approximately 267 miles of BLM-administered lands. The riparian acreage associated with these streams totalled approximately 2,550 acres. Of the 131 streams, 52 contained viable self-sustaining fisheries on 132 miles of aquatic habitat. Of these streams, 80 percent or 104 miles of aquatic habitat is on 10 streams ranging in length on BLM-administered lands from 46 miles on the Arkansas River to just over 3 miles on Tallahassee and Barnard Creeks. The other 20 percent (27 miles) of these fisheries occur on the remaining 34 streams, which vary in length from three-quarters of a mile to approximately 2 miles. Table 2-24 displays existing BLM fisheries and related information.

The majority of aquatic habitat occurs west of I-25 and are primarily cold-water stream fisheries. Less than 10 miles (8 percent) of the total fisheries are warm water and occur primarily in small parcels east of I-25 on the plains.

Aquatic habitat for threatened or endangered species is very limited in the planning area. A historic population of the state threatened greenback cutthroat trout (*Salmo clarki stomias*) occurs in South Apache Creek southwest of Rye in Huerfano County. South Apache Creek flows from the Greenhorn Mountains on the San Isabel National Forest and crosses a short one-quarter-mile section of BLM-administered lands before entering private property. Samples of this fish were analyzed and confirmed as a pure strain of greenback cutthroat. The population is monitored yearly and is stable with few immediate threats.

BLM also has fisheries in lakes, reservoirs, and ponds scattered throughout the planning area. Both cold and warm-water fisheries occur in 27 lakes and reservoirs (Table 2-25). Approximately 236 surface acres of cold-water fisheries in 10 reservoirs are on BLM-administered land (approximately 2 percent of the total 10,257 surface acres). Warm-water fisheries occur in 17 reservoirs, primarily on the eastern plains, which total 24,589 surface acres. BLM administers 8,558 surface acres or about 34 percent. With the exception of one 5-acre natural pond, all other 26 are man-made reservoirs. The cold-water lake fisheries, which occur in the higher elevation mountainous portions of the planning area, generally support good trout fisheries because of smaller yearly fluctuations in water levels. Most all the eastern plains warm-water fisheries, however, are highly dependent on years of good precipitation and can fluctuate widely. The fisheries in these reservoirs are closely monitored by the Colorado Division of Wildlife. Regular stocking is an integral part of their program.

TABLE 2-24
Fisheries on BLM-Administered Land

Water Name[1/]	WHA[2/]	Public Land Miles	Species Present[3/]	Aquatic Condition[4/]	Habitat Improvements[5/]
East Fork Arkansas River #1	8	4-1/8	Br,Bk	Good	RC
East Fork Arkansas River #2	8	3/4	Br,Bk	Good	-
Tennessee Creek #1	8	1/2	Bk	Good	-
Tennessee Creek #2	8	1/2	Bk	Good	-
Halfmoon Creek	8	1/8	Bk	Good	-
Iowa Gulch #2	8	3/4	Bk	Excellent	-
Arkansas River (Twin Lakes)	8	3/4	Br	Good	-
Twobit Gulch	8	1/2	Br	Excellent	-
Low Pass Gulch	8	1-1/8	Br	Excellent	-
Clear Creek	1	1/2	Br	Good	-
Arkansas River (Heckendorf)	1	6	Br	Good	-
Fourmile Creek	1	1/2	Br	Fair	-
Trout Creek	1	1/2	Br	Excellent	-
Arkansas River (Browns Canyon)	1	10-1/8	Br	Good	RC
Green Creek	1	1/2	Br	Excellent	-
Pass Creek	1	2	Br	Excellent	TC, GB, PL
Little Cochetopa	1	1/2	Br	Good	-
Poncha Creek	1	1-1/8	Br	Fair	-
Badger Creek#3	10	4-1/8	Br	Fair	-
West Creek	10	1/4	Rn	Good	-
Hamilton Creek	10	2-1/2	CT	Poor	GB, PL
Bear Creek	10	1/4	Br,Bk	Excellent	-
Big Cottonwood Creek	10	1/2	Br	Good	-
Texas Creek	10	3-1/4	Br	Excellent	GB, LW, RC, PL, RP
Arkansas River (Echo)	10	20	Br,Rn	Excellent	RC
Grape Creek	10	19	Br,Rn	Fair	GB, LD, PL, RP
Grape Creek (Temple Canyon)	10	3-1/8	Br,Rn	Fair	-
Currant Creek #1	18	3-1/4	Br	Excellent	-
Currant Creek #2	10	1	Br	Excellent	-
Cottonwood Creek	10	6-1/4	Br,Rn	Excellent	-
Tallahassee Creek	10	3-1/8	Br	Good	-
Fourmile Creek	18	6	Br	Fair	-
Barnard Creek	18	3-1/8	Br	Good	-
Eightmile Creek	18	7	Br	Fair	-
East Fork West Beaver Creek	18	1-1/8	Br,Bk	Good	-
High Creek	19	1/2	CT	Fair	-
Sheep Creek	19	1/4	Bk	Fair	-
Twelvemile Creek	19	1/8	Bk	Fair	-
Crooked Creek	19	1-1/4	Bk	Fair	-
Trout Creek	19	1/2	Br,Bk	Fair	PL, RP
Tarryall Creek	19	1-3/4	Br	Fair	-
Pruden Creek	19	1/2	Rn	Excellent	RP
Crystal Falls Creek	13	3/4	Bk	Excellent	-
Muddy Creek	17	1-1/8	?	Fair	-
May Creek	17	1/8	Bk	Fair	-
South Fork Huerfano River	17	1/4	Br,Bk,Rn	Good	-
Huerfano River	17	1/8	Br,Bk,Rn	Good	-

Table 2-24 (Continued)

Water Name[1/]	WHA[2/]	Public Land Miles	Species Present[3/]	Aquatic Condition[4/]	Habitat Improvements[5/]
St. Charles River	17	3/4	Bk	Good	-
South Apache Creek	17	1/4	GCT	Excellent	-
Cucharas River	25	2-3/4	Wmsp	Poor	-
Purgatoire River	-	1-1/2	Wmsp	Poor	-
Arkansas River (Pueblo to Lamar)	-	4-1/2	Wmsp	Fair	-
TOTAL		131-7/8			

[1/]Streams are listed by name, some are numbered, and others are in parenthesis as designated in the aquatic inventory.
[2/]Designates Wildlife Habitat Area and number.
[3/]Br - Brown Trout
Rn - Rainbow Trout
Bk - Brook Trout
CT - Cutthroat Trout
GCT - Greenback Cutthroat Trout
Wmsp - Warm-water species
[4/]Based on RAIDS ratings as described in Colorado RAIDS User Guide, Colorado State Office, 1990, 30 pp. See Table 20-3.
[5/]Type of Improvement: GB - Gabions
LD - Log Dams
LW - Log Wings
RC - Rock Placements
TC - Trash Collectors
PL - Plantings
RP - Riparian Fencing

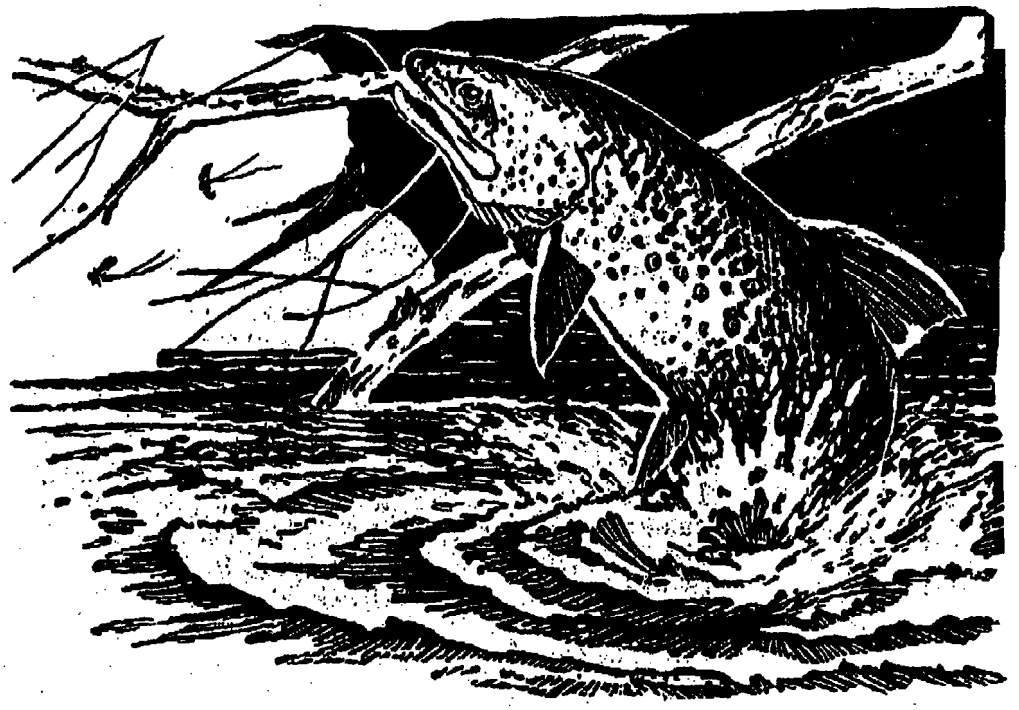


TABLE 2-25
Reservoir, Lake, and Pond Fisheries

Water Body	WHA	Total Surface Acres[1/]	BLM Surface Acres	Percent Surface Acres	Major Species Present[1/]
Clear Creek Reservoir	8	150	30	20	Rn
Elevenmile Reservoir	19	3,520	80	2	Rn, Br, KK,Pk
Spinney Mountain Reservoir	19	2,240	20	1	Rn, Br, CT, Pk
Antero Reservoir	19	4,000	50	1	Rn, Br
Fairplay Pond	19	5	2	40	Unknown
Trout Creek Pond	19	10	10	100	CT
High Creek Pond	19	10	10	100	CT
Skagway Reservoir	18	84	12	14	Rn
DeWeese Reservoir	10	208	4	2	Rn
JM Reservoir	13	30	18	60	Rn
Bradford Reservoir	25	170	10	5	Rn
Cucharas Reservoir	25	1,500	8	1	Unknown
Model Reservoir	25	1,198	400	33	Unknown
Nepesta Reservoir	-	200	160	80	Unknown
Dotson Reservoir	-	240	240	100	Unknown
Two Buttes Reservoir	-	1,798	80	4	Wm
Chivington Reservoir	-	160	160	100	Unknown
NeeNoshe Reservoir	-	3,696	2,200	60	Wm
Upper Queens Reservoir	-	1,930	760	39	Wm
King Reservoir	-	160	60	38	Wm
NeeGrande Reservoir	-	800	800	100	Wm
NeeSopah Reservoir	-	600	200	33	Unknown
Lake Meredith	-	3,220	800	25	Wm
Lake Henry	-	1,150	200	17	Wm
Holbrook Reservoir	-	670	160	24	Wm
Horsecreek Reservoir	-	1,950	320	16	Wm
Adobe Creek Reservoir	-	5,147	2,000	39	Wm

[1/]Surface acres at total capacity. Depending on yearly precipitation, surface acres vary considerably. Some reservoirs are dry in below-average precipitation years.

[2/]Species: Rn - Rainbow
Br - Brown
Bk - Brook
CT - Cutthroat
Pk - Northern Pike
KK - Kokanee
Lt - Lake Trout
Wm - Warm-water species

Of the 52 streams containing fisheries, 15 were noted as excellent (40-7/8 miles), 18 were good (33-1/8 miles), 17 were fair (50-1/2 miles), and 2 were rated as poor (6-3/4 miles). In the arid west, aquatic habitat conditions are very dependent on riparian habitat conditions. Riparian vegetation provides shading of the stream thereby reducing water temperatures, holds streambank soils, traps stream sediment, and provides an insect population important to the diet of fish. Riparian aquatic information data summary (RAIDS) showed of the 33 streams rated as excellent or good for aquatic habitat, 32 were also rated in excellent or good riparian condition. Riparian habitat conditions were rated based on RAIDS definitions.

Despite the figures displayed previously, aquatic and riparian habitat on streams administered by BLM are not without need for improvements. Table 2-26 shows the top 10 streams in the planning area in terms of miles on land administered by BLM. These streams make up 80 percent of the total miles occurring in the planning area. Three streams totaling 12-3/4 miles are rated as excellent aquatic habitat, three are rated as good (52-1/2 miles), and four as fair (39-1/4 miles). Table 2-26 shows serious aquatic and

riparian habitat deficiencies on Grape Creek and on Badger Creek. These condition ratings exist despite improvements in riparian habitat in recent years. Significant problems still exist and must be addressed.

TABLE 2-26
Major BLM Fisheries

Stream Name	BLM Miles	Aquatic Rating	Riparian Rating
Arkansas River	46-1/4	Good	Good
Grape Creek	22-1/8	Fair	Poor
Eightmile Creek	7	Fair	Good
Cottonwood Creek	6-1/4	Excellent	Good
Fourmile Creek	6	Fair	Fair
Badger Creek	4-1/8	Fair	Fair
Texas Creek	3-1/4	Excellent	Excellent
Currant Creek	3-1/4	Excellent	Excellent
Tallahassee Creek	3-1/8	Good	Good
Barnard Creek	3-1/8	Good	Excellent
TOTAL	104-1/2		

Aquatic and riparian habitat conditions on South Apache Creek, which provides habitat for the threatened greenback cutthroat trout, are excellent. Even though BLM only manages one-quarter mile of the creek, habitat conditions are excellent on nearby private and U.S. Forest Service lands. Monitoring the habitat is an annual requirement; however, changes in conditions are not expected.

Aquatic habitat conditions on the reservoirs in the planning area vary considerably primarily because of fluctuating water levels. BLM involvement in management of these reservoirs has been nonexistent because of lack of water control and fisheries personnel. The Colorado Division of Wildlife (CDOW) biologists have adequately managed the fisheries in these reservoirs for many years.

Warm-water fisheries on the eastern plains also provide significant recreation. The Queens Reservoirs Complex is extremely important locally and regionally.

Aquatic conditions are adequate to warrant stocking and active management of the cold-water resource in the following reservoirs by DOW: Clear Creek, DeWeese, Skagway, Antero, Spinney Mountain, and Elevenmile Reservoirs. The remaining reservoirs are either too small or lack public access. Of the warm-water fisheries, the following are intensively managed: NeeNoshe, Upper Queens, NeeGrande, Meredith, Henry, Holbrook, Horsecreek, and Adobe Creek Reservoirs. All have good public access and generally contain a conservation pool necessary to sustain year-round fisheries.

An additional conflict/concern with the fisheries resource, both stream and reservoir, is the lack of public access to utilize the resource. Of the 132 miles of fisheries on BLM-administered land, only 60 percent (80 miles) are accessible to the public. Of the accessible miles, 27 percent (22 miles) can only be accessed by walking. Approximately 57-5/8 miles have good public access; however, the Arkansas River makes up 80 percent of this total with 46-1/4 miles. Most of the Arkansas River in the planning area parallels U.S. Highway 50 or other county roads and is available for recreational use. Discounting the river, good public access is available on only 11-3/8 miles or 8 percent of the total stream miles.

Public access to the planning area reservoirs is somewhat better. Most, with viable fisheries activity managed by the DOW, have good access. Access is rarely across BLM-administered lands but more frequently across DOW- leased or owned land or state Division of Parks and Outdoor Recreation (DPOR) lands.

Fishery habitat is influenced by riparian conditions, which have been adversely affected by heavy recreation use. Specific areas include Grape Creek, Eightmile Creek in Phantom Canyon, and certain segments of the Arkansas River. Many reservoirs, especially on the eastern plains, are drawn down considerably; this also affects shoreline riparian vegetation. In all cases, where poor riparian conditions are affecting aquatic habitats, livestock grazing is a contributing factor. Access to fishery habitat could be significantly improved with acquisition of key parcels; it could also be adversely affected by disposal. Improved access would improve utilization of the fishery resource. Future management of both riverine and reservoir fisheries would have a significant effect on fisheries. Minimum stream flows and minimum conservation pools would be necessary to maintain current fishery resources. Water quality is also closely related to the fisheries resource.

BLM-administered lands in the planning area will assume a greater importance in providing fishing opportunities in the future. The state population is increasing every year especially along the front range. Much of the fishing pressure in the area originates from Denver, Colorado Springs, and Pueblo. In addition, there is a growing recognition of the economic significance of the fishery resource and the recreation it provides.

Data compiled by the Colorado Division of Wildlife in 1989 shows that anglers spent over 2 million (2,016,118) days fishing in the counties within the planning area (Division of Wildlife, 1990). Approximately 77 percent of these days are cold-water fishing days with the remainder warm-water. BLM-administered lands provide opportunities for fishing, which will increase in the future.

Figures also show that anglers spend over 65 million dollars (Division of Wildlife, 1990) in the planning area. These figures demonstrate the benefits to local economies. Although detailed figures are not available on angler use of lands administered by BLM, it would be expected to be high. A prime example is the Arkansas River from Cañon

City to Leadville. Of the approximate 130 miles in this stretch, over 46 miles are accessible to anglers through land administered by BLM. Land administered by BLM provides the bulk of available fishing opportunities on the river; U.S. Forest Service and Division of Wildlife have some small parcels. Since the Arkansas River is one of the major river fisheries in Colorado, it has statewide significance.

Fisheries habitat improvements in the planning area have affected a relatively small amount of habitat. Of the 132 miles of habitat, improvements have been made on eight streams totaling 16 miles or 12 percent of the total (Table 2-27). Work on the Arkansas River accounts for 8 of the 16 miles.

TABLE 2-27
Fisheries Habitat Improvements

Stream Name	Miles Affected	Type of Improvement (# structures, miles fence, etc.)
East Fork Ark. River	2.00	Boulder Placement (300)
Arkansas River	8.00	Boulder Placement (1,630)
Pass Creek	2.00	Trash Collectors (43), Riparian Rehab. (2 mi.)
Hamilton Creek	1.00	Gabion Baskets (8)
Texas Creek	2.00	Gabion Baskets (17), Riparian Rehab. and Fencing (.5 mi.)
Grape Creek	.50	Gabion Baskets (7)
Pruden Creek	.25	Riparian Exclosure (.25 mi.)
Totals	16.00	

Additional habitat work is needed on several streams to bring them to their potential. This work will proceed as time and funding are available.

The future for fisheries management on BLM-administered lands is positive. Three recent initiatives, *Fish and Wildlife 2000*, the *National Recreational Fisheries Policy*, and the *Riparian Wetland Initiative for the 90s* outline goals and objectives designed to provide additional fishery opportunities and increase public awareness. This increased focus on fisheries will require BLM to increase funding and staff to meet these increased demands.

The Arkansas River, which is currently a high use area with good public access, will face increased pressure, and BLM will need to highlight management of this resource. Additional fishing opportunities on BLM-administered streams will need to be developed. Improving public access to existing fisheries will be a high priority, since many BLM-administered streams are inaccessible and could provide additional user days of recreation with proper access.

SPECIAL STATUS PLANT/ COMMUNITY SPECIES MANAGEMENT

Intensive inventory for threatened, endangered, or special status plants has not been conducted in the planning area in recent years. The occurrence of rare plants in this portion of Colorado is relatively low because of the absence of unusual or restrictive habitats. The Colorado Natural Areas Program has provided Element Occurrence Records for those species that occur in the planning area. Thirteen species have been mapped and will be addressed in this chapter. Table 2-28 lists the species, status, and comment.

Because of the lack of inventories and information on these plants, relatively little information can be included at this time. Of the 13 plants, 7 presently are not believed to occur on BLM-administered lands although they have been located nearby and ultimately could occur there. Six plants are located on BLM-administered lands according to the Colorado Natural Areas Program.

Pendland alpine fen mustard (*Eutrema pendlandii*) has recently been listed by the U.S. Fish and Wildlife Service as a threatened specis under the *Endangered Species Act* of 1973 as amended (FR Vol. 55, No. 199, 10-15-90, pp 41725-41729). The species occurs along the Continental Divide in central Colorado, growing above 12,500 feet elevation on small wetlands with perennially subirrigated peat soils. There are eight occurrences totaling 5,200 plants. The site with the second largest number of plants (1,550 individuals) occurs on 5 acres of BLM-administered land on Mosquito Pass. The plants are herbaceous perennials, extremely small, and extraordinarily inconspicuous. Pendland alpine fen mustard is one of only two North American species of *Eutrema*, and the only representative of the genus known in the United States. The habitat of this plant is included in the Mosquito Pass ACEC.

Brandegee wild buckwheat (*Eriogonum brandegei*) is presently in two locations on BLM-administered lands in the planning area. The most significant site is the Droney Gulch area west of Salida with a smaller population located north of Cañon City along Fourmile Creek. The Droney Gulch site represents the best known occurrence in the world for this species. It occurs on dissected, nearly barren light-brown hills of the Dry Union Formation. The area supports sparse stands of the piñon-mountain mahogany-Indian ricegrass plant association. Because of the significance of the Droney Gulch site, it has been proposed as an area of critical environmental concern (ACEC).

TABLE 2-28[1/]
Federally Classified Sensitive or State Concern Plants

Common Name	Scientific Name	Federal Status[2/]	State List[3/]	Comments
Brandegee wild buckwheat	*Eriogonum brandegei*	1	1	Occurs on BLM in two areas
Pendland alpine fen mustard	*Eutrema pendlandii*	T	1	Occurs on BLM on Mosquito Pass.
Degener beardtongue	*Penstemon degeneri*	2	1	Occurs on BLM in Arkansas Canyon
Royal Gorge stickleaf	*Mentzelia densa*	2	4	Occurs on BLM in Arkansas Canyon
Single-head goldenweed	*Haplopappus fremontii* spp. *monocephalus*	2	4	Occurs on BLM near Gardner
Weber saussurea	*Saussurea weberi*	3C	2	Occurs on BLM on Mosquito Pass
Dwarf hawksbeard	*Crepis nana*	-	2	Not known to occur on BLM
Greenland primrose	*Primula egaliksensis*	-	2	Not known to occur on BLM
Rock-loving neoparrya	*Neoparrya lithophila*	3C	4	Not known to occur on BLM
Globe gilia	*Ipomopsis spicata*	3C	1	Not known to occur on BLM
Alpine braya	*Braya humilis ssp. ventosa*	-	2	Not known to occur on BLM
Roundleaf Four-O'Clock	*Oxybaphus rotundifolius*	2	1	Not known to occur on BLM

1/ Colorado Natural Areas Program; 1991, Colorado Plant Species of Special Concern, Department of Natural Resources.
2/E - federal endangered
T - federal threatened
PT - federal proposed as threatened
2* - presumed extinct
1 - federal category 1 (candidates for formal listing)
2 - federal category 2 (candidates under review for formal listing)
3C - federal category 3C (former candidates for federal listing).
3/LIST 1 - federal threatened or endangered plant species and species that are rare throughout their range, including a number of species which only occur in Colorado;
LIST 1* - plant species presumed extinct;
LIST 2* - plant species presumed extirpated from Colorado;
LIST 2 - plant species which are rare in Colorado but relatively common elsewhere within their range;
LIST 3 - plant species which appear to be rare but for which conclusive information is lacking;
LIST 4 - plants of limited distribution or special interest which appear secure at this time.

Purchase of key land parcels would further preserve habitat and populations; disposals of parcels supporting habitat and population would threaten survival of the plants.

A third species, degener beardtongue (*Penstemon degeneri*), has been located in several areas along the Arkansas River between Cañon City and Salida. It occurs in rocky areas of piñon and juniper in disturbed reddish soils at 6,000 to 6,700 feet elevation. Although little is known about the plant, it has scientific, aesthetic, educational, and horticultural value (Peterson, 1981). Additional inventory for the plant is needed to more accurately define its range within the planning area.

Royal Gorge stickleaf (*Mentzelia densa*) is listed Federal Status 2 and is restricted to a small portion of the Arkansas River drainage in Fremont and Chaffee Counties. Very little is known about this species.

Single-head goldenweed (*Haplopappus fremontii* spp. *monocephalus*) appears to be widespread in southeastern Colorado and occurs in one location on BLM-administered lands near Gardner. Weber saussurea (*Saussurea weberi)* also occurs in one area on BLM-administered lands on Mosquito Pass. Additional information is not available for either of these species.

There are immediate threats to pendland alpine fen mustard and brandegee wild buckwheat, the two species for which adequate information is available. Management actions carried out by the Bureau will directly affect the viability of these species habitats. As part of this plan, habitats for both species are proposed as areas of critical environmental concern (ACECs).

The plants themselves, both of which have significant populations on BLM-adminisgtered lands, depend on the habitat for their survival. Maintenance of that habitat is critical to their existence.

Because of the high degree of habitat specificity, the pendland alpine fen mustard only occupies a small area in Colorado estimated at 62 acres (Naumann, 1988). Hydrology is the most fragile aspect of this plant habitat. Perennial subirrigation is required to maintain the peat fens. Ditching, from the ruts of off-road vehicle tracks or mining activity, can cause desiccation of a peat fen supporting penland

alpine fen mustard. The result can be loss of habitat and consequently plants. The Mosquito Pass site, which contains the second largest population, is in a popular recreational area, and active mines are in operation within a cirque of south Mosquito Creek. In addition, a small annual burro race from Fairplay traverses through the population. Acid drainage from mine trailings can affect the habitat by lowering pH and changing it from basic to acidic, contributing to loss of plants. Management of recreation, particularly OHV use, is critical in this area.

Obviously the supply of the resource is limited. Scientifically there is a great importance attached to rare plant species. Pendland alpine fen mustard demonstrates the processes of plant migration, biogeography, and evolution. The specific habitat requirements of this species provide valuable opportunities for studying types of rarity among plant species. The apparent importance of pH in the soil and hydrologic environment suggests that pendland alpine fen mustard may be useful as an indicator species in studies related to acid precipitation and/or mine drainage effects in alpine tundra environments.

The pendland alpine fen mustard will be protected under section 7(a)(2) of the Act, which requires that the Bureau ensure that any actions authorized, funded, or completed are not likely to jeopardize the continued existence of the species. Per 50 CFR 17.61 and 17.71, it is also unlawful to remove and reduce to possession any listed plant from an area under Federal jurisdiction. Conservation measures provided to species listed as endangered or threatened under the *Endangered Species Act* include recognition, recovery action, requirements for Federal protection, and prohibitions against certain practices.

Brandegee wild buckwheat has scientific, educational and aesthetic significance, as a unique member of the Colorado flora. This species is important in the study of the genus *Eriogonum* and displays an ability to colonize disturbed lands; i.e., roadcuts. The genetic information contained in this species could be used in research on the revegetation of disturbed lands.

Threats and/or conflicts with brandegee wild buckwheat would be limited to modification of habitat, especially since it has limited range. Only a few populations are presently known, and all are near areas of potential disturbance, particularly work on highway rights-of-ways. Interestingly, the plant seems to do well where a small degree of disturbance occurs. The known population seems healthy and relatively stable, perhaps increasing slightly in response to the small amount of disturbance that has been introduced at these sites (Johnston, 1981). Nevertheless, measures must be initiated to ensure the survival of the plants. Although presently not a problem, OHV use, motorcycles, overgrazing, and heavy public use could impact the plant. Potential increases in recreational use in areas where the plant occurs will need to be monitored closely. The proposed Droney Gulch State Natural Area designation will also aid in this effort.

SPECIAL STATUS ANIMAL SPECIES MANAGEMENT

The planning area contains a variety of threatened, endangered, or sensitive animal species. Threatened or endangered species are those recognized by the U.S. Fish and Wildlife Service (USF&WS) and listed under the guidelines of the *Endangered Species Act* of 1973, as amended. Sensitive species include those animals that are candidate species and are being considered for listing by the USF&WS and/or a concern to the state of Colorado. Federal agencies are directed by the *Endangered Species Act* to avoid actions that would further jeopardize listed and sensitive species and to enhance them whenever possible. Table 2-29 describes the threatened, endangered, or sensitive species presently or historically in the planning area. One species of threatened fish (greenback cutthroat trout) in the planning area is addresed in the Fishery Habitat section.

Five species; i.e., black-footed ferret, gray wolf, grizzly bear, lynx, and wolverine were at one time present in the planning area, however, have been abolished from their ranges. The Bureau and Colorado Division of Wildlife have no plans to reintroduce these species to their former ranges unless intensive inventories determine habitat suitability.

Two other sensitive species mammals in the planning area are the river otter and the swift fox. Neither species is typically on BLM-administered lands and the Bureau has no management responsibility for them.

Of the 17 species listed as occurring in the planning area or as having historical habitat, only 5 are realistically affected by BLM management programs. These five species, peregrine falcon, least tern, piping plover, lesser prairie chicken, and Mexican spotted owl, are on BLM-administered lands or on private lands with BLM-administered minerals. Current management of special status animal species is limited to habitat on BLM-administered lands that is critical for their survival.

The peregrine falcon is an endangered species; however, numbers have increased in the planning area in the last several years because of reintroduction efforts. Birds have been released into historic habitats since the early 1980s and are now breeding throughout the planning area in suitable habitats.

The peregrine breeding population in Colorado is at an all-time high, since reintroduction efforts began, and improving each year. This trend is anticipated to continue as more birds are produced and habitats reoccupied. Because of the remote nature of this species and the habitats used, it is unlikely that conflicts will arise to reverse this trend. Good peregrine

TABLE 2-29
Special Status Animals

Common Name	Scientific Name	Status[1/]	Comment
Black-footed ferret	*Mustela nigripes*	FE, SE	Historical Range
Gray wolf	*Canis lupus*	FE, SE	Historical Range
Grizzly bear	*Ursus arctos*	FT, SE	Historical Range
N. Amer. lynx	*Lynx canadensis*	FC-2, SE	Historical Range
N. Amer. wolverine	*Gulo luscus*	FC-2, SE	Historical Range
River otter	*Lutra canadensis*	FC-2, SE	Resident
Swift fox	*Vulpes velox*	FC-2	Resident, Breeder
Peregrine falcon	*Falco peregrinus*	FE, SE	Resident, Breeder
Bald eagle	*Haliaeetus leucocephalus*	FE, SE	Migrant, Winter Res.
Ferruginous hawk	*Buteo regalis*	FC-2	Migrant
Least tern	*Sterna antillarum*	FE, SE	Breeder
Lesser prairie chicken	*Tympanuchus pallidicinctus*	ST	Resident, Breeder
Long-billed curlew	*Numenius americanus*	FC-2	Breeder
Mountain plover	*Charadrius montanus*	FC-2	Breeder
Piping plover	*Charadrius melodus*	FE, SE	Breeder
Mex. spotted owl	*Strix occidentalis*	FT	Resident, Breeder
White-faced ibis	*Plegadis chihi*	FC-2	Breeder

[1/]FE Federally listed as Endangered
SE State listed as Endangered
FP-T Federal Proposed as Threatened
FC-2 Federal Candidate 2
FT Federally listed as Threatened
ST State listed as Threatened
FP-E Federal Proposed as Endangered

habitat is generally steep, rugged cliffs in remote areas with little other public use. Although rock climbing has been a concern in other areas in the state, it is not a problem in this area at the present time. Since the peregrine falcon is an endangered species, the Bureau is required by law to determine if management actions would negatively affect the species before those actions occur.

BLM has played a major role in terms of funding and support for the reintroduction efforts of the peregrine falcon. Release sites have been located on BLM-administered lands for approximately 10 years with over 50 birds released. Inventories are ongoing each year to monitor the return of birds to suitable nest sites. The goal of the Recovery Plan for Colorado for nesting birds in the state was attained in 1990. Reintroduction of young peregrines has now been suspended in Colorado and is occurring in other western states. The Beaver Creek Wilderness Study Area (WSA) is considered excellent peregrine habitat, and birds are common there. Peregrines should be re-establishing nest sites in suitable habitats in the planning area in future years.

The lesser prairie chicken is a state threatened species in southeastern Colorado in sand sagebrush habitats. The largest population is southeast of Campo with a smaller population south of Holly. Recently birds have been transplanted to suitable habitat east of Pueblo near the Department of Transportation (DOT) test track. A small flock is also located in northern Kiowa County.

Possible threats to the lesser prairie chicken are loss of habitat because of extensive oil and gas exploration. Suitable habitat for prairie chickens in Colorado is rare with the sand sagebrush communities only occurring in a few areas. Any loss of this habitat type could be detrimental to the existence of the birds. Fortunately, much of the habitat is managed by the U.S. Forest Service in the Commanche National Grassland. The Bureau works closely with the USFS in the oil and gas leasing program to ensure that stipulations are attached to all leases to protect lesser prairie chicken habitats. Continued inventory and monitoring will provide necessary data to manage the birds in the future.

None of these prairie chicken populations are on BLM-administered land, however, they are on nearby private lands, which have BLM-administered mineral estate. These areas have active oil and gas wells, and exploration activities are ongoing. The CDOW conducts yearly lek counts and field inventories to monitor population fluctuations.

The piping plover and least tern have recently been discovered nesting and brood rearing on BLM-administered lands around two eastern plains reservoirs. NeeNoshe Reservoir northwest of Lamar is an irrigation reservoir that experiences drawdowns of water most years. As the water level drops, flat sandy beaches are exposed, which provide suitable nesting areas for piping plovers. The least tern has been seen on Adobe Creek Reservoir north of Las Animas in similar habitats.

Threats to these species are related to the potential loss of nesting habitats because of high water levels that would inundate the flat beaches required by these birds. The Bureau has no control over the storage of water and probably cannot influence water management in the reservoirs. An additional threat is unauthorized livestock grazing on the beach habitats, which may result in trampled nests and chicks. Currently, grazing in the areas used by these birds is not allowed, and livestock use is controlled by fencing. A recovery plan for these species is currently being prepared and the Colorado Division of Wildlife is monitoring the birds.

Management for the least tern and the piping plover has been limited to working with the Colorado Bird Observatory, USF&WS, and the CDOW on a recovery plan for these birds. Yearly inventories are conducted to monitor species populations and nesting success. BLM has provided funds for these efforts in addition to working with permittees to reduce the chance of livestock impacts to the nesting plovers and terns.

The Mexican spotted owl was located on BLM-administered lands northeast of Cañon City for the first time in 1991; therefore, has not been managed in the past. Surveys in 1991 along the front range of Colorado have revealed several owls, and it is believed that this area of Colorado may be more important than originally thought. Based on the habitat in which it was detected, which is common in the planning area, it is anticipated additional owls are in other areas. The spotted owl is presently listed as a threatened species. Suitable habitat for owls is available in many areas of the planning area, and further inventory work is needed to determine status of this species in the resource area.

Inventory work will continue for the next several years to document the status. This subspecies inhabits rough, rocky, timbered habitats, which are generally unsuitable for timber harvest. Other possible conflicts with spotted owls are not anticipated at this time because of the lack of available information. The rarity of the bird and the specific habitat requirements, however, will require that protective measures be taken to ensure its continued existence.

Since the owl is listed as a threatened species, the Bureau will follow management guidelines set forth by the USF&WS and enter into Section 7 consultation as needed. At this time surveys are ongoing to determine the distribution of the owl in the area.

Key parcels could be purchased to further preserve habitat for peregrine falcon, least tern, piping plover, lesser prairie chicken, and Mexican spotted owl. Conversely, disposal of key parcels could threaten their survival. Transfer of management of the eastern plains reservoirs to the CDOW would allow better management of habitats for tern and plover. Designation of the Browns Canyon, Beaver Creek, High Mesa Grassland, and Phantom Canyon as ACECs would provide additional protection for the peregrine falcon and Mexican spotted owl. Increased recreational activities in some areas such as Phantom Canyon may have a long-term effect on certain species depending on the activity being promoted and the location of developments. Development of the oil and gas resources on the eastern plains could impact lesser prairie chicken, least tern, and piping plover if adequate stipulations are not applied. Certain species, such as the peregrine falcon and spotted owl, may require solitude and minimal disturbances to their habitat. Development of recreation sites must be carefully planned in these areas. The piping plover and least tern depend on certain reservoir water levels for nesting requirements. Spotted owls have very specific habitat requirements in timber types, which must be maintained. Wilderness management is very compatible with protection of peregrine falcon and spotted owls. Beaver Creek and Browns Canyon contain habitat for both species.

The public demands that agencies preserve, protect, and enhance habitats for these species to ensure their continued existence. BLM policy is to ensure that habitat of sensitive species be managed and/or conserved to minimize or eliminate the need for Federal or state listing in the future. The sensitive species listed previously are extremely dependent on the habitat provided by BLM-administered lands. Maintenance of this habitat is critical to their survival.

Four other bird species in the planning area are the ferruginous hawk, long-billed curlew, mountain plover, and the white-faced ibis. All of these species are primarily on the eastern plains and associated reservoirs where very small areas of BLM-administered lands occur. Inventories by other agencies are underway to determine the status of these species.

The bald eagle is a winter migrant to the Arkansas Valley and is commonly seen along the Arkansas River and the many irrigation reservoirs on the eastern plains. It also occurs in the upper valley and in several upland areas north of Cañon City where it feeds primarily on carrion. At this time, the bald eagle is not known to be nesting in the planning area. Use of BLM-administered lands by eagles is extremely low, and no critical areas are known to occur within the planning area.

FLUID MINERALS MANAGEMENT

Parts of six USGS petroleum provinces are within the boundaries of the Royal Gorge Planning Area (RGPA).

Oil and Gas and CO_2 Activity

There are 76 oil and/or gas fields within the RGPA, which have produced a cumulative total (as of October 1988) of 32,102,154 barrels of oil (2.1 percent of the state total) and 520,317,961 Mcfs of gas (7.6 percent of the state total), including CO_2 gas. Most of the fields are within the Las Animas Arch Province (40 fields) and the Anadarko Basin province (28 fields). Of the remaining eight fields, seven are in the Raton Basin-Sierra Grande Uplift Province, and one is in the Denver Basin Province.

About 3,890 oil and/or gas wells have been drilled (about 8.8 percent of the state total) within the RGPA, of which 371 are still producing (as of June 1988). The Anadarko Basin has the most producing wells (194), followed closely by the Las Animas Arch Province with 108 wells. Predictions for the amount of future development are in Appendix G.

Within the planning area, there are approximately 653,000 acres of Federal minerals/Federal surface and 2.3 million acres of Federal minerals/private surface available for oil and gas and CO_2 activities.

This plan will not make decisions for mineral resource actions on lands not administered by BLM within the planning area. These decisions will be made by the appropriate agency in cooperationn with BLM.

Lands with the Pike and San Isabel National Forests and the Commanche National Grassland are leased according to decisions in the Forest Plan Amendment/Oil and Gas Leasing Environmental Impact Statement (EIS/PA). BLM was a cooperating agency in the preparation of this EIS/PA providing oil and gas technical expertise, projections of future oil and gas activity, and impact analysis of subsurface operations. This EIS/PA analyzed oil and gas leasing and development on all lands within the administrative boundaries of the Pike and San Isabel National Forests and the Commanche National Grasslands, regardless of surface ownership. The USFS will utilize the document to make decisions on whether to consent or not consent to leasing and the need for stipulations on lands they administer. The BLM plan for the planning area will utilize, with minor change, the leasing decisions of the EIS on approximately 107,000 acres of private surface/Federal mineral estate lands within USFS administrative boundaries. The cumulative and specific impacts that would occur from potential leasing and development on all Federal lands within the boundaries of the Pike and San Isabel forests and the Commanche Grasslands were analyzed in the USFS EIS/PA. Cumulative impacts on USFS lands from potential oil and gas leasing and development occurring on BLM-administered lands in the planning area would not occur, or would be insignificant.

BLM is responsible for the leasing and development of lands administered by the National Park Service (NPS) that are eligible for that purpose. By law and regulation, the lands administered by the NPS in the Florissant Fossil Beds and Bents Fort National Monument are unavailable for leasing. The cumulative impact to these lands from potential oil and gas leasing and development within the planning area would be insignificant. BLM is responsible for the leasing and development of lands administered by the U.S. Fish and Wildlife Service (USFWS) that are eligible for that purpose. The lands administered by the USFWS in the Leadville Federal Fish Hatchery are, therefore, unavailable for leasing by regulation. The cumulative impacts to these lands from potential oil and gas leasing and development within the planning area would not occur, or would be insignificant.

BLM leases Federal minerals that lie beneath private surface (split estate). The private landowner is notified when the minerals are leased and when an Application for Permit to Drill (APD) is filed. The landowner is invited to attend the onsite inspection, and his needs and desires are considered when the decision is made to approve the APD. The needs of the landowner are also considered if and when a plan of development is reviewed so the private surface and the resources are considered during field development. BLM has the authority to require the same mitigation on the private surface as it does on Federal lands. This ensures the private landowner of protection when the underlying Federal minerals are extracted.

Oil and gas leases issued by BLM at the direction of Congress (1920 *Mineral Leasing Act* as amended) are contractual agreements between the U.S. and the lessee. New management practices and techniques are incorporated in existing lease management as long as they are compatible with the lease rights granted. The lease rights granted consist of the right to occupy as much of the lease surface as is reasonable for the extraction of the resource and the right to remove the resource (oil and/or gas). When these two rights must be restricted, a stipulation is written and becomes part of the lease. One example of such a restriction is the denial of the surface for a specified period of time (for a discussion of timing limitation stipulations, see Appendix G). The standard lease terms allow the authorized officer to require reasonable measures to mitigate adverse impacts from proposed operations. For example, the authorized officer may deny use of the surface for up to 60 days. This plan will not amend valid existing rights. New management practices, identified in Appendix G, that do not violate existing rights would be used in managing existing leases in the form of Conditions of Approval.

Based on past exploration and future projections concerning fluid mineral activity, the reasonably foreseeable level of development within the planning area for all alternatives analyzed would result in an estimated 20 acres of surface disturbance per year.

LOCATABLE MINERALS MANAGEMENT

There are three categories of locatable minerals recognized under the mining law, which will be used in this analysis: Metallic minerals (e.g., gold, silver, copper, lead, zinc); energy minerals (e.g., uranium, thorium); and industrial (nonmetallic minerals (e.g., gypsum, limestone, bentonite, fluorite). More details are in Appendix H.

Metallic Minerals: Although occurrences of metallic minerals can be widely dispersed, geological controls of mineralization cause concentrations of mines in certain areas, which have been designated as mining districts. The RGPA has two important large mining districts; Cripple Creek and Leadville/Climax, and several smaller less important districts.

The Cripple Creek District is a world-class district. Almost half of all the gold produced in Colorado came from this district alone. Based on the present market, total past production from Cripple Creek would be valued at over 7.3 billion dollars.

The Leadville/Climax District has been a major U.S. producer of silver, molybdenum, and gold. Past production from the district in present dollars is estimated to be approximately 2.0 billion. The Climax mine is the world's largest single source of molybdenum.

Less important mining districts within the RGPA include Silvercliff/Westcliffe (silver); Cotopaxi (copper, gold); and Fairplay (placer gold).

Energy Minerals: The most important occurrence of energy minerals within the RGPA is the Tallahassee Creek uranium deposit, located 25 miles northwest of Cañon City. Two separate ore bodies occur here, which are estimated to total about 200,000 tons at a grade of approximately 0.08 percent U_3O_8.

Other minor occurrences of uranium and thorium also occur within the RGPA.

Industrial Minerals: Locatable industrial minerals within the RGPA include fluorite at Browns Canyon; limestone in the Wellsville area; bentonite near Howard; and gypsum near Coaldale and in the Table Mountain area southwest of Colorado Springs.

MINERAL MATERIALS MANAGEMENT

Mineral materials are those "common variety" industrial (nonmetallic) minerals, which include, but are not limited to, sand and gravel, crushed stone, dimension stone, specialty/monumental stone, clays, pumice, pumicite, cinders, and commercial petrified wood. Disposal of these materials is regulated by 43 CFR 3600. The following rock types are considered for disposal in the RGPA minerals material program:

- sand and gravel
- limestone and dolomite
- sandstone and quartzite
- granite
- monzonite and syenite
- granodiorite
- gneiss
- pegmatite
- travertine
- volcanic rocks
- clay

Most of these materials are used in the aggregate industry, a major contributor to the American economy. Aggregate production is over 2.0 billion tons/year, with a value of 8.8 billion dollars. Production in the U.S. consists of crushed stone (57 percent) and sand and gravel (43 percent). Crushed stone is predominantly limestone and dolomite, but also can consist of granite, volcanics (traprock), sandstone, and quartzite materials. Aggregate is a vital ingredient in Portland cement concrete and asphaltic products.

In addition to the aggregate category, other uses of mineral materials include those for sealants or layering (clay, riprap), landscaping (specialty stone, quartz, dimension stone), and brick making (clay).

Some of the mineral materials previously listed also could be included as locatable minerals. Limestone and some specialty clays and sandstone are examples. Other industrial minerals or rock types such as fluorite, barite, bentonite, and gypsum also are locatable.

Mineral materials utilization is often dependent on factors such as proximity to market, transportation networks, and available labor force. For example, a volcanic deposit suitable for railroad ballast has much higher potential if it is close to an existing railroad. This proximity factor, along with an analysis of previous development and location of specific geologic rock units, was combined to provide a mineral potential map, which should more accurately predict where future development would occur. It is difficult to predict the type and location of future industrial mineral development, and most of the planning area has some potential for development. Only the moderate and high potential areas for salable mineral development, therefore, have been emphasized.

COAL MINERALS MANAGEMENT

The coal resources of the Royal Gorge Planning Area (RGPA) have had extensive historic development but are currently in a state of only limited development. The majority of the coal resources are within areas on fee and split-estate lands with only a small percentage of the area totally administered by BLM.

The planning area has two coal-bearing basins (Denver/ Raton) and two small coal fields (Cañon City/South Park) within its boundaries. The Denver Coal Basin was analyzed in the Northeast Resource Management Plan (NERMP). The southern tip of the Denver Coal Basin intrudes through the northern resource area boundary. The northern half of the Raton Coal Basin lies within Colorado from the New Mexico border to south of Walsenburg, and is known as the Trinidad-Walsenburg field. The Cañon City coal field lies just south of Cañon City, and is all on private land. The South Park field, in Park County, encompasses Federal, state, and private lands, but the coal is dipping very steeply (25 to 90 degrees), making mining difficult, and no current interest exists for this field.

For the purpose of this analysis, only the Trinidad-Walsenburg field will be discussed, and more specifically, the Trinidad known recoverable coal resource area (KRCRA) within that field. That part of the Denver Coal Basin intruding into the northern part of the resource area has been covered by the NERMP. The Cañon City coal field and the South Park coal field will not be addressed because the former is on private land and the latter has unattractive coal resources at present.

The Trinidad KRCRA covers about 438,204 acres in parts of Las Animas and Huerfano Counties, of which approximately 131,000 acres are Federal coal. It is roughly bounded on the east by I-25 and on the west by Colorado State Highway 12. The Purgatoire River forms the southern boundary, and the northern boundary is a few miles north of Walsenburg. The KRCRA area is a dissected upland consisting of a series of flat-topped benches that rise from an elevation of about 6,000 feet on the east side to about 9,000 feet at the western boundary. Just to the west of the KRCRA, West Spanish Peak is the highest point in the area at 13,623 feet. The Cochair, Apishapa, and Purgatoire Rivers and tributaries drain the area as they flow eastward.

There are approximately 286 million tons of Federal strippable coal and approximately 936 million tons of Federal underground coal within the Trinidad KRCRA. This area covers about 131,000 acres with 53,000 acres suitable for either strippable or underground mining and 78,000 acres suited for underground mining only.

The coal area is shown on Map 2-8, most of which has potential for underground mining with a smaller portion having potential for surface mining. A detailed discussion of the coal resources is included in Appendix I.

PALEONTOLOGICAL RESOURCES

Paleontology inventories on about 95 percent of the BLM-administered lands within the resource area were completed between 1979 and 1983, which divided the resource area into four basic categories. The purpose of these inventories was to classify BLM-administered lands according to the potential for fossils of major scientific value. Generally, the classification is based on the degree to which a particular geologic formation is known to contain fossils.

Category 1 lands cover a very small percent of the planning area. These areas have documented localities that contain vertebrate or other fossils with important scientific value.

Category 2 lands are within geologic formations or members of formations that have produced fossils of scientific value elsewhere.

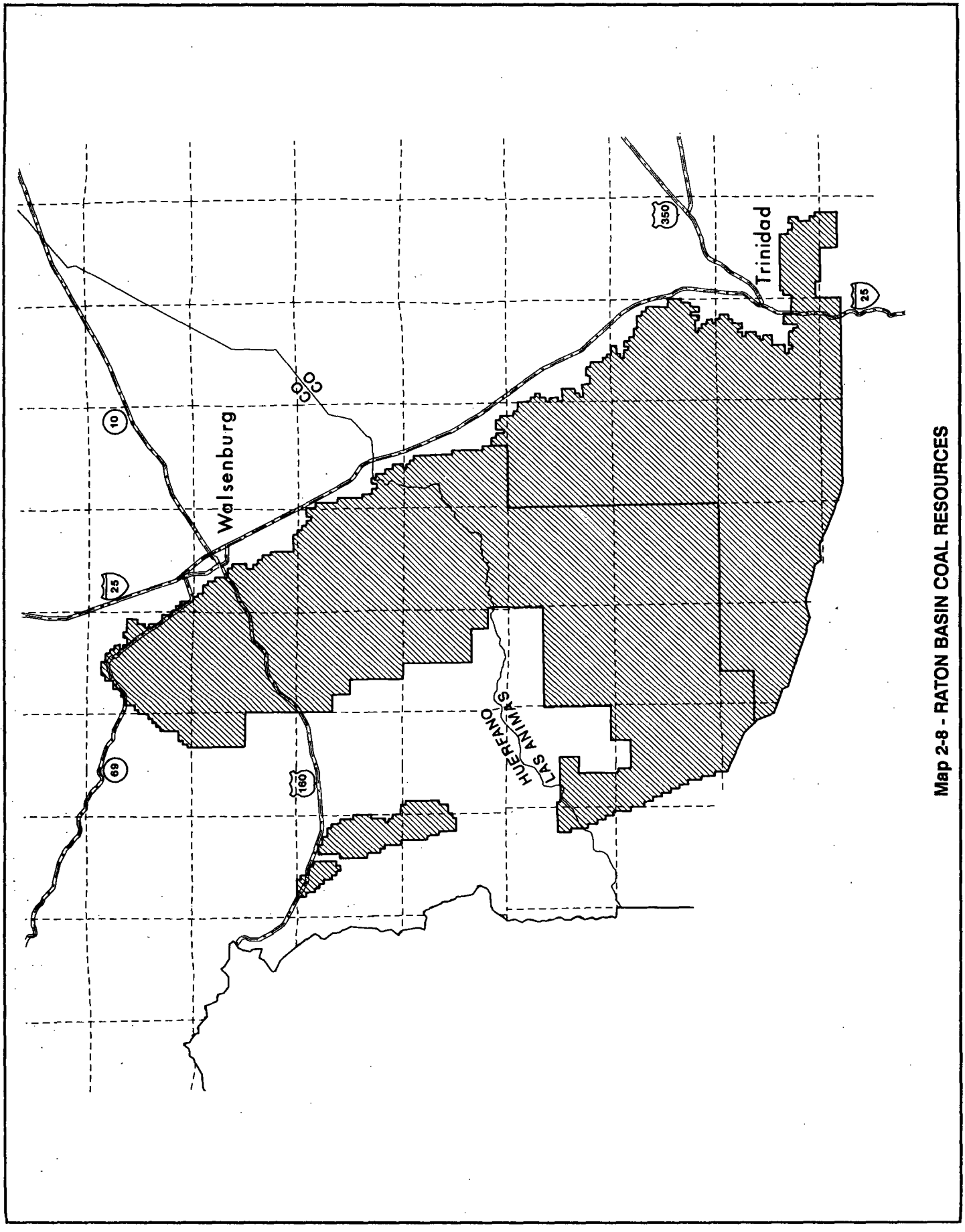
Category 3 lands have low potential for the discovery of fossils of scientific value.

Category 4 lands have negligible potential for the discovery of fossils.

These two inventories are "Paleontological Inventory and Assessment of the Northern Portion of the Royal Gorge Resource Area of Central Colorado" completed by Dennis Fisher in 1979 and "Paleontological Inventory and Assessment of the Southeastern Portion of the Royal Gorge Resource Area of Central Colorado" completed by Don Lindsey/Jane Westlye in 1983. These referenced studies give much detailed information about this resource.

One outstanding paleontological class I area of special interest is the Garden Park Area Fossil (3,757 acres). Although certain areas such as the Garden Park Fossil Area have received significant public interest and attention, the remainder of the resource has been neglected. Manual guidance recommends two types of management. The first is a "reactive" program where site-specific paleontologic inventories would be conducted prior to Federal actions. Because of a general lack of emphasis in this program, such inventories have been rarely completed resulting in the potential loss of scientifically important fossils. This type of program is roughly equivalent to sec. 106 compliance conducted by archaeologists. The second type of program is a proactive program in which very important areas are identified, and the paleontologic values are given special emphasis; i.e., the Garden Park Fossil Area.

Conflicts between user groups have existed for some time. Casual collecting of vertebrate fossils has been proposed by



Map 2-8 - RATON BASIN COAL RESOURCES

some groups resulting in conflicts with the scientific community. Both vertebrate and invertebrate fossils are sold commercially in rock shops and gem/mineral shows. Universities and museums depend on BLM-administered lands for fossil resources, and there are currently nine permits in Colorado issued to qualified institutions for vertebrate fossil collection. The Garden Park area is being used periodically by the Denver Museum of Natural History as a research/educational area. Extensive guidelines and stipulations are provided for this type of activity. Little guidance exists for any other type of paleontology use; however, it is expected that such guidance will be developed over the next few years.

The local chambers of commerce have identified rock and fossil collecting as a top recreational type use of public interest. The large number of rock and fossil type clubs, organizations, and magazines would also reflect significant public interest in paleontology. Regular phone calls and visits to BLM offices by those interested in fossils also occur. A significant public interest exists when vertebrate fossils are discovered.

The Garden Park Paleontology Society has had dramatic growth in its membership, and a number of other fossil oriented nonprofit groups exist in the region. Commercially, a strong demand for fossils exists, some of which even exists for vertebrate fossils such as dinosaur skeletons. Commercial operators also depend on public lands for these types of resources, but have not in the past ever requested permits or authorizations to utilize BLM-administered lands; therefore, this demand is unmeasured.

Although there is a large supply of invertebrate fossils when considering geologic formations as a whole, there are relatively few locations with a sufficient supply to meet long-term public demand. This makes it difficult to identify a location for general public use on the ground. Rock and gem locations identified in mineral collecting publications have suffered serious overuse and abuse. Identification of specific sites requires intensive management to ensure long-term success. A strong demand for public participation in vertebrate fossil excavation and preparation also exists.

Some paleontologic sites such as Garden Park also are important for historic values, resulting in a proactive program to identify these sites under the National Register of Historic Places program. The Historical Resources section of this chapter has more details on the historical significance of this area.

HISTORICAL RESOURCES

The Royal Gorge Planning Area (RGPA) was one of the first places in Colorado to be settled. As early as 1860, miners were seeking their fortunes in South Park. Settlements such as Cañon City sprang up along the Arkansas River, and by the 1870s, several railroads were developed in the region opening it up to further settlement. Large cities like Pueblo became manufacturing centers, and other places such as Leadville, Cripple Creek, and Buena Vista served the many mines in the area.

There are 114 historic sites in the planning area shown on the BLM site inventory. Of these, 24 are on BLM-administered lands. They represent everything from early settlement to homesteading, mining, and transportation. The majority of these sites are either mining or railroad related. BLM personnel spent 2 years conducting inventories in the Royal Gorge Planning Area; the BLM State Historian spent several months doing field inventory in South Park, the Raton Basin (coal related), and in the Wet Mountain Valley.

The planning area has several national historic districts; i.e., Leadville and Cripple Creek National Historic Districts. There are several historic properties that appear to be eligible for inclusion in the National Register of Historic Places, most of which are on private lands. BLM sites (2,960 acres) that may be eligible for the National Register include the following:

Florence and Cripple Creek Railroad Narrow Gauge Railbed segments, bridges, abutments, and tunnels in Phantom Canyon (960 acres);

Garden Park historical dinosaur dig sites in the Fourmile Creek area (320 acres);

Leadville stage road and settlement sites along the upper Arkansas River in Lake and Chaffee Counties (320 acres);

Midland Railroad railbed segments, station sites, and bridge abutments between Trout Creek and Buena Vista (480 acres);

Denver and Rio Grande Railroad railbed segments, station sites, and bridge abutments along Grape Creek between Temple Canyon Park and Lake DeWeese (720 acres; and

All of the DeReemer Forts along the Arkansas River (160 acres).

There are several overviews or Class I documents available that detail the history of the planning area. They include *Land of Contrast, A History of Southeast Colorado, Colorado Southern Frontier Historic Context*, and *Kansas Preservation Plan.*

Most of the historic resources in the RGPA are on private lands. Unless the landowner is interested in preservation, these sites are deteriorating because of natural weathering, vandalism, and other causes. The historic places on BLM-administered lands are often in an advanced state of decay because of neglect, weathering, or vandalism. A number of

sites are either ruins or are merely locations of something that was once there. It is not BLM policy to deliberately destroy sites without proper mitigation; however, in some cases cabins have been burned without recordation. The trend for historic properties is continued deterioration because of natural and manmade causes.

The primary relationship between historic resources and natural resources is the inherent conflict between long-term preservation and short-term resource use. When resource development occurs and a historic site is involved, the historic property is usually removed if it impedes development. This, however, is done with complete recordation of the site for permanent/archival record. In most cases, the provision of the Colorado Programmatic Agreement (PA) between SHPO, BLM, and the Advisory Council on Historic Preservation would apply. This trend of archival recordation is accomplished to Historic American Building Survey/Historic American Engineering Record standards.

Recent developments in the recreation management program have increased the need for historic resources as part of interpretation packages. The Gold Belt Loop is an excellent example of how historic resources are used for recreation needs. The loop contains an old narrow gauge railroad bed, historic buildings, and other sites that are of historical significance. The Arkansas Headwater Recreation Area also has historic resources that enhance visitors' experiences in the area. The demand for quality historic resources will continue to increase as recreation and tourism become more important on BLM-administered lands.

As noted previously, there is an increasing demand for quality historic resources as they relate to tourism and recreation. The Gold Belt Loop is a National Scenic Backcountry Byway; places like Cripple Creek and Leadville are National Historic Districts. These resources contribute to local and state economies by providing sightseeing, photography, and other opportunities for visitors. On the other hand, there is a market for historic artifacts, bottles, and barnwood. These destructive demands cause historic properties to eventually disappear. The economic value of bottles and/or artifacts is marginal and affects only a small number of persons. Tourism, however, provides a large-scale economic benefit for towns throughout the resource area and far overshadows personal economic gains.

Historic resources are currently managed in compliance with all existing Federal laws regarding protection and preservation of significant historic places. Historic sites eligible or potentially eligible for inclusion in the National Register of Historic Places are subject to treatment as outlined in 36 CFR Part 800. This involves consultation with the State Historic Preservation Officer, and probable mitigation measures.

The vast majority of historic sites on record were identified and considered in the Royal Gorge Management Framework Plan (MFP) and the Raton Basin MFP. Both of these documents made recommendations for the management of historic sites, most of which were never implemented because of fiscal or management constraints.

ARCHAEOLOGICAL RESOURCES

Archaeological resources in the Royal Gorge Planning Area (RGPA) range in age from the earliest known occupation of the North American continent (Paleo-Indian) to the protohistoric and contact periods. Within a general Plains cultural framework, archaeological sites in southeastern Colorado represent variability in both time and space; i.e., a wide variety of time periods are encountered in many different environments. Park Plateau resources possess "puebloid" features; materials from the various large canyons in the eastern plains are spatially unique; mountain and foothill sites exhibit a wide array of cultural characteristics. Further information about archaeological sites in Southeastern Colorado is available in two reports produced by the Colorado Historical Society (Eighmy 1984; Guthrie et al. 1984), as well as a BLM publication (Gunnerson 1987) and a popular book (Cassels 1983).

Site types present in the planning area include:

- lithic scatters
- lithic quarries
- rock shelters
- stone alignments
- open camps
- isolated features
- isolated artifacts
- tipi rings
- hunting blinds
- pits and semi-subterranean structures
- game jumps
- game surrounds
- game drives
- bone beds
- trails
- various types of burials
- rock art
- aspen art
- sacred and ceremonial sites

Three archaeological sites in the RGPA are listed on the National Register of Historic Places (Hackberry Spring, Torres Cave, and the Turkey Creek Canyon Petroglyphs), but none are on BLM-administered land. Approximately 350 recorded sites in the RGPA are eligible for the National Register of Historic Places, of which 60 percent are located in Las Animas County. Several large tracts of BLM-administered land in the eastern plains have potential equal to or greater than Piñon Canyon, yet remain unsurveyed. In the mountains and foothills of the RGPA, areas with high potential for location of eligible sites are present in or near several major drainages; however, only a small number of these areas have been inventoried for cultural resources.

Of the approximately 653,000 acres in the planning area, only 5 percent have been inventoried, an indication of the

"reactive" role of the cultural program in the past management on lands administered by BLM. An average of 50 sites is located and recorded by the resource area cultural staff annually; therefore, fewer than 800 have been recorded since the beginning of the program in 1975. Information from recent annual reports indicates that the typical site density on BLM-administered lands is about one for every 95 acres.

Archaeological resources in the RGPA are subject to categories of disturbance from three main sources. In order of damage level, from the most serious to the least, human interest, natural forces, and Federal, or public, initiated projects can all potentially cause severe harm or destroy aboriginal cultural resources.

Archaeological resources invoke curiosity in many people. Although cultural resources on BLM-administered lands are protected by various Federal laws, and destruction or disturbance of such resources may be a felony, human curiosity can result in illegal activities, ranging from artifact collection to vandalism and black-market trafficking. Evidence of vandalism and illegal collection has been noted at various sites within the planning area.

Development of archaeological resources for interpretation is considered in the Royal Gorge Resource Area Recreation Program. The benefits and detriments of interpretation must be carefully weighed. Although public education, as a form of recreation, is most often desirable, the potential site destruction from public visitation and resulting vandalism are important considerations. Achieving this balance is a challenge.

Destruction of archaeological resources by natural forces in the planning area is a result of the same problems that affect archaeological sites universally. Weathering and erosion by wind and/or water are the two most common environmental forces that adversely impact Royal Gorge Planning Area sites.

Sec. 106 of the *National Historic Preservation Act* requires BLM, in conjunction with the Colorado State Historic Preservation Office, to follow a five-step review process prior to any Federal undertaking. If a site is determined eligible for the National Register of Historic Places, mitigation must be conducted before the undertaking is allowed to proceed. Two potentially eligible sites (8,800 acres) in the planning area are Cucharas Canyon (1,600 acres) and Badger Creek (7,200 acres).

Conflicts with other resource uses occasionally arise, particularly when the *Mining Law of 1872* is invoked. For example, prospecting for minerals in a project area smaller than 5 acres in size is not considered to be a "Federal undertaking;" therefore, a Class III inventory is optional. Most archaeological sites (99 percent) in the Royal Gorge Planning Area, however, are smaller than 5 acres and could easily be destroyed.

Another type of conflict might arise if a significant cultural resource was in the location of a proposed project, such as a land exchange or a road. Several mitigation options (e.g., avoidance or site excavation) are available in such a situation.

At present, three major concerns about management of the archaeological resources have been identified. These include the identification of significant sites; balanced management of these sites to protect resource integrity and provide for public appreciation; and the development of an active, rather than a reactive, approach to archaeological resource management.

Plains cultures left little evidence of their habitation sites; however, there is abundant evidence of stone tool manufacturing activities. Most artifacts and living structures were portable and subject to poor preservation (e.g., wooden items, skin tents). Features, such as hearths, are equally rare, and are easily affected by natural weathering. Onsite interpretation is not likely to be rewarding for the visitor. Because these resources are so difficult to locate and interpret, they are subject to inadvertent, or even intentional, destruction by vandalism and "collection." Drawing the attention of the public to such archaeological resources may invite problems.

Present archaeological resource management, including inventory, recording, excavation, evaluation, and nomination to the National Register of Historic Places, occurs on an "as needed" basis. These activities are accomplished as part of environmental analyses for potentially destructive projects. Several locations in the planning area contain a wealth of archaeological resources, but are left unattended unless a project is planned for the vicinity. As part of ongoing site identification, one or more cultural resource management plans (CRMPs) need to be developed to provide effective care of these irreplaceable resources on land administered by BLM.

The goals of cultural resource management are protection and preservation of these irreplaceable materials for future generations. An increased emphasis on education and interpretation, however, has resulted in the need to identify interpretable resources for public educational development.

Current management of cultural resources is guided by Sec. 106 of the *National Historic Preservation Act* of 1966, which specifies that site inventory, assessment of eligibility to the National Register of Historic Places, and consultation with the Colorado State Historic Preservation Officer and the Advisory Council on Historic Preservation must occur before a Federal undertaking may proceed. Sec. 110 of the Act also requires that sites determined to be eligible for the National Register of Historic Places are nominated, and listed, if one of four significance criteria are met. The criteria include:

- Association with significant events in history;
- Association with significant historic individuals;
- Architectural or artistic significance;
- Potential to yield important information about the past.

Other important legislation specific to the protection and management of cultural resources includes the *Antiquities Act* of 1906, the *National Environmental Policy Act*, the *Federal Land Management and Policy Act*, and the *Archaeological Resources Protection Act.* Compliance with these and other less significant laws, acts, and presidential orders is, and will continue to be, an important function of the cultural resources program.

The cultural resource program provides various levels of protection for archaeological resources. Since it is not feasible to erect a protective structure over every site in the planning area, reactive management is the current strategy. For example, if a site is undergoing active erosion, salvage excavation might be conducted or diagnostic materials that might otherwise be lost or destroyed are collected from a site. A few locations in the planning area are protected by road closures, fences, and signs. The entire area is monitored on a regular basis by BLM law enforcement and cultural resource personnel. Other means of physical protection (such as movement sensors) are also available, as needed.

Public speaking engagements, press releases, and academic instruction are provided on request or as necessary. Walk-in, telephone, and written requests for specific information are handled individually. Partnerships with interest groups are maintained and supported as funds are available.

TRANSPORTATION AND ACCESS MANAGEMENT

Planning criteria for transportation maintenance include: 1) need for the route, 2) amount of use, 3) present or likelihood of deterioration, and 4) resource conflicts/risk of unnecessary or undue degradation of the environment.

The transportation system on BLM-administered land is made up of publicly maintained roads (including BLM), roads constructed and maintained by and for a private entity, and other roads constructed or maintained by an unknown person, or maybe not maintained by anyone. This is also true for trails.

The road and trail system on the BLM-administered land is part of the access sytem and should provide legal admission and deter illegal use and access. Roads and trails not part of the access system should be closed.

Planning criteria for access needs include: 1) identification of BLM-administered lands with sufficient access for the public and BLM administration, and 2) identification of BLM-administered lands where public or administrative access should be acquired. Determination of priorities for acquisition would be based on the following: resource values, risk of closure to the public, resource conflict mitigation, public demand and BLM administrative need, configuration of the BLM-administered land parcel, proximity to population centers, and proximity to major travel routes.

Most legal public access is provided by a Federal, state, or county road crossing BLM-administered land. It may also be provided by an easement (exclusive) acquired for that purpose or a private dedication of property for the purpose of public access. Legal public access (exclusive) is an acquired right for the general public to cross non-Federal property. Permanent exclusive easements are recommended under one or more of the following conditions:

a. A substantial investment is to be made.

b. The need for the road is to remove a substantial amount of resource over a long period of time.

c. The road is needed to adequately manage the multiple use resources.

d. The road is needed to reach BLM-administered lands with significant outdoor recreation value.

e. When a substantial investment is to be made on the easement area, or the area served by the easement has a significant amount of valuable resources.

Legal administrative access (nonexclusive) is an acquired right for BLM and its licensees to cross non-Federal property. This can be used to manage resources including removal under contract, but public use is not allowed. Physical access is the existence of a road to BLM-administered land without any legally established right of use. Roads and trails on land administered by BLM are open to casual public use (no maintenance nor disturbance) unless specifically closed.

The above description of access is based on the assumption that access is defined as vehicular by a roadway. Obviously, there are other degrees of access including specialized motorized vehicles or bikes, nonmotorized vehicles or bikes, horse or llama trails, foot travel by trail or cross country, and even aerial access.

Access or the degree of access is defined differently by various individuals. One person wants to drive a 2-wheel drive sedan to within 100 yards of their destination; another to within 5 miles of their destination. Some consider a 10-mile horse ride or hike by foot perfectly acceptable. Individual needs and perception of needs must be considered.

Table 2-30 depicts the status of access to BLM-administered land based on the following four-part definition of public access:

Adequate: Access is adequate if BLM has all necessary rights to access the lands for uses identified by BLM. It would be inadequate if the only legal access in an area targeted for dispersed recreation was for agency administrative.

Permanent: Access is permanent if the Federal government has, for example, fee simple title to land or has been granted an easement in perpetuity. It would not be permanent, however, if access can be withdrawn by the granting party in the future.

Legal: Access is legal if written evidence documents the rights for access. It would not be legal if access depends solely on the cooperation and good will of the granting party.

Public: Access is public if the general public is able to freely enter the lands for the uses identified by BLM. Access would not be public if it is limited to administrative and/or commercial lease uses.

TABLE 2-30
Public Land Without Adequate Permanent Legal Public Access

Type of Area	Acres
Wilderness study areas	38,000
Dispersed recreation areas	50,000
Special management areas	75,000
Multiple use management areas	11,000
Total	174,000

Access to land administered by BLM is significant to the management of every resource and to the public use of the land and resources. Without access, BLM management is hampered or possibly impossible. This then becomes a major factor in the land tenure adjustment issue; in fact, it is a key criteria in determining suitability for disposal.

There is a much greater demand for public access, particularly for recreation, than there is a supply. There is a strong interest by many people in obtaining access to all Federal, state, and local lands, even in some cases to the point of disbelief that a private landowner has the right to keep someone from crossing private land to access public lands. Legal public access vs. roadlessness is a highly controversial issue in BLM land use planning. The public demand spectrum runs from no roads anywhere to roads everywhere, and the spectrum of how much of each is demanded by the public is difficult if not impossible to determine.

Table 2-31 shows the transportation status on BLM-administered land.

RIGHTS-OF-WAY MANAGEMENT

Rights-of-way grants are issued to authorize the construction, maintenance, and use of BLM-administered land for transportation or distribution systems including water, oil, gas, solids, slurries, electricity, communication, or vehicles. Typically, the system consists of pipelines, ditches, wires, roads, or trails and frequently contain ancillary facilities such as reservoirs, tanks, storage sites, juncture sites, transmission sites, relay sites, borrow pits, or turn-out areas.

Applications are reviewed and processed on a case-by-case basis. In theory, all BLM-administered land is open for ROW consideration; however, in reality some is closed because of resource conflicts. For example, construction of a road or major pipeline would likely be prohibited in a wilderness area or across an area of significant cultural resources.

The increasing or high rate of subdivisions adjacent to BLM-administered land creates numerous trespass problems for BLM. Often, lot owners believe that accessing their property through land administered by BLM for roads and utilities is desirable for one reason or another. They also frequently proceed without authorization, either willfully or unintentionally.

TABLE 2-31
Transportation System Status

Type of Road, Railroad, or Trail	Number of Miles on BLM	Maintenance Status
Non-BLM public road authorized by BLM	132	Federal, state, and/orcounty roads with regular maintenance
Non-BLM public road not authorized by BLM	73	Federal, state, and/or county roads with regular maintenance
BLM road system	229	BLM irregular maintenance when funds permit
BLM trail system	23	BLM irregular maintenance when funds permit or as done by volunteers
Private roads/trails authorized by BLM	15	Right-of-way holder with regular maintenance
Private roads/trails not authorized by BLM	470	Mostly not maintained
Corporate roads/railroads authorized by BLM	89	Right-of-way holder with regular maintenance
Corporate roads/railroads not authorized by BLM	14	Mostly regularly maintained
Total	1,045	

Unauthorized and unnecessary roads, either constructed or created by repeated use, are a problem on BLM-administered lands. Many are causing undue and unnecessary degradation of the environment and should be closed and rehabilitated.

Demand for using BLM-administered land for an authorized right-of-way system or facility varies from year to year, but frequently is the only possible route or location. BLM policy is to supply a right-of-way where this need is justified, a better route or location is unavailable, and there is no serious adverse unmitigated impact.

Rights-of-way applications are processed on a first-come first-served basis except in extenuating circumstances as determined by the area manager. A review of each precedes the offer of grant or rejection of application.

Occasionally the economic viability of a project depends on the authorization to cross BLM-administered land. Table 2-32 depicts the rental collection from rights-of-way in the planning area. Many rights-of-way are rental exempt.

TABLE 2-32
Rental Collection from Rights-of-Way

Year	Acreage	Amount of Rent
1991	645.929	30,137.00
1990	727.668	31,769.37
1989	521.574	16,680.33
1988	627.230	28,856.00
1987	388.854	16,154.56
1986	591.094	22,419.00
1985	617.436	21,303.40
1984	425.779	10,044.00
1983	152.249	9,676.00
1982	215.032	2,773.00
Ten Years	4,912.845	189,812.66
Average	491 acres	18,981.00

LAND OWNERSHIP ADJUSTMENTS

The Royal Gorge Planning Area (RGPA) has approximately 653,000 acres of BLM- administered land and 2.5 million acres of BLM-administered mineral estate. Most of the Federal mineral estate lies under BLM-administered land; however, 7,967 acres of the minerals are owned by a non-Federal entity. For a more detailed discussion see the individual mineral section. Table 2-33 shows land ownership summary by county within the resource area. Maps 1-2 and 1-3 in Chapter 1 show the BLM-administered land and BLM-administered mineral estate location.

TABLE 2-33
BLM-Administered Land by County

County/Location	Total Acres	BLM Acres	Percent
Baca	1,625,935	367	<.1
Bent	986,805	1,684	<.1
Crowley	485,421	4,363	1.0
Chaffee	570,595	53,973	9.4
Custer	473,295	15,294	3.2
El Paso	1,353,352	3,899	.3
Fremont	980,299	343,072	35.0
Huerfano	1,017,997	72,721	7.1
Kiowa	1,143,012	8,089	.7
Lake	489,969	17,443	3.6
Las Animas	3,009,822	17,443	.6
Otero	812,096	1,005	<.1
Park	1,414,761	72,297	5.1
Prowers	1,051,094	812	<.1
Pueblo	1,480,545	16,391	1.0
Teller	487,832	24,147	4.9
Total	17,382,830	653,000	3.8

Management of the BLM-administered land is complicated by inholdings of private and state land, irregular boundaries, small parcels isolated from easy access, and occasionally conflicting adjacent land uses. Many varied problems arise, a few of which are unauthorized occupancy, road construction, utility construction, grazing, timber harvest, mining and cultural artifact collectings, infrequent and inadequate monitoring and management by BLM, and sometimes trespass onto private land by users or harassment of legal users.

Land ownership adjustment is directly related to the issues concerning which lands should be considered for acquisition/disposal and the access needed within the RGPA. Land ownership adjustment is indirectly related to all issues and management concerns. Opportunities to adjust ownership to eliminate inholdings, straighten or better locate boundaries, eliminate small parcels, consolidate larger parcels, provide for easy access, or eliminate a conflicting adjacent land use occur throughout the planning area. Resource management for public use under the multiple use concept is more efficient when land is contiguous in large block(s), and the boundaries are easily identifiable. The planning area is divided into three land ownership adjustment opportunity areas described a follows:

Category I - Disposal of BLM-administered land within this zone is a high priority and may be accomplished by any appropriate means. The BLM-administered lands clearly meet the sale criteria in FLPMA, Sec. 203, according to current information. Site-specific review of resource character may identify public values that need to be protected by continued administration by BLM or compensation through a beneficial exchange. Land ownership opportunities would not be acceptable for processing unless the land clearly offers

unique manageable public values. Any priority would be based on this public benefit.

Category II - An area of retention of BLM-administered land, with limited exceptions. Processing land ownership opportunities in these areas is a high priority. Lands in this zone have significant public values and disposal could only occur when in the public interest and to complement management. Proposals offering non-Federal land within this zone have the highest work priority. Offers that lie outside the zone, but adjacent to the boundary, could be considered high priority.

Category III - An area of exchange priority. There are relatively significant public values, but management is difficult because of land ownership pattern. Disposal of BLM-administered lands through exchange for lands of greater public benefit would be as equally acceptable as acquisition that creates a manageable block of BLM-administered land either inside or outside this area.

Demand for BLM-administered land occurs in two ways. First, an adjacent landowner or other user wants the land to remain under BLM administration so the existing use can continue. This use could be for grazing, timber, recreation, scenery, mineral development, etc. Second, an adjacent landowner or other user wants to acquire the land for a single use to the exclusion of others. This use could be any of the same uses described above. The supply of BLM-administered lands on the market is very limited. Only small acreages are offered at any one time. Occasional concern occurs regarding the impact on land values because BLM-administered land is available on the market, but this effect is actually very small since the minimum sale price must be fair market value.

Between 1985 and 1990, sale of 840 acres occurred (an average of 168 acres per year). Between 1980 and 1990, 5,970 acres of BLM-administered land were exchanged for 7,471 acres of private land (appraised value was equal). This averages 597 acres exchanged for 747 acres.

WITHDRAWALS/ CLASSIFICATIONS

Withdrawals/classifications are used to protect BLM-administered lands for a designated use and may restrict other land uses by segregating the lands from the mining laws or other public land laws. Types include recreational sites, Recreation and Public Purposes (R&PP) leases, patents, Public Water Reserves, classification for multiple uses, Prosecution of War, wildlife areas, and other agency withdrawals. Recommended withdrawals/classifications are analyzed through the NEPA process or the Bureau planning system.

As required by Sec. 204 (l)(1) of the *Federal Land Policy and Management Act* (FLPMA), a review of existing withdrawals is being completed as part of this RMP/EIS. The review will determine whether, and for how long, the existing withdrawal of the lands would continue, and which are consistent with the statutory objectives of the programs for which the lands were withdrawn or classified.

Existing BLM Withdrawals/ Classifications

R&PP Leases/Patents: These were designated for public uses, for recreational purposes, or historical monument purposes by state, local authorities, or nonprofit organizations. Special act patents by Congress were made for similar purposes. It does, however, require money to develop the areas and to manage the facilities. The BLM-administered lands are segregated from all public land laws including the mining laws. Once a lease is issued, the lands remain closed. If the lease is rejected or the lands revert back to BLM management, the lands may be open to all or some public lands laws by an opening order. A restoration order returns the lands to unreserved, BLM-administered land status open to operation of all general public land laws. Lands patented under an R&PP lease remain closed to the mining laws until the Secretary of Interior approves such regulations to open the lands to the mining law. Action by the Secretary has not occurred to date. R&PP leases are no longer used to authorize sanitary landfills on BLM-administered lands.

The following R&PP lease classifications are authorized in the RGPA:

Colorado Division of Wildlife at Lake DeWeese near Westcliffe for recreational camping, fishing, picnicking, educational, and water related activities - 240 acres.

Saint Scholastica has an educational lease at Poverty Mountain near the Glen Vista Subdivision - 20-acre classification; 5-acre lease.

Colorado Division of Parks and Outdoor Recreation has 14 sites along the Arkansas River as part of the Arkansas Headwaters Recreation Area - 479 acres.

Park County for a sanitary landfill near Fairplay, Colorado - 20 acres.

Chaffee County for a sanitary landfill between Buena Vista and Salida, Colorado - 40 acres.

City of Cañon City has a classification pending adjacent to Temple Canyon Park for an addition to the existing park- 160 acres.

The following R&PP patents in the planning area include:

City of Cañon City for Temple Canyon Park (640 acres), Red Canyon Park (600 acres), Royal Gorge Park (512 acres).

Upper Huerfano Gardner Cemetery Association (20 acres).

Trinidad Water Department has a parcel near North Lake for fishing, picnicking, and watershed protection (40 acres).

City of La Junta has two patents along the Arkansas River corridor (720 acres).

Deer Mountain Fire Station in the Glen Vista Subdivision (4 acres).

Odd Fellows Grand Lodge of Colorado for a public campground adjacent to the Deer Mountain Fire Station (95 acres).

Recreation:

Five Points Recreation Site on the Arkansas River between Parkdale and Texas Creek, Colorado, was withdrawn to protect Federal improvements (85 acres).

Browns Canyon Primitive and Recreation Area along the Arkansas River was withdrawn to protect the designated values (2,214 acres).

Public Water Reserves: There are approximately 123 public water reserves (PWRs) throughout the PA that protect water holes and developments for public use. The BLM-administered lands involved are closed to non-metalliferous mining activity only. The PWRs are 40-acre parcels, usually described by a surveyed legal description and are not centered around the waterhole or spring. BLM is presently in District Court filing for water rights on all the PWRs; the priority date would be 1926, and the water flows would be established.

Classification for Multiple Uses (CMUs): The Bureau identified certain public lands for segregation from the public land laws and mining laws.

- Coaldale/Short Creek, C-0111199
- Lone Pine Recreation Site, Cotopaxi C-083480
- Swissvale, C-083414
- Rincon Recreation Site, C-083428
- Salida East Recreation Site, C-083981
- Eight Mile Creek, C-083469
- Phantom Canyon, C-083482
- Bootlegger/Bakers Gulch, C-083440
- Pinnacle Rock Recreation Site, C-083393
- Lone Tree/Texas Creek, C-0127886
- Protective Classifications

High Mesa Grassland (Sommerville Table): The Bureau identified this protective withdrawal area because of the existing diverse plant community. It closed the BLM-administered lands to mineral entry (1,170 acres).

Other Agency Withdrawals

The U.S. Department of Defense put a Prosecution of War withdrawal on lands around Leadville, Colorado, and one on lands east of Trinidad, Colorado, for a bombing range. These are obsolete and currently have no effect.

The U.S. Fish and Wildlife Service has a withdrawal for a fish hatchery southwest of Turquoise Lake near Leadville, Colorado. This withdrawal covers both BLM-administered lands and National Forest system lands.

The U.S. Forest Service has a scenic easement along U.S. Highway 24 between Manitou Springs and Woodland Park.

The Air Force Academy has a scenic easement west of the facilities.

The cities of Colorado Springs and Manitou have numerous withdrawals around Pikes Peak to protect watershed.

Most of the existing withdrawals in the PA have been reviewed pursuant to FLPMA and recommendations have been made as to whether the withdrawal should be modified, continued, or revoked. Periodic compliance inspections are made on R&PP leases and patents to ensure the lands are still used for the designated use. Sec. 302 leases are also inspected periodically for compliance with lease stipulations.

Presently, BLM is in the process of a wild and scenic river evaluation program. Designation is the responsibility of Congress. Wild and scenic designation would supercede and provide more protection to the present BLM recreational sites such as Five Points, Hecla Junction, and Ruby Mountain. The Arkansas Headwaters Recreation Area R&PP sites are also compatible with any designation. If wild and scenic river designation would occur on the Arkansas River or Beaver Creek drainage, resource protective waterpower and reservoir site withdrawals would be terminated.

Concurrence with the managing agency and review for NEPA compliance is required on all applications submitted for conflicting uses in a withdrawn area.

Potential BLM Withdrawals

Sites with a unique feature or resource capability not currently withdrawn pose management challenges to ensure resource protection. BLM-administered lands not withdrawn to protect a unique resource often have multiple use potential. There is a growing public demand for multiple

use on lands administered by BLM. Valid existing rights prior to land withdrawal also raise concerns regarding protection of rights to continue on the BLM-administered land.

Conflict resolution prior to any withdrawal must be acknowledged and must consider the uniqueness of the protected resource, multiple use, and valid existing uses of the BLM-administered lands.

Further withdrawal needs because of unique resources may be considered on the following areas or sites:

Garden Park Paleontology Area

Gold Belt Tour National Back Country Byway

Arkansas Headwaters Recreation Area

Shelf Road Rock Climbing Area

Cucharas Canyon Cultural Area

Regional Airport near Fairplay, Colorado

ACECs

Bike Trails (Midland)

Scenic Overlook (Collegiate Peaks)

All of the above have special interest groups who currently believe the areas are unique and deserve protection; e.g., Garden Park Paleontology Area has national significance; the Shelf Road Rock Climbing Area has statewide, if not national, significance; the Gold Belt Tour Area has regional tourism; the Regional Airport benefits four adjacent counties.

WATERPOWER/RESERVOIR RESOURCES

BLM provides a scientific classification of waterpower and reservoir resources (WRR) values on Federal lands. This classification is accomplished by resource inventory, evaluation activities, monitoring, and resulting land actions required by legislation, regulation, and policy.

Reservoir sites are constructed to provide the operator with control of the distribution of the flows in a stream for a more dependable supply. This control of the distribution is valuable to meet needs or demands for flows for agriculture, fisheries, flood control, hydroelectric power generation, industrial use, irrigation, municipal water, navigation, quality of water, recreation, shoreline protection, and wildlife. Development can only occur to the extent that physical conditions will allow. These sites are dependent on topography, geology, water supply, and water distribution Quality potential reservoir and waterpower sites are limited in number, fixed in position, increasingly scarce, and irreplaceable.

The reservoir sites may or may not have hydroelectric generation (waterpower) facilities installed. The hydroelectric value is a function of demand and need; generally, the value has been recognized and given high priority by Congress. Additional information is in Appendix J.

The Arkansas and South Platte drainages produce an abundance of high quality water for which demand exceeds supply. Present demand includes irrigation, power, fisheries, esthetics, recreation, and domestic use. Nearly 90 percent of the 3.1 million people in Colorado live east of the Continental Divide in an area receiving an average annual precipitation of 15.7 inches. Groundwater in eastern Colorado has been developed to a point where wells are running low, and yields are of low quality for meeting the rapidly growing demand being imposed by urban population growth and intensified agricultural practices.

Future local, regional, and national needs in these basins include provision for irrigation, mining, interbasin transfers, off-stream storage, flood control, groundwater recharge, wetlands, improved water quality, enhanced fisheries, additional water for wildlife, stock, and fire fighting, domestic and industrial supplies, recreational opportunities, scenic values, and hydroelectricity.

The Federal government has been identifying and documenting potential reservoir sites since 1888. The objective of the WRR inventory activity is the identification of the potential sites, a professional assessment of the value, and the protection of the more valuable sites.

The sites listed in Appendix J indicate the previous interest and are a guide for the location of resources. The listed sites are those previously identified and may not reflect all possible sites. In this planning area there are 21 developed reservoirs over 5,000 acre-feet and 29 undeveloped; 43 developed reservoirs under 5,000 acre-feet and 12 undeveloped; 9 developed diversions and 33 undeveloped; and 1 developed pump storage.

As part of the inventory activity, these 146 sites have been tracked by USGS (presently the BLM WRR function) since their identification. Information pertaining to discovery, technical evaluation, monitoring, partial development, and the subsequent land actions on the WRR sites in these basins may be obtained from the Colorado State Office.

The objective of the WRR evaluation activity is to identify resource management conflicts and opportunities through the planning process. The importance and value of WRR will be established and compared to conflicting resources.

The following WRR determinations must be made for management areas during resource management planning:

All BLM-administered lands in the planning area determined by professional evaluation to have potential for WRR development must be assigned to one of three categories: lands suitable for intensive management of WRR sites, lands suitable for restricted management as WRR sites, and lands unsuitable for management as WRR sites.

All BLM-administered lands within the planning area currently withdrawn for WRR purposes must be assigned to one of two categories: lands recommended for continuation of the withdrawal and lands not recommended for continuation of the withdrawal. Various alternatives will modify the WRR recommendation for either continuing the withdrawals or for not continuing the withdrawals. The mix of other resources described in these various plan alternatives provides a basis for the analysis as to why a withdrawal is or is not recommended for continuation.

Management direction for areas of potential development needs to be assigned to one of four categories: excluded, restricted, permitted, or preferred. This includes the identification of other resource values that need protection and the constraints to be placed on WRR developments. The BLM land manager has responsibility for the identification of conflicts that may involve WRR values. When considering conflict resolution, the value of the potential WRR site must be weighed against the value of existing resources. This comparison helps to set priorities, identify possibilities for mitigation or enhancement, determine alternative actions, and provide guidance for future actions.

Presently the city of Colorado Springs is evaluating construction of the Elephant Rock Dam north of Buena Vista for storage and interbasin transfers. They are also evaluating construction of the Princeton Diversion Dam north of Buena Vista. These dams are two of eight domestic water alternatives for the city.

There are 16 withdrawals in this resource area that protect WRR values and involve approximately 47,000 acres. USGS made these withdrawals for the Secretary of the Interior, but in 1983, the Secretary delegated the authority to BLM. Now BLM has recommendation responsibilities over these withdrawals, which are a form of long-range planning to keep sites in Federal ownership and control to ensure the sites are available if and when needed.

Withdrawals were based on WRR technical evaluations of the potential development schemes. Information on which the withdrawals were made is available from the Colorado State Office. Sites in these resource protective waterpower withdrawals will be treated as though the resource decision has already been made by the Secretary of the Interior, with the concurrence of the management agency. In order to keep these withdrawals protecting WRR values to a minimum, BLM has been delegated authority for withdrawal review to evaluate water development potentials and make recommendations for change to the Secretary of the Interior. The Secretary has the ultimate decision authority on withdrawals. Recommendation to alter the resource decision, therefore, will require significant justification.

In most cases, the BLM manager must consult with the Federal Energy Regulatory Commission (FERC) before allowing interim use action to occur on withdrawn land. If the land is not in a waterpower withdrawal, the manager has to consider the responsibilities given to the Bureau by the Secretary of the Interior to identify and nominate sites for withdrawal.

Lands with WRR values not withdrawn nor recommended for withdrawal pose resource protection and planning challenges to the land manager to consider multiple resource conflicts. Land with WRR values often have other important resource uses. The BLM land manager may allow interim use, provided waterpower resource values are not endangered.

Within the RGPA only those sites within the BLM-administered lands are analyzed in Chapters 3 and 4 of this plan. Those sites outside the planning area on USFS, BOR, NPS, military lands, etc., will be addressed in the individual agency land use plan.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN DESIGNATIONS

BLM is required to consider areas of critical environmental concern (ACECs) under Sec. 202(c)(3) of the *Federal Land Policy and Management Act* of 1976 and BLM Manual 1613. Designated research natural areas (RNAs) are eligible for consideration as ACECs and if eligible must be designated as RNA/ACECs. If they are not eligible for ACEC status, they will be deregistered as RNAs.

Nominations were solicited from BLM staff, other agencies, and through public workshops for potential ACECs within the Royal Gorge Planning Area. All ACEC nominations, and those meeting requirements of the "screening" process are shown on Table 2-34. ACECs recommended for nomination are shown on Map 2-9. The screening process is explained in Appendix K.

There are currently two special management areas within the Royal Gorge Planning Area, which are:

High Mesa Grassland Research Natural Area: High Mesa Grasslands RNA is 1,510 acres and has scenic, biological, and other values. The area represents a relict plant community and also a key raptor habitat. It was designated an RNA in 1982 and is also a Colorado Natural Area. This area requires management to protect values from OHV use and grazing. The condition of the site is fair, but deteriorating. Management of the site to enhance natural values will help improve its condition and will provide a trend to improving conditions for the research values at High Mesa Grasslands.

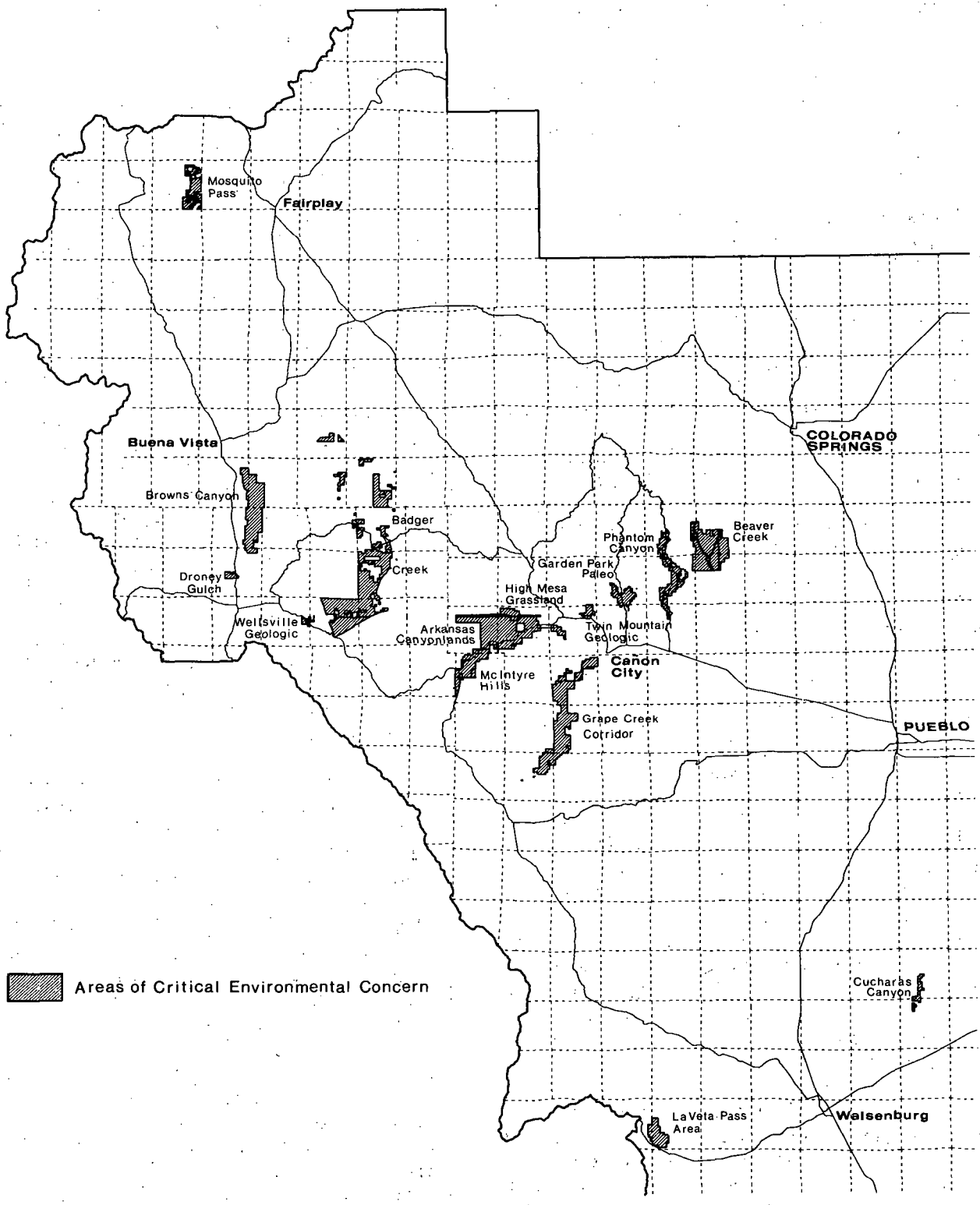
Garden Park Paleontological Area: Garden Park is 2,728 acres and is a highly significant site for paleontological values. Additionally, Garden Park is significant for threatened and endangered plants and has historic values. The site is considered one of the most important quarries for dinosaurs in the world. Garden Park is also a National Natural Landmark (NNL) as designated by the National Park Service in 1972 and was recommended in the Royal Gorge MFP for special management and potential withdrawal (Kuntz, et al., 1989). The Denver Museum of Natural History has an ongoing excavation program at Garden Park. The site is also, unfortunately, popular with illegal fossil collectors. There has been recent vandalism at Garden Park caused by unauthorized fossil collectors. Demand for Garden Park fossils will continue into the future. Additionally, there is considerable local demand for interpretation and visitor use for Garden Park. The Garden Park Paleontological Society has contributed many volunteer hours in helping develop interpretive/visitor use plans for this site. Garden Park Paleo Area provides world-class fossil resources not available elsewhere.

Both Garden Park and High Mesa Grasslands RNAs are managed to enhance and protect special values. There is deterioration caused by OHV use, vandalism, collectors, and grazing uses. Garden Park is currently being managed for scientific values, and a management plan is being

TABLE 2-34
Nominated ACECs

Name of ACEC	Acres	Values	Recommended
Browns Canyon	10,963	Scenic/wildlife	Yes
Beaver Creek	3,734	Scenic/wildlife	Yes
Grape Creek Corridor	18,560	Scenic/wildlife/riparian	Yes
High Mesa Grassland	1,510	Scenic/relict plants	Yes
Garden Park Paleo	2,728	Fossils/plants	Yes
Big Game Habitat	?	Wildlife	No
Arkansas Headwaters Recreation Area	5,000	Recreation/scenic	Yes[1/]
Phantom Canyon	7,200	Historic/scenic	Yes
McIntyre Hills	17,240	Historic	No[1/]
Big Hole	14,635	Cultural/Scenic	Yes[1/]
Droney Gulch	828	T&E Plants	Yes
South Apache Creek	330	Fisheries	No
Cucharas Canyon	3,160	Scenic/cultural	Yes
La Veta Pass Area	3,431	Scenic/wildlife	Yes
Midland Hill Area	6,070	Historic	No
Crystal Falls	159	Scenic	No
Badger Creek	1,804	Cultural/riparian	Yes
Texas Creek	230	Riparian	Yes[1/]
Rocky Mtn. Moraine	199	Geologica	lNo
St. Charles River Canyon	559	Scenic/riparian	No
Huerfano Divide	1,419	Scenic	No
Lower Phantom Canyon Paleo Site	166	Paleontology	Yes[2/]
Twin Mtn. Geologic	1,060	Geological	Yes
Wellsville Geologic	812	Geological	Yes
Indian Springs Fossil	45	Paleontological	No
Purgatoire River Canyon	160	Scenic	No
Chacuaco Canyon	40	Scenic	No
Talahassee Leafy Spurge	253	Noxious weeds	No
Bighorn Area	8,688	Wildlife/scenic	Yes[1/]
Shelf Road Corridor	7,335	Scenic/recreation	No
McCoy Gulch	30	Riparian	No
Arkansas Canyonlands	23,200	Scenic/recreation	Yes

[1/]Will be part of the Arkansas Canyonlands ACEC (combined).
[2/]Will be part of Phantom Canyon ACEC (combined).



Map 2-9 - AREAS OF CRITICAL ENVIRONMENTAL CONCERN

developed for this site. The trend is for stabilized use and improved condition for Garden Park.

The designation of RNAs must be concurrent with designation of the site as an ACEC. High Mesa Grasslands and Garden Park were designated RNAs prior to these regulations; therefore, were not designated as ACECs. Both sites were also designated as Colorado Natural Areas under the terms of a Memorandum of Agreement between CNAP and BLM (1982 and 1989).

WILD AND SCENIC RIVER DESIGNATIONS

There are currently no designated segments of the National Wild and Scenic River System (NWSRS) within the Royal Gorge Planning Area. Prior to the Royal Gorge Resource Management Plan (RMP), no stream within the resource area had been analyzed for inclusion into the NWSRS. All potentially eligible stream segments were studied for eligibility for wild and scenic designation and are described in more detail in Appendix L, the Wild and Scenic Rivers Analysis Study Report. As part of this RMP, two streams are being analyzed for potential addition to the NWSRS. These streams are a 126-mile stretch of the Arkansas River from Leadville downriver to the Royal Gorge Park, and a 20-mile stretch on the main branch and east branch of Beaver Creek from below Skagway Dam downstream to the southern boundary of the Beaver Creek State Wildlife Area.

The process for wild and scenic river designation consists of six major steps (Table 2-35). In the Royal Gorge planning process, the Wild and Scenic Rivers Study Group determined 146 miles of stream or river eligible and suitable for potential designation as additions to the national system. Appendix L provides more details on this process.

BLM responsibility under the *Wild and Scenic Rivers* (W&SR) *Act* ends 3 years after the completion and signing of the record of decision (ROD)/approved resource management plan (RMP) if management does not recommend action by Congress for wild and scenic designation. Protective management, under the W&SR Act, of those outstandingly remarkable values along the 20-mile segment of Beaver Creek and the various segments on 126 miles of the Arkansas River would cease 3 years after the ROD/approved RMP is signed..

Conflict has increased between recreational users and private property owners. This has led to an increased workload for local law enforcement and BLM managers. As is typical in the west, much of the land along a stream is privately owned. The Arkansas River is approximately 50 percent in public ownership (BLM, USFS, city, and state) and Beaver Creek is approximately 86 percent in public ownership (BLM and state).

Beaver Creek is currently managed under the *Wilderness Interim Management Guidelines* as a part of the 28,000-acre wilderness study unit. The southern portion of Beaver Creek lies within the Beaver Creek State Wildlife area and is managed for wildlife related public recreation use.

About 109,000 acres of the Arkansas River corridor is currently managed as the Arkansas River Special Recreation Management Area by BLM. A portion of the Arkansas River corridor, about 5,000 acres, is currently managed for recreation as the Arkansas Headwaters Recreation Area (AHRA). Day-to-day management is conducted by the Colorado Division of Parks and Outdoor Recreation in partnership with BLM. Management involves shoreline activities and boating. Water rights administration and streamflow management is conducted through the Colorado State Engineer. The two affected water conservancy districts and the Bureau of Reclamation are the largest water cooperators on the Arkansas River.

The significance of the Arkansas River is related to the historical development of and access to many communities along the corridor. It is the longest stream in the planning area and has nationally recognized recreation values, which are very vulnerable to future development. The headwaters lie a few miles north of Leadville at Fremont Pass. The river runs south to Salida, Colorado, then turns east; exits the mountains at the Royal Gorge; and continues across the eastern plains into Kansas. Pueblo Reservoir ends the free-flowing stretch of the river. There are three other major rivers tributary to the Arkansas River within the planning area (Cucharas, Huerfano, Purgatoire). These are all eastern plains rivers, and essentially all lands within the corridors are private.

Many small streams occur within the planning area, most of which are tributary to the Arkansas River. The more important tributaries include Beaver Creek, Grape Creek, Texas Creek, Cottonwood Creek, Currant Creek, Tallahassee Creek, Badger Creek, and Fourmile Creek. These perennial tributary streams are small and generally of good water quality. They all contain fisheries and provide some recreational opportunities. The most common drainages are intermittent streams that only flow seasonally or after heavy storms. The planning area, excluding the eastern plains, is heavily permeated with these drainages.

The recreational use of the Arkansas River has dramatically increased over the last 15 years. Private recreational use, including fishing, boating, camping, and sightseeing, is encouraged by the accessibility of the river from both U.S. Highways 50 and 285. Commercial whitewater boating has grown at a rate of 15 to 20 percent per year through the 1980s. The whitewater boating industry estimates their economic impact at approximately $35 million for the Arkansas Valley for the 1991 boating season.

TABLE 2-35
Matrix of the Wild and Scenic River Analysis Process

Study Segment	Step 1 Determination of Eligibility	Step 2 Classification Finding (miles)			Step 3 Determination of Suitability	Step 4 Study Group Determination for Inclusion	Step 5 Management Recommendation Recommendation by Plan Alternative				Step 6 Congressional Designation
	Yes/No	Wild	Scenic	Recreation	Yes/No	Yes/No	Alt A	Alt B	Alt C	Pref Alt	Yes/No
Beaver (Upper)	Yes	14.7	0	0	Yes	Yes	None (in MFP)	Yes	No	No	
Beaver (Lower)	Yes	0	5.4	0	Yes	Yes	None (in MFP)	Yes	No	No	
Arkansas #1	Yes	0	0	46.7	Yes	Yes	None (in MFP)	Yes	No	No	
Arkansas #2	Yes	0	0	28.7	Yes	Yes	None (in MFP)	Yes	No	No	
Arkansas #3	Yes	0	0	19.6	Yes	Yes	None (in MFP)	Yes	No	No	
Arkansas #4	Yes	0	0	31.3	Yes	Yes	None (in MFP)	Yes	No	No	
Arkansas #5	Yes	0	0	6.3[1/]	N/A	N/A	N/A	N/A	N/A	N/A	
Arkansas #6	Yes	0	0	22.0[1/]	N/A	N/A	N/A	N/A	N/A	N/A	

[1/]Deferred to the state of Colorado for Steps 3, 4, 5, and 6

The whitewater boating industry is dependent on high river flow levels. The short natural boating season on the Arkansas River has been extended significantly by the agricultural and municipal diversion of western slope Colorado waters for downstream Arkansas River delivery.

In Colorado, water can only be "owned" if it is applied to a beneficial use. The whitewater industry has developed as an incidental use of water owned by other interests. The rafting industry has grown to the extent that it is becoming a factor in streamflow management on the Arkansas River. During some of the summer months in the last several years, streamflow was regulated by the Bureau of Reclamation to provide acceptable flows for the whitewater industry when flows were expected to be very low during July and August.

The nationally significant recreational values of the Arkansas River exist to some degree because of transmountain diversion water. Currently, BLM does not have exact figures on how much of the Arkansas River flow is transmountain water on any given day, but it is a major component and may approximate 50 percent of daily flow after high runoff flows occur. Native flows on the Arkansas River are probably insufficient to support a commercial whitewater industry through the months of July and August. A more seasonal whitewater boating industry would likely exist during the normal run-off period.

Browns Canyon, one of the most heavily used stretches on the Arkansas River, currently requires approximately 700 cfs for commercial boating activity. If companies use smaller self-bailing boats, they can operate on water as low as 500 cfs. Below 500 cfs, Browns Canyon does not provide a commercial opportunity, and companies float the more tranquil, low gradient stretches to water levels as low as 250 cfs.

Transmountain diversions of water are not subject to a Federal reserved water right. Transmountain waters are the sole property of those responsible for the diversions. A Federal reserved water right on the entire native flow of the Arkansas River would not protect a sufficient volume of water for current levels of whitewater boating activity.

There are currently two active dam construction proposals on the Arkansas River. The proposed dam at the Elephant Rock site would impound approximately 80,000 acre-feet of water. The other proposal is for the Princeton Diversion Dam near the Pine Creek Rapid. This project would consist of a smaller dam with an impoundment of approximately 5,000 acre-feet of water.

The entire Arkansas River corridor is currently under withdrawal for potential powersite development or dam construction. New development proposals could affect additional locations along the river in the future.

In the future, there is potential for substantial dewatering of the Arkansas River from the Buena Vista area downstream to Fountain Creek below Pueblo Reservoir. Currently there are no minimum flow restrictions on the Arkansas River. Agreements have been established to provide minimum streamflows past the sewage treatment plants at Salida and Florence, but are not binding on all users. These agreements do not provide for significant streamflow protection. Colorado Springs has a decreed water right to exchange water along this segment of river as part of its transmountain diversion efforts. This exchange agreement allows the city to re-treat transmountain waste water to attain existing state water quality standards. They can then dump that re-treated water into Fountain Creek for eventual return to the Arkansas River and are then allowed to take an additional volume of native water from the river for the treated water returned. In effect, the river is "whole" but in reality the stretch of river channel from Buena Vista to Fountain Creek is dewatered by the same volume. The ability of Colorado Springs to use this exchange is limited by the technology available and by its delivery capacity.

As development continues, flows are likely to decrease through that stretch of river most heavily used by commercial interests. The Elephant Rock Dam, if constructed, would remove much of the adjudicated western slope water of Colorado Springs from the river at Buena Vista. It has been estimated that up to 30 percent of the river flow after peak run-off could be removed at Elephant Rock. The existing exchange agreement could further decrease flows as Colorado Springs returns more treated waste (imported) water to the Arkansas River and removes an equal volume of native water from the river channel.

The effect of the Elephant Rock Dam itself on the boating industry, both commercial and private, would be minimal. Colorado Springs engineering studies show that the upstream end of the pool would stop short of the "Numbers" area of prime kayaking waters, and the reservoir pool area currently receives a very minor amount of float-through use.

In Colorado, water rights are an exchangeable property right that can be bought and sold on the open market. Currently the Arkansas River is used simply as a conduit to transfer those property rights from the headwaters areas downstream to the property rights holders, specifically farmers, municipalities, and industrial users.

Three specific interests exist on the Arkansas River. It appears that generally, the water rights community would assist in regulating streamflow for recreation as a courtesy within their normal water management operations. It also appears they would oppose any attempt to legally regulate streamflow for recreation. The recreation community strongly desires to be included in water allocations as a legal partner. The environmental community recognizes both legal allocation of water and the growing recreational use of water but argues that the first priority must be the natural river system and its dependent life forms.

OFF-HIGHWAY VEHICLE USE

Motorized travel on BLM-administered lands includes travel off the pavement, on existing maintained or primitive roads, and cross-country travel off existing routes. The motorized vehicles used are varied and include various sizes and types of motorcycles, dune buggies, all-terrain vehicles, and four-wheel drive vehicles. Off-highway vehicle (OHV) travel is more concentrated near population centers and near major highway arterials. Concentrated use has been occurring on BLM-administered lands adjacent to Buena Vista, Salida, Cotopaxi, Cañon City, Fairplay, Gardner, Cripple Creek/Victor, and at various locations along main roads/highways leading out of these population centers.

Most of the existing OHV travel occurs in conjunction with recreation pursuits. A sizable amount, however, is associated with woodcutting, mineral exploration and development, livestock operations, and other administrative functions on BLM-administered lands. There are no extensive quantifiable studies nor analyses of this OHV travel.

BLM policy is that off-highway vehicle use is an acceptable use of BLM-administered land wherever it is compatible with established resource management objectives. Currently all BLM-administered lands in the Royal Gorge Planning Area are undesignated with the following exceptions: wilderness study areas (70,984 acres) and Deer Haven (4,887 acres) and 31 Mile Ranches (1,971 acres) are closed to OHV use; seasonal road closures are in place for the Kerr Gulch and Grand Canyon Hills areas. This plan will classify all lands into three categories; open, closed, and limited.

Open designations are used for intensive OHV use areas where there are no special restrictions or where there are no compelling resource protection needs, user conflicts, nor public safety issues to warrant limiting cross-country travel.

Closed designations are used for areas or trails where closure to all vehicular use is necessary to protect resources, promote visitor safety, or reduce user conflicts.

Limited designations are used where OHV use must be restricted to meet specific resource management objectives; i.e., seasonal limitations to protect critical big game wintering and birthing areas and to protect road surfaces during winter wet periods.

The recreation section in this chapter provides more information concerning recreational OHV use (user days, demand and supply, etc.). OHV designations would provide opportunities for this use and also protection for scenic values, public safety, nonmotorized recreation opportunities, and sensitive resources (erosive soils, wildlife, etc.). In some instances, OHV use is not consistent with prescribed off-highway limitations on BLM-administered lands. Some resource damage is occurring to riparian areas, range grasses, and nonvegetated slopes because BLM-administered lands in the RGPA are undesignated, even though some limitations are used in management. CFR regulations, however, provide protection to prevent severe resource damage from off-highway vehicle use. OHV designations for BLM-administered lands will provide additional guidelines to help alleviate some impacts from OHV use.

Occasionally special use permits are issued by BLM for off-highway vehicle races, hill climb events, etc., within the Royal Gorge Planning Area. These are usually on an as-needed basis since the existing land use plans do not give area-wide OHV use classifications/designations. Each event (commercial or noncommercial) is considered on an individual basis to ensure NEPA requirements are met, and special recreation permits are issued for these events. Approximately eight permits annually are issued in the Royal Gorge Planning Area.

Table 2-36 describes the present situation on BLM-administered lands in the Royal Gorge Planning area.

TABLE 2-36
Existing OHV Acreages

Existing OHV Designations	Acres of BLM-Administered Land	Percent of BLM-Administered Land
Open	564,918	87
Limited	10,240	21
Closed	77,842	12
Total	653,000	100

VISUAL RESOURCE MANAGEMENT

The visual resources in the planning area have been classified in accordance with the visual resource management (VRM) system outlined in BLM Manual 8400.

BLM-administered lands have a variety of visual values, which warrant different levels of management. The VRM system is a tool used by managers to accomplish management objectives for a particular area or project. Because it is neither desirable nor practical to provide the same level of management for all visual resources, it is necessary to systematically identify and evaluate these values to determine the appropriate level. Visual values are identified through VRM inventory and are considered with other resource values in the planning process. Visual management objectives are established in RMPs in conformance with the land use allocations in the plan. These specific objectives provide standards for planning, designing, and evaluating future management projects. The contrast rating system provides a systematic method to evaluate proposed projects

and determine whether these projects conform with the approved VRM management objectives. It also provides a way to identify mitigating measures to minimize adverse visual impacts. The VRM system, therefore, is a tool to identify visual values; to establish objectives through the RMP process for managing these values; and to provide timely input for proposed surface disturbing projects to ensure that these objectives are met.

The basic premise of the VRM system focuses on man-caused changes to the natural landscape. When these changes do not repeat the basic line, form, color, and textural elements of the natural landscape, they contrast or stand out in undesirable ways.

Values used to determine inventory classes for use in the RMP analysis include scenic quality, sensitivity levels, and distance zones. Scenic quality is determined based on an analysis of the relative visual value of existing landscape components (landforms, vegetation, water, color, etc.).The sensitivity level of an area is based on an analysis of such factors as the type of user who will view the area (e.g., recreational sightseers are very sensitive to landscape changes), the number of users, and the public interest in visual values of the area. Since visual contrast decreases with distance, the third factor, distance zones, is determined by measuring the distance of inventory units from key travel corridors and other observation points accessed by the public.

Vvisual resource inventory classes are used as a basis for considering visual values during the planning process. VRM classes are then established through the RMP process for all BLM-administered lands in the planning area. During the process, the inventory class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs. Under the Bureau VRM system, the following four management classes correspond with the four inventory classes:

Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and not attract attention.

Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture in the predominant natural features of the characteristic landscape.

Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract the attention but should not dominate the view of the casual observer. Changes should repeat the basic elements in the predominant natural features of the characteristic landscape.

Class IV: The objective of this class is to provide for management activities requiring major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

By combining input from these factors, visual resource inventory classes are determined (VRM Class I through IV). The class I inventory rating is reserved for previously congressionally or administratively designated areas such as wilderness and wild and scenic rivers where decisions have been made to preserve the natural landscape. Inventory classes II through IV are based on the combined input of scenic quality, sensitivity, and distance zones (with class II having the highest combination of these criteria, and class IV the lowest). For example, a class II area will likely have a very high scenic quality, a high level of visibility to a large number of visitors, and be in the foreground distance zone. In contrast, a class IV area will have lower scenic values, be seen by fewer concerned publics, and be in the background distance zone.

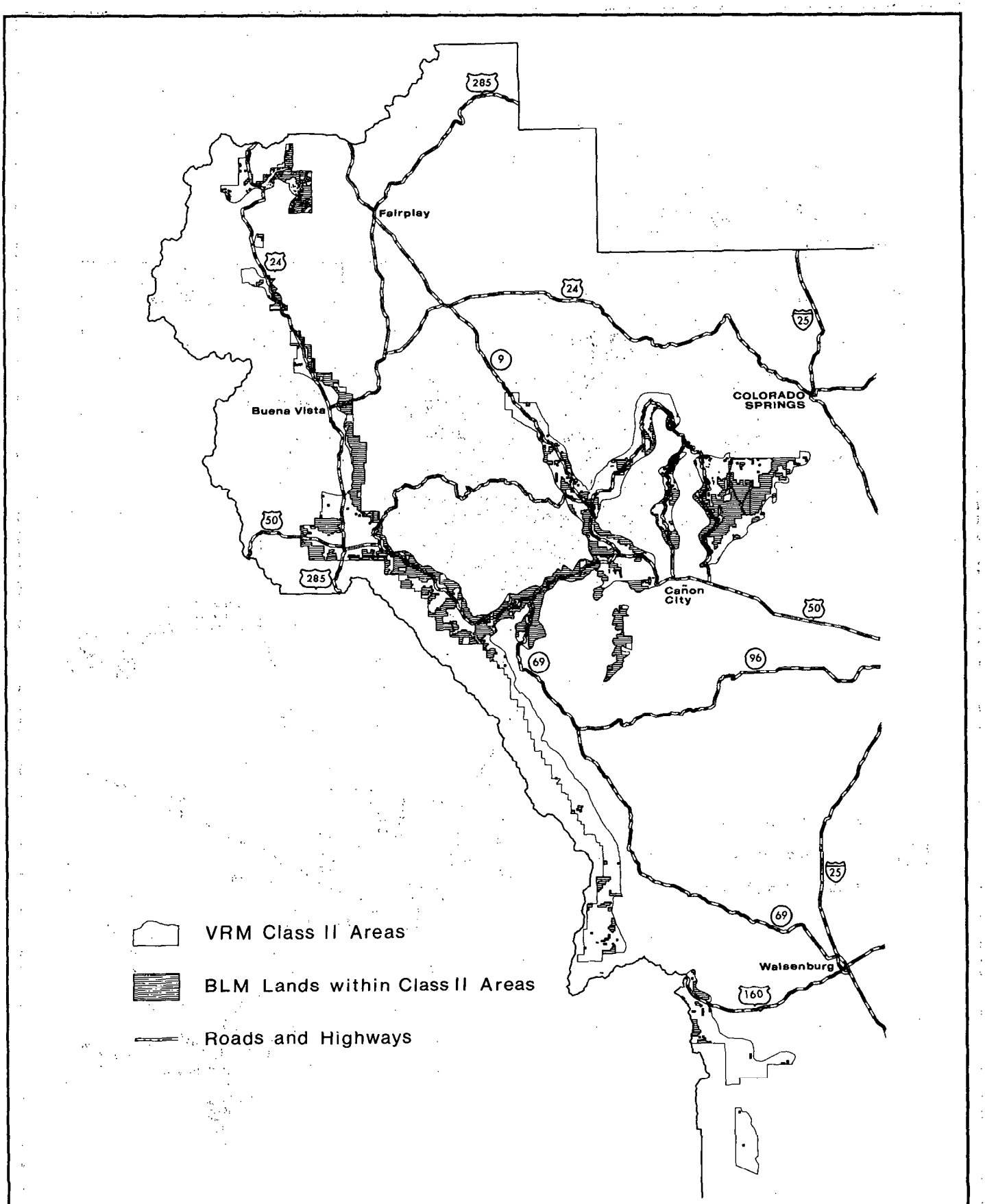
The following VRM inventory classes for the planning area reflect the acreage of BLM-administered lands assigned to each class (Maps 2-10 and 2-11):

- Class I - 0 acres
- Class II - 206,436 acres
- Class III - 350,357 acres
- Class IV - 96,207 acres

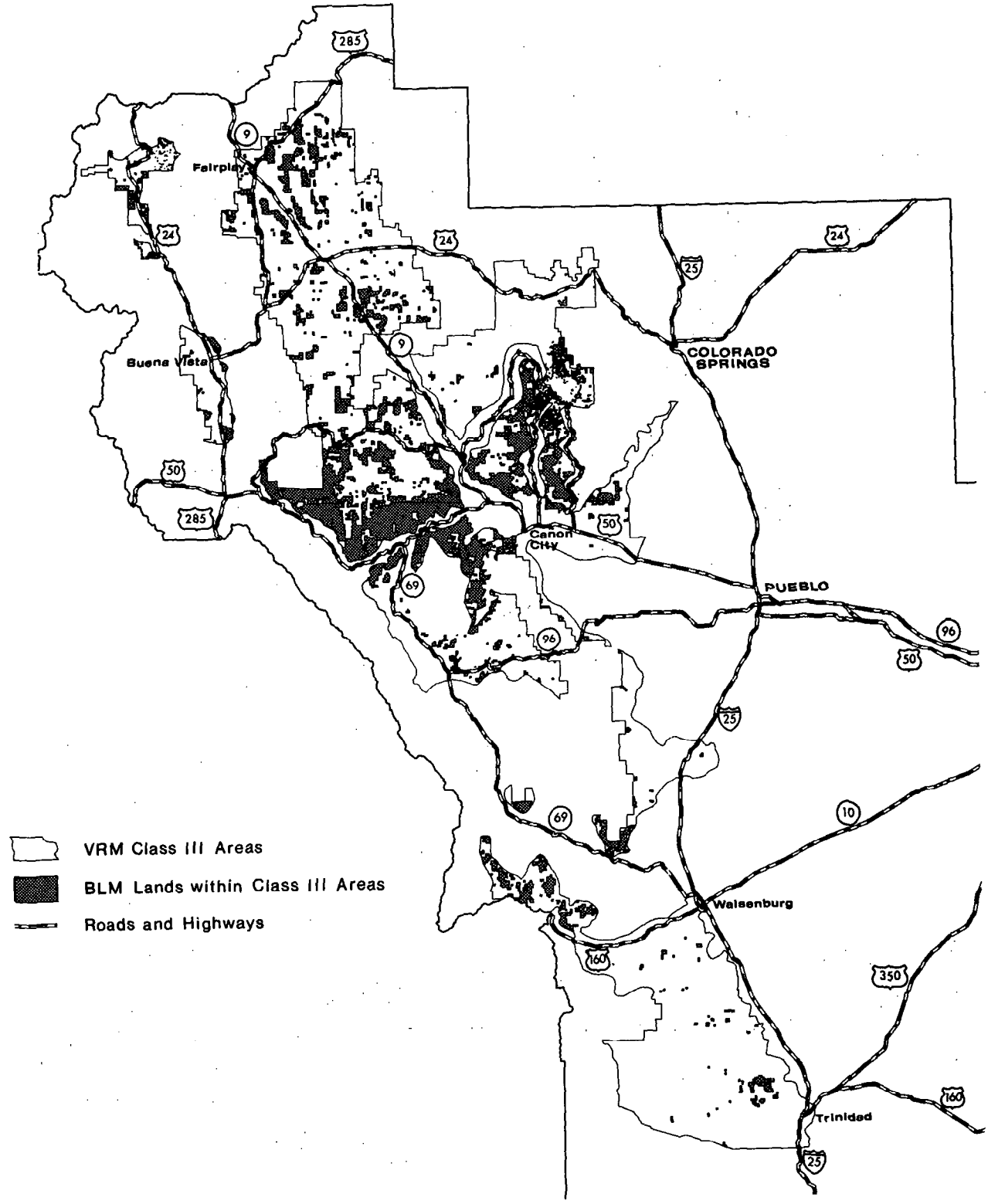
Currently, since there are no congressional/administrative designations requiring VRM Class I areas, there are none in the RGPA. Portions of designated ACECs and congressionally designated wilderness areas, however, would/could be upgraded to a class I rating to maintain the integrity of the visual resources. Imprints from man in these areas should be reclaimed to a near natural condition when funding allows.

The Arkansas River, paralleled by the major travel routes of Colorado State Highways 50 and 285/24, provides the visitor with some of the most scenic driving in the planning area. The high levels of recreational use encountered along the corridor, along with the outstanding scenery, make this area very sensitive to impacts that could affect the scenic quality.

The majority of the Arkansas River SRMA has a VRM Class II inventory rating; however, some class III and IV areas do exist within the boundaries. The SRMA offers outstanding whitewater boating, fishing, wildlife viewing, scenic driving, and four wilderness study areas (Browns



Map 2-10 - VISUAL RESOURCE MANAGEMENT (Class II Areas)



Map 2-11- VISUAL RESOURCE MANAGEMENT (Class III Areas)

Canyon recommended for wilderness designation by BLM, Upper and Lower Grape Creek, and McIntyre Hills). Many opportunities also exist throughout the upland areas (areas not directly related to the Arkansas River) for various recreational activities such as hiking, backpacking, camping, mountain biking, off-highway vehicle use, rock climbing, and hunting. Rugged canyons and open valleys along the river corridor and distant 14,000-foot peaks attract over a million recreationists a year. According to the results of a recreation survey conducted along the Arkansas River during the 1991 use season, over 60 percent of those surveyed listed the outstanding scenery as an important factor in their decision to visit the area. The results of the survey are representative of the impressions of close to one million visitors to the area. The remarkable scenic quality, along with extensive recreational activity along the river corridor, is a major attraction for the visiting public. Outstanding scenery along the river corridor is visible in the foreground viewing area. The visual inventory class rating moves from class II to III and in some cases class IV in the upland areas away from the major travel corridors and use areas. The reason for the change in inventory ratings for these areas is again related to the criteria described earlier. Although the scenic quality of particular areas throughout the upland area may be relatively high to moderate, the sensitivity of the area is greatly diminished because of the reduced number of visitors who see the areas. Many of the outstanding scenic features are in the middleground or background instead of the foreground viewing area.

The Gold Belt SRMA was added to the BLM National Back Country Byway system because of the scenic qualities, rich history, and over 350,000 annual pleasure drivers. Results of a 1991 recreation survey conducted along the scenic byway indicated that the scenic quality of the area was the number one attraction for visitors to the area. Steep and rugged terrain of Eight and Fourmile Canyons along with the wide expanses and rolling hillsides of the High Park area attracts visitors from around the world. The Gold Belt SRMA includes one wilderness study area (Beaver Creek) recommended by BLM for wilderness designation. The SRMA has VRM Class II rating areas in the foreground and views of the scenic canyons/vista adjacent to the byway roads where the majority of activity occurs. Class III and IV rating areas in the middle ground and background of the viewing range are in the upland areas away from the major use areas.

High Mesa Grasslands is an area consisting of a rolling mesa top with outstanding scenic views of the Arkansas River corridor and surrounding mountain peaks. The area is being managed by BLM as a research natural area and is a VRM Class II area.

Mosquito Pass is an area of alpine meadows with the distinction of being the highest continuous road in the continental United States and offers breath-taking views of the Mosquito and Sawatch Ranges. The maintained county road crossing the pass attracts a large number of visitors during the short summer season. Scenic views from along the road and top of the pass offer the visitor both near and far viewing opportunities. This area is a VRM Class II inventory area.

La Veta Pass area has unique geological features, which are very representative of the area. The spectacular valley floor can be seen from atop Mount Mestas, and large numbers of visitors enjoy the scenery of this area as they travel along the major highway. This is a VRM Class III area.

RECREATION MANAGEMENT

BLM policy regarding recreation management is to ensure the continued availability of BLM-administered lands and related waters for a diversity of resource-dependent outdoor recreation opportunities. Commitments to manage these lands as a national resource in harmony with the principle of balanced multiple use will also be maintained. These efforts are based on two levels of management: (a) intensive management of certain areas of lands with high priority outdoor recreation (special recreation management areas, SRMAs) and (b) committed management of the majority of BLM-administered lands for traditional dispersed recreation use (extensive recreation management areas, ERMAs).

The Royal Gorge Planning Area (RGPA) consists of 653,000 acres and currently has two SRMAs, (Map 2-12) the Arkansas River SRMA (109,063 acres) and the Gold Belt SRMA (126,248 acres). The remainder of the resource area is identified as an ERMA (417,689 acres). Recreation activities occur throughout the planning area where access is available.

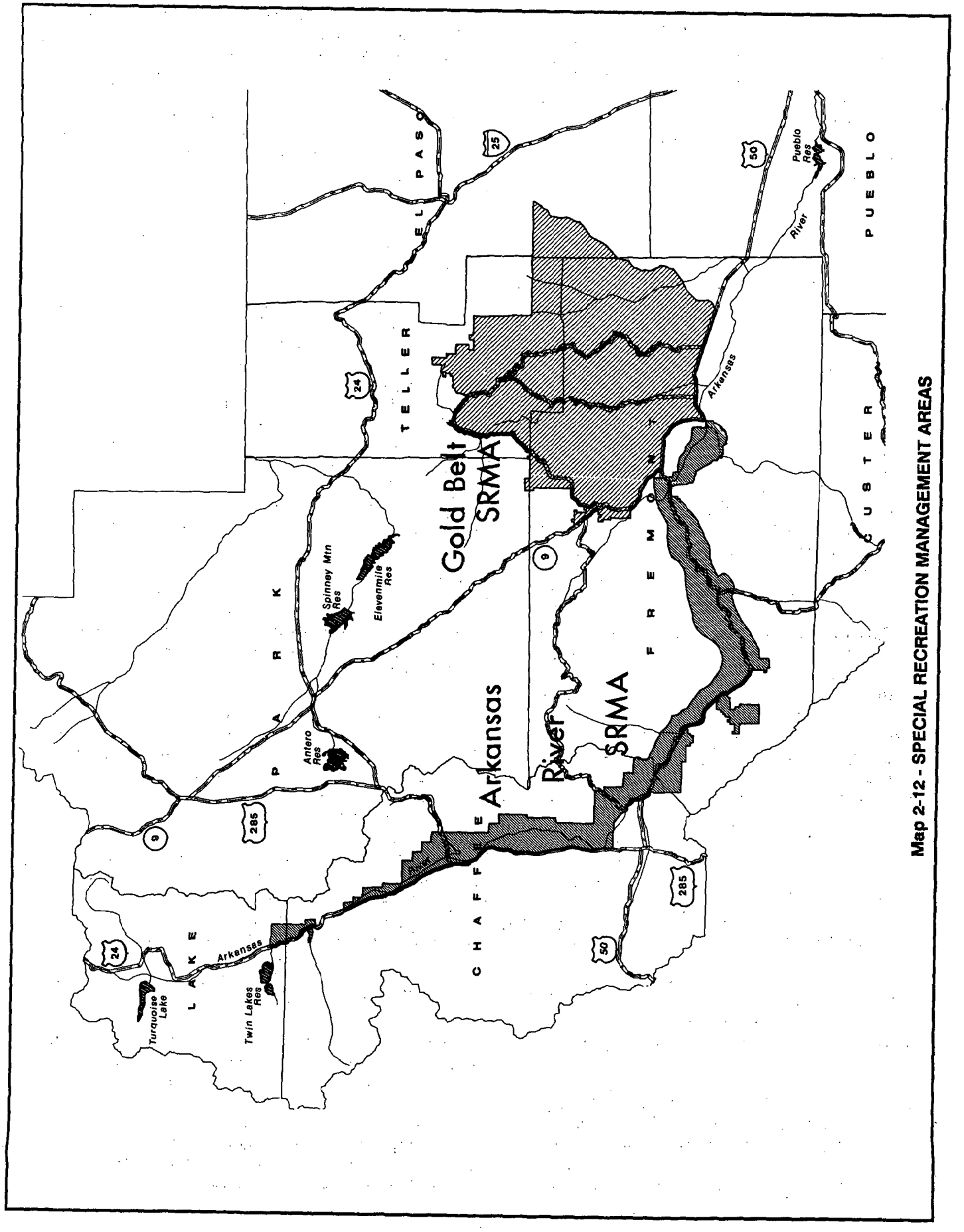
To ensure incorporation of the goals of the Director's recreation strategy into BLM planning, *Recreation 2000: A Strategic Plan*, was prepared. The plan presents a revitalized approach to managing outdoor recreation as one of the principle multiple uses. The goals of the recreation program are used in various ways when making land use plan decisions:

Diversity (offer a wide diversity of recreation opportunities). New initiatives such as the *National Back Country Byway Program* and mountain biking are examples of incorporating new recreational opportunities with the traditional recreational activities occurring on public lands;

Resource dependency. Provide opportunities dependent on natural resource values;

Resource monitoring and protection. Use seasonal employees and volunteers to assist with on-the-ground studies to help determine where recreational impacts are occurring;

Visitor services. Identify the public expectations for an area through visitor surveys, registration boards, and public contacts to help determine the appropriate level of facility development to meet public demand;



Map 2-12 - SPECIAL RECREATION MANAGEMENT AREAS

Partnerships. Develop strong relationships with other Federal, state, and local governments, along with recreation interest groups, to enable BLM to provide better services to the public;

Maintenance, construction, and planning. Ensure that all recreation planning identifies needed personnel and budget sufficient to maintain any existing and new facility construction;

Special recreation permits and fees. Continue to provide quality services to the public that would reflect positively on BLM and collect appropriate fees to cover the administration of the program;

Tourism. Work with regional and local tourism groups to ensure BLM-administered lands are properly marketed for the public.

To ensure the goals of the 1986 report by the President's Commission on Americans Outdoors are incorporated into land-use planning decisions, BLM prepared its own report to guide the management of recreation on BLM-administered lands: *Recreation 2000: A Strategic Plan*. The plan presents a revitalized approach to managing the outdoor recreation resource as one of the principle multiple uses.

The RGPA offers outstanding diverse recreational opportunities throughout south-central Colorado - from some of the finest whitewater boating to spectacular canyons and mountain scenery. The Arkansas River is recognized as the most heavily commercially floated river in the nation with over 200,000 user days during the 1992 season. Additionally, over 14,000 private boaters enjoyed the river. The Arkansas River is also recognized for its outstanding brown trout fishery. The Gold Belt Tour National Back Country Byway has approximately 400,000 visitors a year. Some of the attractions along the byway include the Shelf Road Climbing Area, which has received international publicity through magazines, and the Garden Park Fossil Area, recognized as one of the most significant dinosaur fossil areas in the world.

Over 2 million front range residents live within a 2-hour drive of these SRMAs. Many out-of-state visitors travelling west receive their first impression of BLM-administered lands from their visit to or through the RGPA. A recreation visitor survey completed for the Gold Belt Tour National Backcountry Byway during the summer of 1991 showed that approximately 60 percent were out-of-state visitors. Colorado State Highway 50 is one of the major travel routes to the area. The estimated annual traffic volume along this highway corridor from Cañon City to Salida is approximately 1.5 million vehicles (estimates based on the Colorado Department of Transportation average 24-hour count period for 1990). In summary, the RGPA provides outstanding recreation values accessible to large numbers of visitors.

Mountain biking is fast becoming a major activity because of the exceptionally mild winter climate and the recent boom of the industry throughout the country. BLM developed a nationwide strategy and action plan in September 1992 to address the use of mountain bikes. The overall goal is to identify and include diverse opportunities in the multiple use system of trails and roads by the year 2000. These opportunities would be enhanced by a proactive, educational program emphasizing safety, fitness, ethics, and environmental protection and appreciation. As local user groups become actively involved with BLM management of mountain biking, opportunities to expand the current system of mountain bike trails are being addressed.

Hunting continues to be a major use on BLM-administered lands. Approximately 60,000 hunters utilized lands in the RGPA during 1991 according to *Big Game Hunting Statistics*, a special edition of *Colorado Outdoors*. Legal public access to some BLM-administered lands throughout the planning area, especially in the Trinidad/Walsenburg, Westcliffe, and South Park areas, continues to present problems for hunters. Efforts continue to obtain public access in these areas. BLM maps provide help in locating public lands, and boundary signs erected along some of the major travel corridors provide additional help. BLM personnel patrolling lands during the hunting season provide additional support.

For the past 10 years, BLM, USFS, and CDOW have sponsored a hunter information center at the BLM Cañon City District Office. This joint approach has provided hunters the convenience of one location for information and maps. Over 750 hunters visited the information center during the 23 days it was in service during the 1992 season.

Tourism is the second most important contributor to the economy of the state bringing in over $5.5 billion annually (*1991 Community Tourism Action Guide*). Marketing studies suggest the majority of these opportunities are dependent on Federal and, to lesser extent, state and local natural resource attractions. Marketing strategies for the Arkansas River, Gold Belt Tour, and other BLM attractions in coordination with other agencies and businesses continue to be aggressive and to ensure the public receives the most up-to-date information available. Publications, media coverage, mailings, conventions, trade shows, and fair booths are some of the tools used to attract visitors to the area.

Visitation to BLM-administered lands in the RGPA is estimated at 1.5 million recreation visits a year (figures based on actual use figures of the Arkansas River and Gold Belt Tour, estimates of other activities in the SRMA and dispersed recreation use in the ERMA). Table 2-37 shows recreation visitor use in the RGPA, which continues to increase annually as residents in major metropolitan areas along the Front Range seek opportunities closer to home.

The recreation opportunity spectrum (ROS) would be used to provide a conceptual framework for inventory, planning, and management of the recreation resources in the planning area. ROS is used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. The three basic components of all natural resource settings are physical (recreation resources and facilities), social (visitor

TABLE 2-37
RGPA Recreation User Data

Activity	Estimated Number of People Recreation Visits Per Year[1/]			
	Gold Belt SRMA	Arkansas River SRMA	RGRA ERMA	Total
OHV	4,200	15,000	35,300	54,500
Other motorized	409,900	307,500	224,700	942,100
Nonmotorized	12,600	8,300	38,300	59,200
Camping	24,100	19,000	49,700	92,800
Hunting	18,000	4,900	43,300	66,200
Land based	23,900	79,800	11,000	114,700
Fishing	1,800	20,200	29,400	51,400
Boating	0	233,100	10,000	243,100
Other water	0	5,600	1,100	6,700
Winter sports	200	1,400	13,200	14,800
Snowmobiling	200	1,100	5,600	6,900
Total	494,900	695,900	461,600	1,652,400

[1/]Estimate based on recreation staff findings as reported in BLM national Recreation Information Management System report.

use), and managerial. Each of these factors influences the basic nature or character of recreation activities and experiences available to all participants in any given area.

Physical Setting: The component of setting opportunity determined by the on-the-ground condition or degree of environmental modification resulting from human activity.

Social Setting: The component of setting opportunity determined by the level and types of contacts between individuals or groups that can be expected in a particular area. Social setting indicates opportunities for solitude, for interactions with a few selected individuals, or for contact with large numbers of individuals.

Managerial Setting: The components of setting opportunity that reflect the kind and extent of management services and facilities provided to support recreation use, and the restrictions placed on peoples' actions by the administering agency.

The spectrum contains six classes: Primitive, Semi-primitive Nonmotorized, Semi-primitive Motorized, Roaded Natural, Rural, and Urban. Descriptions for each class are in Appendix M. This framework may be used either to classify existing resource characteristics or to prescribe management objectives. When used to prescribe objectives, the intended characteristics of the land itself, its use for public recreation, and how it is to be managed are described.

Use of ROS criteria helps planners and managers better understand the types of activities and experiences that could occur in a particular setting or area. When identifying management objectives for an area, it may be more desirable and beneficial to the public to manage an area focusing on another opportunity class while still affording the needed protection to the natural resources. For example, portions of the Gold Belt SRMA have been inventoried as semi-primitive motorized, however, because of demands by the public for additional facilities, such as interpretive overlooks, camping and picnicking areas, facilities to provide for user convenience, a high frequency of visitor contacts, and continued improvements to the existing roadway, it may be necessary for the area to be managed under roaded natural criteria.

Table 2-38 shows the BLM-administered acreage in each ROS class in the planning area.

Arkansas River SRMA

The Arkansas River SRMA consists of approximately 109,000 acres. The area is characterized by the Arkansas River and its many drainages, steep rugged canyons, open expanses of irrigated pastures, high mountain peaks, and lush riparian zones. The SRMA encompasses the area along the Arkansas River corridor between Cañon City and Leadville, including upland areas surrounding the corridor. Recreation opportunities within the SRMA range from highly structured to very isolated and dispersed (ROS classes from rural through semi-primitive nonmotorized). The major emphasis for recreation is directly related to the Arkansas River, which has been rated as one of the top 10 whitewater rivers in the nation by a leading national magazine *River Runners, Inc.*

A recreation visitor survey of fisherman and boaters was conducted during the 1991 use season. The survey has been helpful for managers to understand the relationships, expectations, and concerns of fishermen and boaters and will be used as a tool when making management decisions affecting these users.

TABLE 2-38
Acres of Recreation Opportunity Spectrum Inventory Classification

ROS Setting Class	Arkansas River SRMA	Gold Belt SRMA	ERMA	Total Acres
Primitive	0	18,377	55	18,432
Semi-primitive nonmotorized	10,338	13,620	19,234	43,192
Semi-primitive motorized	41,249	34,042	142,410	217,701
Roaded natural	55,885	16,087	138,643	210,615
Rural	1,924	18	7,000	8,942
Urban	0	0	14	14
Unclassified	0	48,047	106,057	154,104
Total	109,396	130,191	413,413	653,000

The survey showed that boaters and fisherman either participated, or would like to participate, in a wide variety of additional activities during their stay in the Arkansas Valley. The most popular activities included scenic driving/sightseeing, wildlife viewing, picnicking, camping, swimming, sunbathing, and hiking. A smaller percentage of the users participated in backpacking, hunting, rock hounding, rock climbing, mountain biking, gold panning, visiting museums or education centers, horseback riding, and OHV use. These results indicate that BLM could enhance opportunities within the SRMA to provide a greater diversity of upland activities for the visitors participating in river activities.

The condition of the recreation resources in the SRMA varies according to activity. Commercial boating continues to increase as private boating is on the decline, which is related to the type of experience the river offers. Large numbers of commercial boaters on certain sections of the river have displaced private boaters, who typically look for quieter, less congested stretches of river. Over 60 percent of the boaters surveyed, however, stated that the number of people seen while on the river was what they had expected or fewer. Overall, 96 percent of those surveyed rated the quality of their river trip as good to superior. Conditions for fishing on the Arkansas, according to those surveyed, showed that just over 65 percent rated the fishing good to superior. The majority of the rest rated conditions acceptable. Improving fishery habitat, providing no-boat river segments, and scheduling no-boat times to improve fishing conditions were favored by over 65 percent of the fisherman. Overall, 91 percent of those surveyed, agreed they would fish the Arkansas River again. Conditions for other recreational activities occurring along the river and throughout the upland areas continue to be monitored by BLM recreation specialists and appear to be stable or improving.

Increased use associated with the Arkansas River for recreation and other uses generated the need for a new plan to manage the river. The result was the final Arkansas River Recreation Management Plan and Environmental Analysis approved in October 1989. BLM and the Colorado Division of Parks and Outdoor Recreation (DPOR) jointly manage the river corridor as equal partners and implement the plan under a cooperative management agreement (CMA). The Arkansas Headwaters Recreation Area (AHRA) managed under the CMA has approximately 5,000 acres of BLM-administered lands. The focus of the agreement is for DPOR to provide on-the-ground management of recreational activities occurring within the CMA area, and for BLM to continue to manage all other resources, including upland recreation opportunities, within and outside the CMA area. The final plan calls for a combination of a CMA and Recreation and Public Purpose leases (R&PP).

Under an R&PP lease, jurisdiction to manage recreational use on the lands administered by BLM would be given to DPOR. Fourteen developed recreation sites were authorized for R&PP leases; 12 leases have been issued. Additional leases can be pursued by DPOR, if the proposed leases meet the criteria specified in Chapter 3 (Recreation) of this document. The final Arkansas River Recreation Management Plan and CMA are available for review in the Royal Gorge Resource Area office.

The partnership between BLM and DPOR to manage recreation along the Arkansas River Corridor has produced a significant increase in management capability. Increased management attention has resulted in additional staffing for more on-the-ground management and facility development to meet the public demand for river-related recreation opportunities. Increased levels of funding by DPOR for capital improvement projects along the river corridor are providing improved facilities addressing health and safety concerns, providing better access to the river, and complimenting the scenic qualities of the area. These improvements continue to add to the success of the commercial boating industry, which is important to the economic well-being of the counties and communities along the river. The strong cooperative relationship between BLM and DPOR continues to improve conditions along the river corridor.

The primary issues addressed in the final Arkansas River Recreation Management Plan relate to:

Resource protection: focus on protection and retention of natural resources in the area;

User Conflicts: focus on resolving conflicts between recreationists, recreationists and private landowners, recreationists and those travelling the adjacent highways and roads;

Allocation of use: prescribe carrying capacities for commercial and private boaters as maximum allowable use levels for different river segments;

Wilderness study areas: develop techniques to mitigate impacts to WSAs from increased recreational use;

Access: provide appropriate signs, necessary information, and enforcement to increase public awareness of BLM-administered lands;

Economic development: recognize future management of the river has a direct bearing for providing greater contributions to the tourism and economic development of the river valley.

The following describes issues not addressed in the Arkansas River Recreation Management Plan and identifies actions to be addressed through this RMP.

1. Land Acquisition: Identify parcels of land along the river corridor to be acquired through purchase or exchange from willing sellers or traders. Land acquisitions that provide direct benefits to the recreating public and further the management objectives identified in the river plan would be pursued.

2. Access in the "Numbers": The "Numbers" is a section of the river located between Granite and Buena Vista. Private boating opportunities are the main focus in this area. Land acquisitions and public easements would need to be pursued in this area to provide better public access.

3. Wild and Scenic River Designations/National Conservation Areas/National Recreation Areas: Refer to these sections in this plan for further detail.

4. Recreation and Public Purposes Lease (R&PP): R&PP leases provide DPOR with BLM-administered lands for major capital improvements.R&PP leases, in addition to those specified in the river plan, may be acquired by DPOR, if the proposed leases meet the management in Chapter 3 of this plan.

Gold Belt SRMA

The Gold Belt SRMA contains approximately 130,000 acres of BLM-administered lands. The majority of the SRMA is in Fremont and Teller Counties, between the towns of Cripple Creek and Victor to the north and the cities of Cañon City and Florence to the south. Colorado State Highways 115 and 9 are the east and west boundaries, respectively. The topography of the area consists of rugged canyons dissected by the drainages of Beaver, Eightmile, Sixmile, Fourmile, Cripple, and Currant Creeks, to the rolling park lands of the High Park area. The elevation of the SRMA ranges from 4,500 to over 10,500 feet.

The Gold Belt Tour was dedicated as a BLM National Back Country Byway in May 1990. BLM is participating in a nationwide effort to enhance scenic driving opportunities through the back-country byway program. The President's Commission on Americans Outdoors determined that American adults identified driving for pleasure as their number two pastime; walking was number one.

The Gold Belt Tour comprises three "back-country" roads connecting the historic mining communities of Cripple Creek and Victor with Cañon City and Florence. The Phantom Canyon, Shelf, and High Park Roads are the main segments of the tour. Approximately 400,000 visitors enjoy the byway annually (visitor data is gathered from various traffic counters along the tour). Recreational opportunities range from wilderness experiences in primitive settings to developed technical rock climbing in a rural setting.

A cooperative management agreement between BLM, Colorado Department of Transportation, Fremont and Teller Counties, and Cañon City, Florence, Cripple Creek, and Victor was established for the byway. The agreement commits each of the involved entities to participate in coordinated planning and management of the byway. The agreement further outlines responsibilities of each entity for cooperative management of the corridor until a plan is completed.

A recreation visitor survey was conducted along the byway during the summer of 1991. Over 90 percent of those surveyed listed the outstanding scenery to be the number one attribute attracting them to the area. Other high ranking attributes were wildlife, historical significance of the area, historic mining operations, challenge of driving the roads, and the vegetation in the area. The major recreational activities were driving for pleasure, technical rock climbing, visiting historic areas and sites, nature and wildlife photography, camping, picnicking, hiking, fishing, visiting museums, backpacking, mountain biking, sightseeing, target shooting, and horseback riding.

Currently, BLM provides only limited facilities to enhance public enjoyment and provide health and safety for the visitors. Directional signs identifying the Gold Belt Tour are in place. Safety/warning signs have been placed along portions of the byway identifying areas that require additional care by the driver. Signs identifying public land boundaries are also present along most of the tour to reduce trespass.

To address management goals and objectives for the backcountry byway, a coordinated activity plan will be developed, an effort that will involve the byway partners. Continued input to the plan from local tourism and economic development organizations, special interest groups, byway corridor landowners, and the public will be solicited throughout the process.

Some of the management objectives to be addressed in the plan relate to the protection of the natural and cultural resources, including scenic values, facility development, proper land use ethics, trespass control, continued multiple use activities, BLM-administered land access, road maintenance, and law enforcement. Addressing these objectives will help meet the present and expected demands of the public.

Suggested improvements identified by those surveyed in 1991 ranged from leaving the area as it is to improving the roads, developing picnicking and camping areas, and providing more restrooms, interpretive pullouts, better access, shooting areas, and better signing. Activity planning for this area will follow and address goals outlined in *Recreation 2000*, the Colorado Byways Corridor Planning Framework, as well as needs identified through the 1991 Gold Belt Tour Visitor Survey. A major focus of the activity plan will be providing public information, interpretation, and development of wayside interpretive stops, brochures, signing, and educational programs that would enable BLM and partners to reach the public and provide for a positive recreational experience. Initial public meetings helped identify the following issues and concerns:

1. Increased Vehicle Traffic: Impacts relating to the road surface, traffic congestion, safety, and public health will need to be addressed in the corridor integrated activity plan.

2. Public/Private Property: Additional conflicts between recreation users and private property owners have occurred. Additional BLM presence, signing, and law enforcement could help reduce this concern.

3. Resource Damage/Protection: Conflicts between rock climbers and wildlife continue to be studied. Possible nesting raptors at the Shelf Road Rock Climbing Area and improper and excessive trail development are currently being evaluated. Impacts to riparian areas by recreationists are being evaluated.

4. Ranching/Climbing Conflicts: Conflicts between users have resulted in the closure of private property to rock climbing. Trespass by the climbers continues to be a problem.

5. Vandalism: Education of the public and additional law enforcement presence have curtailed some of this concern.

The level of use within the SRMA increased by approximately 10 percent per year during 1990 and 1991 after the dedication of the byway in 1990, and the condition of the recreation resources showed some improvement through an increased management presence. Further increases (25 percent) in use during the fall of 1991 and through 1992 along the byway are attributed to the new gaming initiative in Cripple Creek and have caused additional concerns. Visitors travelling to Cripple Creek, via Phantom Canyon and to a lesser extent Shelf Road, to participate in limited stakes gambling have produced significant impacts to the byway, which will be addressed in the Gold Belt IAP.

Increased use continues at the Shelf Road Climbing Area, as national climbing magazines focus on the area. National trends reflected in these magazines show an increased popularity in climbing. Limiting factors, however, such as difficulty of the climbing routes, lack of access to high quality routes on private property, and development of the majority of BLM-administered lands for climbing, have helped control the expansion of the Shelf Road area, without restricting growth.

Determining levels of appropriate use is difficult. Factors such as local and regional marketing efforts, county road improvements, media coverage, and economic initiatives pursued by the local communities are not always controllable by BLM. By closely monitoring these factors, conducting further studies, and coordinating the findings with the communities, help BLM to determine management for appropriate levels of use.

The Garden Park Fossil Area, located 9 miles north of Cañon City along the Shelf Road portion of the Gold Belt Tour, is recognized as one of the most significant dinosaur fossil areas in the world. A preliminary site plan was submitted to BLM by a local nonprofit group (Garden Park Paleontology Society) to establish a world class dinosaur education center. An environmental analysis of the site plan and several alternatives were completed in June 1992. Through the analysis it was decided to prepare a project plan in the Garden Park Fossil Area at the site location and access route originally proposed by the GPPS. The proposed purpose of the center would be to manage, interpret, and preserve the internationally significant Garden Park Fossil Area. Recreational activities occurring within this area will be analyzed in the Gold Belt Corridor IAP.

Royal Gorge ERMA

The Royal Gorge ERMA consists of approximately 413,000 acres of BLM-administered lands. Elevations range from 4,000 feet to over 13,000 feet. Nine vegetation ecosystems occur in the ERMA: riparian areas, short grass prairie, sagebrush, piñon-juniper woodland, mountain brush, high mesa grassland, aspen and conifer forest, and alpine. Topography varies from the flat rolling eastern plains to the rugged peaks of the Mosquito Range. The ERMA offers a wide array of recreational opportunities and settings. Recreation is dispersed and typically used for the following activities: hunting, fishing, off-highway vehicle use, hiking, backpacking, camping, wildlife viewing, mountain biking, rockhounding, winter sports activities, and photography.

No actual figures are available to determine visitor use in the area; however, 375,000 users are estimated comprising over 525,000 recreation user days enjoy activities in the ERMA. A limited number of signs (information, education, directional) are in place, many of which are in need of replacement because of vandalism. Public education by BLM personnel continues to a minor extent throughout the area.

The overall condition of the recreational resources in the planning area varies. Studies are needed to determine visitor satisfaction. Scattered BLM land pattern adds to the difficulty of determining what recreation opportunities can be supported and managed. Conflicts between various user groups, both recreation and nonrecreation, are mainly addressed by a reactive approach, instead of a proactive approach used in the SRMA. Lack of public access in some areas and difficulty in identifying BLM-administered land boundaries present conflicts between private landowners and recreationists. Minimal recreation management attention in these areas is often insufficient to resolve conflicts, and only provides short-term solutions.

Conflicts/concerns associated with recreation include resource damage, vandalism, trespass, and commercial outfitting violations. Lack of law enforcement presence, recreation personnel to monitor activities, and funding have made management of difficult. Increased efforts relating to BLM-administered land identification and land acquisition could help reduce conflicts. Preparation of activity plans and revisions of existing plans focusing on solutions to conflicts would help; however, funds for these plans are normally not available except when major issues are present. The current recreation budget only allows for minimal management, including some signing, boundary identification, and emergency responses to recreational conflicts.

Additional management may be needed for new initiatives or support of current growth. Trail initiatives should continue to be developed when user support is present and time and funding are available. Demand for trail development for mountain biking continues to be priority for some users of BLM-administered lands. Activity plans will be prepared to address current and new recreation trends and increased use when necessary.

NATIONAL RECREATION AREA DESIGNATIONS

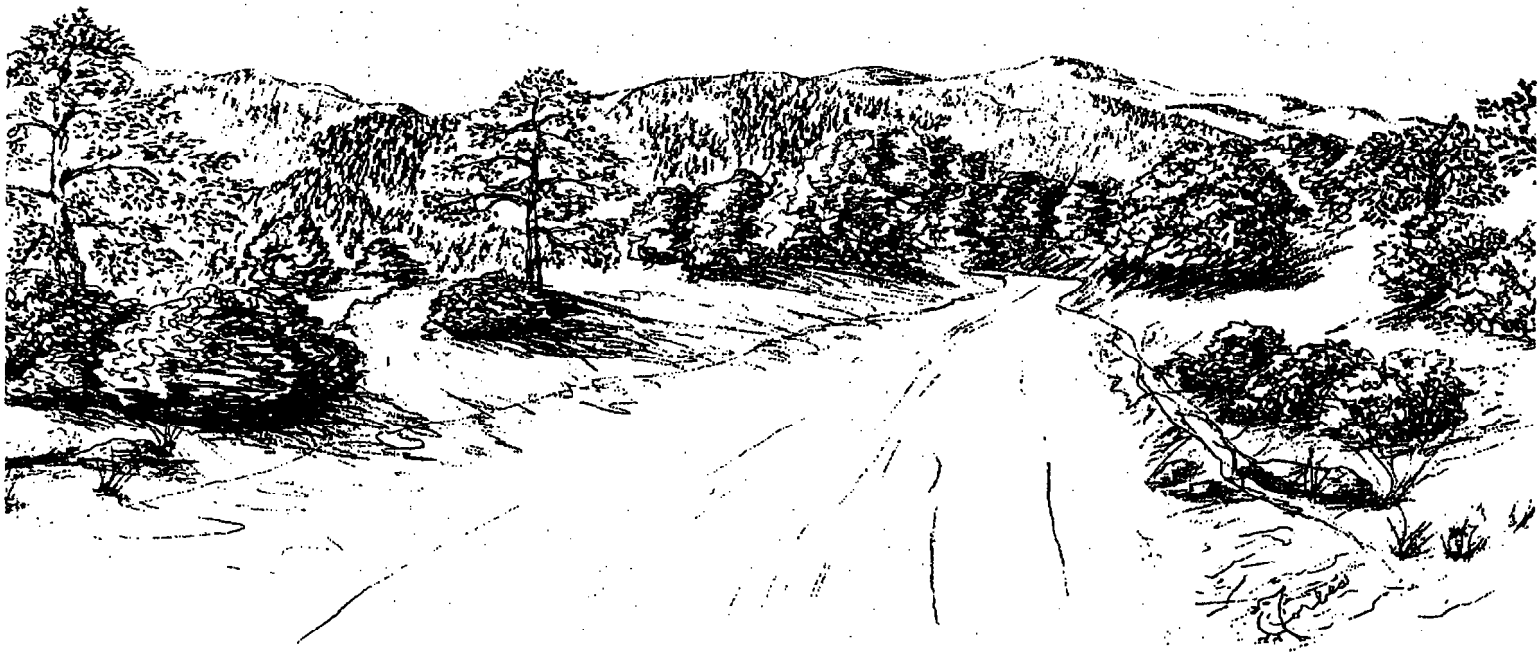
National recreation areas (NRAs) typically contain a great diversity of uses and values, but will usually have one very significant national recreation value.

No limits of size are required, although those previously established NRAs have contained substantial acreages (5,000 acres and more). The most frequently used and consistent criteria for national recreation areas were developed by the National Park Service in 1978. These areas must:

- be spacious areas containing outstanding natural and/or cultural features and providing significant recreation opportunities,
- be located and designed to achieve comparatively heavy recreation use, and location should usually contribute significantly to the recreation needs of urban populations,
- provide recreation opportunities significant enough to ensure national, as well as regional visitation, and
- provide a scale of investment, development, and operational responsibility sufficient to require either direct Federal involvement or substantial Federal participation to ensure optimum public benefit.

The Arkansas River corridor could be appropriately considered for national recreation area (NRA) status. These areas are usually established to provide for intensive management of recreational values. The land pattern on the Arkansas River is very mixed between private, state, USFS, and BLM. Approximately 45 percent of the corridor is administered by BLM. Values relating to water-based recreation (rafting, kayaking, fishing, etc.) and upland recreation (hunting, mountain biking, mining, OHV use, etc.) would be enhanced for public use on approximately 125,000 acres administered by BLM in the corridor. This acreage, therefore, could logically be included in a potential NRA and intensively managed for recreation values. The 1991 visitor survey conducted on the Arkansas River revealed a large percentage of users want additional upland opportunities to complement river activities. Tourism provides the largest economical benefit of communities along the river corridor. According to trends occurring in other BLM NRAs, NRA designation would significantly increase tourism. Minor mineral activity and livestock grazing also occur. This corridor currently is managed as a special recreation management area (SRMA) with portions (5,000 acres) managed in conjunction with Colorado DPOR as the Arkansas Headwaters Recreation Area for the same significant recreation values. Potentially the entire upper Arkansas Basin might be viewed as a multi-agency NRA. The recommendation to consider the Arkansas River for NRA status was developed by the Cañon City District Advisory Council during their involvement in the wild and scenic river analysis. The Arkansas Canyon is suitable for NRA designation because of the scattered land ownership pattern and the nationally recognized specific water-based recreation values for which it was nominated.

CHAPTER 3
ALTERNATIVES



CHAPTER 3 ALTERNATIVES

Four land use management alternatives have been developed for the BLM-administered lands in the Royal Gorge Planning Area. These are the Existing Management Alternative, the Resource Conservation Alternative, the Resource Utilization Alternative, and the Preferred Alternative.

GENERAL ALTERNATIVE GUIDANCE

Management for some of the resources/values in this alternative would not differ from that discussed in management common terms in the Resource/Value Analysis section.

All alternatives considered in this plan will incorporate, to the degree possible, general guidance ensuring that any planned resource conditons, land use allocations, or management activities are compatible with ecosystem management and biological diversity goals.

It is essential that each alternative describe a logical, realistic, and achieveable mix of multiple use management resource conditions, resource allocations, and management actions. Basically alternatives should:

- be complete plans by themselves
- resolve issues/concerns
- provide a spectrum of possibilities
- be practical and implementable
- help people understand situation
- use BLM program guidance
- reflect multiple use ideas
- show clear management direction
- reflect other agency plans
- show emphasis by resources
- recognize valid existing rights
- be an interdisciplinary approach
- involve the public in formulation
- conform to existing laws and regulations

The following is a summary of the four alternatives to be used in the RGRMP:

Existing Management Alternative

This alternative describes existing resource conditions with currently practiced management and present land use allocations as shown in the management framework plans (MFPs) and plan amendments (PAs) within the RGRA. Generally under multiple use management all resources are equal until an issue or conflict is identified.

The objective of this alternative would be to continue the present levels, methods, and mix of multiple use resource management, utilization, and protection. Management decisions would be based on current policies, regulations, and direction within this alternative. A ranking table is not present here as in other alternatives because this would not reflect the management direction within the MFPs.

Resource Conservation Alternative

This alternative describes a modified level of management with emphasis on natural resource conditions and actions beneficial for the natural resources. This alternative may be a mix of land use allocations with a strong emphasis on preserving and conserving those resources. Resource values can be ranked according to management priorities among the various resources and values.

The objective of this alternative would be to continue multiple use management of BLM lands in the Royal Gorge Planning Area (RGPA). To facilitate analysis, the resources and resource uses to be enhanced are ranked (Table 3-1) to provide guidance. Emphasis would be on conservation and protection of resources and values such as special plants/animal species, riparian, sensitive soils/water rights/water quality/air, visual resources, etc. Management decisions would be based on current policies, regulations, and directions described in this alternative.

TABLE 3-1
Ranked Resources or Values For the Resource Conservation Alternative

Ranking of Resources or Values	Nonranked Program or Support Functions
Special Status Plant and Animal Species (Sensitive plants/animals, and threatened and endangered plant/animals)	Air Quality
Riparian Areas	Climate
Sensitive Soils/Water Quality	Wilderness
Wildlife/Fishery Habitat	Hazards
Paleontological/Historical/Archaeological	Topography/Geology
Visual Resources	Vegetation
Recreation	Noxious Weeds
Off-Highway Vehicle Use	Transportation and Access
Forest and Woodlands	Rights-of-Way
Livestock Grazing	Water Rights
Fluid Minerals/Locatable Minerals/Mineral Materials/Coal Minerals	Land Ownership Adjustments
Waterpower/Reservoir Resources	Withdrawals
	ACECs
	Wild and Scenic River Designations
	Economic Conditions and Social Environment
	Fire

Resource Utilization Alternative

This alternative describes a modified level of management with emphasis on development or use of those resources. Existing laws and regulations would serve to manage and protect natural resource values. This alternative may be a mix of land use allocations with a strong emphasis on actions benefiting use and development of resources. Resource values can be ranked according to management priorities among the various resources and resource uses.

The objective of this alternative would be to continue multiple use management of BLM lands within the planning area with emphasis on promoting the development, production, and transportation of those resources that provide energy, minerals, food, timber, etc. To facilitate analysis, the resources and resource uses to be enhanced are ranked (Table 3-2) to provide guidance. Management decisions would be based on current policies, regulations, and the specific directions described in this alternative.

TABLE 3-2
Ranked Resources or Values For the Resource Utilization Alternative

Ranking of Resources or Values	Nonranked Program of Support Functions
Fluid Minerals/Locatable Minerals Mineral Materials/Coal Minerasl	Air Quality
Livestock Grazing	Climate
Forest and Woodlands	Wilderness
Waterpower/Reservoir Resources	Hazards
Off-Highway Vehicle Use	Topography/Geology
Recreation	Vegetation
Visual Resources	Noxious Weeds
Paleontological/Historical/Archaeological	Transportation and Access
Special Status Plant and Animal Species (Sensitive plants/animals and threatened and endangered plants/animals)	Rights-of-Way
Wildlife/Fishery Habitat	Water Rights
Sensitive Soils/Water Quality	Land Ownership Adjustments
Riparian Areas	Withdrawals
	ACECs
	Wild and Scenic River Designations
	Economic Conditions and Social Environment
	Fire

Preferred Alternative

This alternative describes a modified level of management with emphasis on natural resource conditions, much like the conservation alternative, but with moderate levels of resource utilization as well. This alternative is a mix of land use allocations with a moderate level of protective actions preserving and conserving the natural resources. Resource values cannot be ranked as they were in the resource and utilization alternatives because the prescribed management is a blend of preserving and using those natural resources present on BLM-administered lands.

The objective of this alternative would be to continue multiple use management of BLM-administered lands in the RGPA. This mixture still would have a strong emphasis on preserving and conserving fragile and vulnerable resources such as special plant/animal species habitat, riparian areas, sensitive wildlife birthing and wintering areas, cultural resource sites and districts, etc. Management decisions would be based on current policies, regulations, and directions described in this alternative.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED

To date only one other alternative has been considered within this draft resource management plan/environmental impact statement (RMP/EIS) and rejected after detailed analysis. A Regional Tourism Alternative was evaluated in the beginning, but was dropped because much of it was duplicated in the existing alternatives. Portions of this alternative are developed within one or more of the four alternatives analyzed within this plan.

INTEGRATED ACTIVITY PLANS

Site-specific activity plans in some cases are needed to begin the RMP plan decision implementation process. Some single resource/use activity planning may still be needed in the RGRA after this RMP is completed. In most cases, however, integrated activity plans (IAPs) will be accomplished rather than the traditional single activity planning; i.e., habitat management plans (HMPs), forest management plans (FMPs), allotment management plans (AMPs), recreation activity management plans (RAMPs), cultural resource management plans (CRMPs). IAPs would be done where more than one activity is considered in RMP decision implementation in a specific location and where there is a need to integrate on-the-ground planning (e.g., clarify, coordinate, resolve conflicts, unify, merge, etc.).

IAPs will very likely be accomplished within areas of critical environmental concern (ACECs). These areas normally have multiple values with specific resource condition objective decisions, land use allocation decisions, and management action decisions from the RMP. There are also some areas outside ACECs where there is a need to integrate on-the-ground planning. With very few exceptions, these IAPs and single resource/use activity plans would be accomplished the same in each of the alternatives.

In some instances over the 20-year life of the RMP, single use activity plans may be needed to implement RMP decisions. This might involve habitat management on an isolated tract where only a wildlife decision is to be implemented, or perhaps an isolated Improve category livestock allotment where no other resource is involved in the decision to manage the resources on that site. The IAPs would attempt to meet any resource programmatic requirements within this intergrated activity planning effort.

There would be a need for some activity planning across the entire planning area. Several examples of these might be an area-wide mineral materials plan to locate and establish community mineral materials pits, or perhaps an area-wide support service plan to begin needed administrative support actions (e.g., access acquisition, transportation maintenance, cadastral surveys, off-highway signing, engineering, hazards, etc.).

In all future activity plans (single or integrated), an attempt will be made to blend all planned human activities with needed conservation of the ecological system and provide for biological diversity.

In areas where planned IAPs are expected to require accurate identification of boundaries, cadastral survey would prepare a report addressing:

- The general status of surveys in the area (estimated accuracies, corner recovery, and status of section subdivisions where appropriate.)
- The expected need for both accuracy and one-the-ground boundary identification for specific areas.
- When the activity is expected to take place and when the boundary identification is necessary.
- Estimated cost for surveys in specific areas.
- Initiation of coordination efforts with other Federal agencies who may have similar boundary identification needs in these areas.

RESOURCE/VALUE ANALYSIS

Bureau policies and regulatory mandates are reflected in common management and would be the same in each of the alternatives addressed in this document. Some resources and values may be partially discussed in this chapter and in Chapter 4, if only portions of the management are considered the same in all alternatives.

Management of the following resource values would not change in any of the alternatives; therefore, are only discussed in general terms.

Climate	Hazards Management
Air Quality	Topography/Geology
Wilderness Management	Noxious Weeds
Sensitive Soils	National Conservation Area
Water Rights	Fire Management
Water Quality	Economic Conditions and Social Environment

Climate

Management would be the same under all alternatives. Climatic variance throughout the planning area, and over time, affects the management options for several resources. Climatic conditions would be monitored and analyzed when appropriate. For example: rangeland vegetation condition assessments would analyze both climatic and grazing management, and mineral development plans would analyze both climatic and mineral development reclamation.

Air Quality

Management for this resource value would not differ under any alternative. Air quality degradation would be minimized through strict compliance with Federal, state, and local regulations and implementation plans. Air quality impacts from prescribed burns are limited by BLM Manual 7723 (Air Quality Maintenance Requirements), which requires a state-approved open burning permit prior to implementation. Prescribed burns would be small in scale and dispersed throughout the planning area. Increasing off-highway vehicle (OHV) use in open areas might accelerate soil erosion and increase fugitive dust emissions; however, dust suppression control devices would not be practical. Additional management activities include monitoring, analysis, and impact mitigation on a project-specific basis, which ensures compliance with applicable regulations and implementation plans.

Wilderness Management

The WSAs in the RGRA would be managed under BLM *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (IMPG) until Congress makes a decision on wilderness recommendations for the Cañon City District and would be the same in all alternatives. Those WSAs not designated as wilderness would return to other types of multiple use management as prescribed in this land use plan. Desired plant community (DPC) would be determined for WSAs returned to other types of multiple use management. In accordance with Section 603 of FLPMA, BLM is required to manage all identified wilderness study areas under the nonimpairment mandate. Valid existing rights must be recognized and are an exception to the nonimpairment mandate. Grazing uses and mining operations occurring as of October 21, 1976, may continue in the same manner and degree as long as they do not cause unnecessary or undue degradation. Uses and operations proposed after this date, however, are subject to the nonimpariment requirements for all operations proposed.Overall no difference in management would occur among any of the alternatives.

Two WSAs (Browns Canyon and Beaver Creek), within the planning area, are recommended by BLM for wilderness designation in the Final Cañon City District Wilderness Environmental Impact Statement dated December 1987, and would be managed in accordance with BLM and congressional directives. These two recommended areas would be returned to other multiple use management if not designated wilderness by Congress.

Sensitive Soils

Surface-disturbing activities including construction of roads, trails, utility lines, and special use facilities; grazing; mineral development; forest and woodland management, and OHV use would be managed to avoid soil erosion and loss of watershed values throughout the planning area during the life of the plan. Allotment grazing adjustments and standards with stipulations for other resource actions would decrease erosion and potentially enhance watershed characteristics.

Water Rights

In compliance with state law, water rights would be acquired to use water in support of BLM programs, including the water needs of BLM recreation sites, commercial and concession facilities, special plant and animal habitat areas, state and local government recreation and public purposes lease areas, livestock management allotments, and wildlife habitat areas. An implicit Federal reserved water right is included in the *Wild and Scenic Rivers Act* and would apply to any designated segments.

The Bureau water use inventory and water rights program within the planning area would continue to be implemented. As new projects are completed and old ones are maintained, re-evaluating and updating would be required.

Water Quality

Minimum state water quality standards would be observed for all activities. Water quality would continue to be maintained or improved in accordance with state and Federal standards. BLM would consult with the appropriate state agencies. Management actions on BLM-administered land within municipal watersheds would continue to be designed to protect water quality and quantity. Monitoring selected ground water and surface water stations would be continued in cooperation with USGS. Numerous state and Federal agencies have studied or are currently conducting water quality studies on the upper Arkansas River.

The Arkansas River Initiative, a group currently headed by the Environmental Protection Agency, is working to consolidate previous studies, coordinate and standardize current studies, and provide a method to share the information obtained. Additional data collection is also anticipated. The Colorado Division of Wildlife (CDOW) is currently studying instream flow requirements for biological needs on the Arkansas River. This study was requested by the Colorado Water Conservation Board and will be used to establish minimum streamflow requirements. BLM is initiating a water needs assessment through the Denver Service Center, in partnership with Colorado Department of Natural Resources, USFS, and U.S. Bureau of Reclamation, to determine water flow needs for both biological and recreational resources, including whitewater boating.

Watershed activity plans would interface with existing plans as appropriate and would be implemented on areas where livestock grazing plan adjustments would not fully correct any determined water quality problem. Cooperation with the range program in the development, implementation, evaluation, and modification of AMPs as affected by watershed values would continue as a top priority in the watershed program.

Monitoring and evaluating water quality and quantity, as well as controlling erosion and sediment production, would remain high priority management goals. Emphasis would be to continue all watershed activities that provide protection, maintenance, and enhancement of the watershed resources, including the support watershed provides to other resource programs and activities.

BLM in Colorado would continue to take an active role in control of nonpoint source pollution on BLM-administered lands. BLM is an active participant on the state of Colorado Nonpoint Source Taskforce and Agriculture/Silviculture Subcommittee. BLM is also, and would continue to be, involved with the Badger Creek and Threemile Creek study groups. Through these organizations, BLM would identify nonpoint source pollution areas for the updating of the Colorado Nonpoint Assessment Report. BLM policy is to protect, maintain, restore and/or enhance the quality of waters on BLM-administered lands. Implementation of best management practices would be utilized to help achieve this goal. Funds would be requested for planning and project implementation for nonpoint source control with emphasis

on the priority watersheds identified in the Colorado Nonpoint Source Management Program report. Nonpoint source control projects would be implemented as funding and manpower allow.

Hazards Management

All hazard sites/areas would be reviewed on a case-by-case basis and management would be the same in all alternatives. Management of all other resources would always involve remediation/reclamation of known hazard sites/areas. Hazards management would be incorporated into all appropriate integrated activity plans (IAPs).

Existing sites/areas from past mineral development considered to be potentially hazardous because of high side walls, deep pits, etc., would be reclaimed in coordination with the Colorado Mined Land Reclamation Board hazard abatement program. The goal of this long-term project is to eliminate the hazards of these sites/areas, and BLM would continue to fully cooperate with this agency in this effort. Trespass dumping on BLM-administered lands would continue to be controlled through signing and monitoring these sites/areas and increasing public awareness. An area-wide hazards management activity plan would provide the details as to onsite closures, signing, site reclamation needs, etc., to implement hazard abatement. Suspected hazardous materials sites would be handled according to the District Emergency Response Hazardous Materials Contingency Plan, which requires six steps:

1. Discovery and notification

2. Education and initiation of action

3. Emergency treatment of contaminated personnel or public

4. Containment

5. Cleanup and disposal

6. Procurement, documentation, and possible cost recovery

Two county landfills are authorized on BLM-administered land:

Park County: R&PP lease, audited for lease compliance in 1990. Audits results show no known nor suspected contamination.

Chaffee County: R&PP lease, audited for lease compliance in 1990. Audit results show hazardous materials in the area. Site evaluation accomplished (SEA); designation granted by EPA in November 1992. Will not be considered further for national priority listing.

Topography and Geology

The topography of the resource area would not change significantly under any of the alternatives; therefore, management would be the same in all alternatives. A brief discussion of the topography of the resource area is included in Chapter 2. Various geological education programs would be developed and addressed in each alternative.

Noxious Weeds

Noxious weeds would be managed the same in all alternatives according to the principles of integrated pest management (IPM) and the *Colorado Undesirable Plant Act.* Cooperative efforts with county weed boards to control infestations would be developed. Methods used would include chemical, cultural, mechanical, and biological control. Environmental assessments would be tiered to the *Vegetation Treatment on BLM Lands Final EIS 1991.*

National Conservation Area

The Arkansas River Corridor and the Gold Belt National Back Country Byway are not appropriate for NCA designation because of primary water based recreation use and mixed land patterns of private, state, USFS, and BLM. The Garden Park Paleo Area has been identified in the activity plan for consideration of NCA designation if significant land exchanges occur in the future. For more details, see Chapter 2.

Fire Management

All BLM-administered lands in the resource planning area would be managed in all alternatives for total fire suppression. No conditional suppression acres are considered in this plan. The fractured land pattern present in the planning area and the extensive private property development, including mountain subdivisions, preclude the conditional suppression of wildfire. There is no anticipated rotational use of prescribed fire within the planning area. Prescribed fire could be used as a management tool to enhance other resources. Prior to fire prescription, DPC would be described and fire projects would initiated through IAPs. A specific burn plan, including NEPA documentation, would be prepared in advance of a prescribed burn.

Economic Conditions and Social Environment

In all alternatives, the contribution in employment and earnings to the economic study area (ESA), including setting the estimated national values to the year 2010, would be analyzed. A determination for each alternative would be made regarding the local and regional impact of employment related to expenditures on BLM-administered lands in the planning area. In each alternative a cost/benefit ratio would be determined comparing the costs to benefits. Economic analysis would mainly involve the sale of forestry products and provision for recreation user opportunities and livestock production.

Other benefits not being analyzed are the estimated values of preserving the natural and cultural resources, the estimated market values of minerals, and the potential values of maintaining viable wildlife populations. A determination of the potential cumulative impacts on the local and regional economy/social environment would be accomplished.

Vegetation Management

Overall objectives in all alternatives would be to attain a stable watershed and soil condition based on site potential. Vegetation manipulation practices or other techniques would also be used, if necessary, to accomplish this. An ecological site inventory would be conducted on all lands in the resource area. Ecological site descriptions would be developed on a priority basis for riparian areas, critical watersheds, and critical wildlife habitat. Site-specific resource objectives including specific DPC would be identified in integrated activity plans and individual activity plans, and in most cases would be a diverse community of grasses, shrubs, and trees that could be reasonably achieved.

Overall trend, condition, and forage production would be expected to improve and would be monitored under all alternatives. Impacts from soil-disturbing activities would be mitigated with standard operating practices for rehabilitation of disturbed sites. Maintenance, improvement, and/or manipulation of the existing vegetation would continue to be a priority concern for all actions in all alternatives. Forage is not currently distributed to wildlife or watershed; however, because of current seasons-of-use and utilization restrictions, there are approximately 20,000 AUMs of forage not distributed to livestock currently being used by big game or as watershed cover.

TABLE 3-3
Analysis of Vegetation Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Vegetation would be managed to provide forage for livestock and wildlife according to existing activity plans. Timber and woodlands would be managed in accordance with existing forest management plans.	Vegetation would be managed with emphasis on providing forage and habitat for wildlife and cover for enhanced watershed conditions and riparian areas.	Vegetation would be managed with emphasis on increased livestock forage, wood products, and to a lesser degree wildlife forage.	Vegetation would be managed to accomplish BLM initiatives included in *Range of Our Vision, Riparian-Wetland Initiatives for the 90's, Forests Our Growing Legacy, Fish and Wildlife 2000*
Allocations	New forage resulting from improved management would be distributed to livestock and/or big game on a case-by-case basis for Improve category allotments.	New forage resulting from improved management would be distributed to big game first until DOW herd management goals are reached, then to livestock until suspended nonuse is satisfied.	New forage resulting from improved management would be distributed to livestock first until suspended nonuse is satisfied.	New forage resulting from improved management would be distributed on a case-by-case basis to either livestock or big game through cooperative efforts with Federal and state agencies and private groups (i.e., the Colorado Habitat Partnership Program).

Table 3-3 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)	Management for forage on 636,000 acres would continue.	Management for forage on 573,000 acres without special values would continue; management for forage on ACECs (62,950 acres) and riparian (650 acres) would not occur .	Management for forage on approximately 653,000 acres would occur.	Management for forage on approximately 642,784 acres would occur. Management for forage would not occur on Mosquito Pass and a portion of Beaver Creek ACECs (9,791 acres) to protect special values and riparian areas in poor condition on 325 acres. Management for limited forage would occur on Droney Gulch (705 acres) and High Mesa (1,510 acres) ACECs with stipulations to protect special plants and a relict plant community and on Grape Creek ACEC (15,978 acres) and Badger Creek (28,640 acres) to protect special values.
	Management for production of forest products on 92,854 acres of forest lands would continue.	Management for enhancement of other resource values on 244,554 acres of forest lands would occur.	Same as Alternative A.	Management for enhancement of other values on 151,700 acres of forest lands (215 acres annually) would occur.
Actions	Desired plant community (DPC) objectives would be developed for existing and new activity plans and would be composed of species mix to best support a balance of livestock grazing, wildlife habitat, and production of forest products.	DPC objectives would be developed for existing and new activity plans and would be composed of species mix to best support wildlife, improved watershed conditions, enhanced riparian areas, critical big game winter range, and special values within the ACECs.	Same as Alternative A, except more emphasis would be placed on DPCs to support livestock and forest products and less on wildlife.	DPC objectives would be developed for existing and new activity plans and would be composed of species mix, production, and ground cover to first support the ecosystem function and second to support the combination of uses for each area. A monitoring program and schedule would be developed to determine progress and would be accomplished on an interdisciplinary basis to avoid duplicity among resource programs.

Livestock Grazing Management

Livestock grazing management would be based on the 1981 *Royal Gorge Area Grazing Environmental Impact Statement* in all alternatives. The valid decisions would be included in the RMP, and only the changes are shown in each of the alternatives. (See Appendix E for more details.)

Livestock grazing would be authorized on 454 allotments. Adjustments in the actual AUMs (temporary increase or decrease) would be authorized and made when warranted by climatic or other conditions. An environmental assessment (EA) would be needed before a term permit is issued for acquired land outside the existing allotment boundary. Temporary livestock grazing could be allowed, pending an EA on completion of acquisition of these lands.

Typical range improvements are listed in Appendix E. Traditionally allotment management plans (AMPs) have been used to prescribe management objectives and achieve the grazing management programs. AMPs would continue to be used on an interim basis until replaced with integrated activity plans (IAPs).

Monitoring studies would be continued or established depending on management category, which would determine monitoring intensity. The highest intensity monitoring studies would occur on Improve category allotments. The specific type of studies would be determined by the IAP objectives. All grazing allotments in the planning area have been assigned to one of three management categories. The Maintain category allotments generally would be managed to maintain current satisfactory resource conditions; Improve category allotments generally would be managed to improve resource conditions; and Custodial category allotments would receive custodial management to prevent resource deterioration (Appendix E). The management category for an allotment could be replaced through a range program summary (RPS) after the RMP/EIS is completed only if the category criteria status of the allotment and/or monitoring studies, plus an allotment evaluation, indicate a change is warranted. Categorization would vary by alternative and is shown in Table 3-4.

Based on monitoring studies, corrective action would be taken if IAP objectives are not being met. Livestock use adjustments would be made by changing one or more of the following: class of livestock, season of use, stocking rate, or the grazing management system. Although most livestock use adjustments would occur in the Improve category allotments, use adjustments could occur in the Maintain and Custodial category allotments. Changes would be made through an IAP revision.

Types of grazing systems being implemented in the planning area are described in Appendix E and would be implemented by an IAP. Plans would generally be prepared in consultation, cooperation, and coordination with the permittee and other affected parties to meet multiple use and land use plan objectives.

Grazing capacity accuracy on Custodial category allotments would be determined. Current poor condition allotments with ecological site inventory (ESI) would be re-evaluated and appropriateness of management levels of use to meet current objectives would be determined. ESI would be conducted and stocking rates and season of use would be adjusted accordingly.

Cattle drift from BLM-administered land onto uncontrolled adjacent private land would be controlled. Livestock grazing would be excluded in historical sites, if a threat of damage exists, developed recreation sites, and approximately 50 acres in Garden Park Paleo area, which would include the visitor center.

TABLE 3-4
Analysis of Livestock Grazing Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Current livestock grazing levels and management direction based on 1981 grazing EIS and BLM grazing policies would continue.	Similar to Alternative A except management would also enhance or protect other uses; e.g., developed recreation sites, cultural sites, riparian areas, critical wildlife habitat, T&E species and ACECs.	Same as Alternative A.	Livestock grazing season-of-use and stocking rates based on 1981 grazing EIS and existing monitoring levels would continue. IAPs would be prioritized based on conflicts with riparian areas, critical wildlife habitat, and ACECs.
Allocations	Grazing would be excluded on Mosquito Pass (10,000 acres); South Park (1,000 acres); and tracts in the Eastern Plains (6,000 acres) - allocated on 636,000 acres - not allocated on 17,000 acres.	Same as Alternative A plus grazing would be excluded on Beaver Creek (12,083 acres); Grape Creek (15,978 acres); High Mesa Grassland (1,510 acres); Garden Park Paleo Area (2,728 acres); Droney Gulch (705 acres); Cucharas Canyon (1,314 acres); Mosquito Pass (4,036 acres); South Park (1,000 acres); tracts in the Eastern Plains (6,000 acres), and riparian areas in poor condition (650 acres) - allocated on 583,000 acres - not allocated on 70,000 acres (area excluded because ACEC designation is larger than ACEC acreage because allotments are larger than ACECs).	Same as Alternative A except grazing would be allowed on Mosquito Pass (10,000 acres); South Park (1,000 acres); and tracts in the Eastern Plains (6,000 acres) - allocated on 653,000 acres - not allocated on 0 acres.	Grazing would be excluded on Mosquito Pass (4,036 acres); a portion of Beaver Creek (5,755 acres); and riparian areas in poor condition (325 acres) - allocated on 642,884 acres - not allocated on 10,116 acres. Stocking rates and season of use would be adjusted in Grape Creek, Droney Gulch, High Mesa Grassland, and Garden Park ACECs (21,221 acres) and Badger Creek (28,660 acres).
Actions	Livestock drift onto uncontrolled private land would be eliminated by cooperative actions.	Livestock drift onto uncontrolled private land would be eliminated through fencing by permittee or by eliminating grazing.	Livestock drift onto uncontrolled private land would be eliminated by BLM fencing or cooperative actions.	Livestock drift onto uncontrolled private land would be eliminated through a combination of BLM fencing, cooperative projects, or by eliminating grazing.
	Allotments would be categorized according to RPS: - Improve allotments, 55; - Maintain allotments, 12; - Custodial allotments, 377	Allotments (25) would be recategorized from Custodial to Improve because of riparian and wildlife conflicts: - Improve allotments, 80; - Maintain allotments, 12; - Custodial allotments, 352	Allotments (10) would be recategorized from Custodial to Improve based on potential from improved livestock management: - Improve allotments, 65; - Maintain allotments, 12; - Custodial allotments, 367	Allotments (20) would be recategorized from Custodial to Improve and 20 allotments would be recategorized from Improve to Maintain because of riparian, wildlife, and watershed conflicts: - Improve allotments, 55; - Maintain allotments, 32; - Custodial allotments, 357.

Table 3-4 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Actions (Continued)	Grazing systems; i.e., deferred, deferred rotation, and rest rotation, would be used, along with newer concepts; i.e., time-controlled grazing and holistic resource management, to enhance wildlife habitat and riparian values. Range improvement projects (fences,water developments, and vegetation treatments) would be used to implement grazing systems and facilitate livestock grazing.	Grazing management on Improve category allotments would be modified to improve/enhance riparian, wildlife, and watershed condition through season of use, area of use, and type of range improvements.	Same as Alternative A.	Grazing systems; i.e., deferred, deferred rotation, and rest rotation, would be used, along with newer concepts; i.e., time-controlled grazing and holistic resource management, to improve/enhance wildlife habitat, riparian values, watershed condition and range improvement projects on Improve category allotments.

Riparian Area Management

In all alternatives the minimum legislative requirements would be met. Riparian areas would be inventoried (see Appendix F for details). Areas would be managed to maintain or achieve policy goal of 75 percent in a properly functioning condition by 1997.

TABLE 3-5
Analysis of Riparian Area Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Riparian areas would be managed to maintain or achieve a properly functioning level with a full range of resource uses.	Riparian areas would be enhanced and protected by eliminating any uses conflicting with riparian values.	Same as Alternative A because of national riparian focus and policy.	Policy would be accomplished with full range of uses on most riparian areas.
Allocations	Livestock grazing would continue to be prohibited within the exclosure in the Texas Creek Riparian Demonstration Area (15 acres, 1/2 mile). A full range of uses would continue in most riparian areas.	Both perennial and intermittent riparian areas (267 miles, 2,550 acres) would be recommended for closure to mineral entry, and withdrawals for waterpower/ reservoir sites would be recommended for termination; leased for fluids with no surface occupancy stipulations; closed to mineral materials disposal; and off-highway vehicle use would be limited to designated roads and trails. Livestock grazing would be eliminated in areas of poor riparian condition on approximately 650 acres or limited to water access only.	Same as Alternative A.	Perennial riparian areas with existing fisheries (132 miles, 1,275 acres) would be recommended closed to mineral entry and withdrawals for waterpower/ reservoir sites would be recommended for termination; closed to mineral materials disposal; leased for fluids with controlled surface use stipulations; and off-highway vehicle use would be limited to designated roads and trails. Livestock grazing would be discontinued in areas of poor riparian condition on approximately 325 acres[1/]. - 2,225 acres of riparian habitat allocated for grazing - 325 acres of riparian habitat with no grazing
Actions	Riparian area inventories would be completed as funding allows. New and existing activity plans would be amended to reflect riparian objectives. See Vegetation Management.	Riparian area inventories would be completed and mapped as soon as possible so limitations could be implemented and enforced. Interdisciplinary support for riparian restoration would be emphasized. See Vegetation Management.	Same as Alternative A.	Same as Alternative B.

[1/]Grazing would be eliminated on approximately 325 acres of riparian habitat in poor condition. These areas areas are scattered throughout the planning area in numerous places and have not been identified because the inventory is incomplete. The amount of acreage is estimated at 50 percent of existing riparian in poor condition because approximately half cannot be improved if livestock grazing continues.

Forest and Woodland Management

Forest and woodland management would be implemented on an extended rotation, even-age basis. Uneven-age management would not be precluded, but would not occur on significant acreage. Silvicultural and site preparation methods that result in natural regeneration would be the primary reforestation methods and would be the emphasis in sale design. In all disturbed sites, DPC would be determined. Commercial forest and operable woodlands would be managed to enhance special status animal habitat. Forest lands allocated for other resource values (not subject to planned timber harvest) would be available for retention, maintenance, and/or re-establishment of old growth and mature forests.

TABLE 3-6
Analysis of Forest and Woodland Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Commercial forest and operable woodlands would be managed for sustained-yield production of forest products.	Commercial forest and operable woodlands would be managed for support of other sensitive resource values.	Commercial forest and operable woodlands would be managed with minimal restrictive stipulations for sustained-yield production of forest products.	Same as Alternative A.
Allocations	Forest products on 92,854 acres (including woodlands) would be available for intensive management. Noncommercial forest and woodlands on 151,700 acres would be available for enhancement of other resources	Forests products on 0 acres (including woodlands) would be available for intensive management. All 244,554 acres would be available for enhancement of sensitive values; e.g., visual, historical, wildlife habitat, watershed, wild and scenic river corridors, etc. Most enhancement, however, would occur on 92,854 acres.	Same as Alternative A. Same as Alternative A.	Same as Alternative A. Same as Alternative A.
Actions	In the 5-year sale plan, stands would be prioritized for harvest consideration in the following order: - insect or disease - other multiple resource values - timber production Additional forest management plans would be developed as funding allows.	In the 5-year sale plan, stands could be considered for harvest in the following order: - enhancement of vegetation goals - other multiple resource values - insect or disease Funding would be solicited from other activities for forest plan development.	In the 5-year sale plan, stands would be prioritized for harvest consideration in the following order: - timber production - insect or disease - other multiple resource values Funding would be pursued for additional forest management plan development.	In the 5-year sale plan, stands would be prioritized for harvest consideration in the following order: - enhancement of vegetation goals - insect or disease - timber production - other multiple resource values Funding would be solicited from other activities to support the 5-year sale plan and all IAPs.

Wildlife Habitat Management

All BLM-administered lands (653,000 acres) would be considered for protection and enhancement of wildlife habitat values. Limitations on fluid minerals are based on 2.5 million acres of subsurface, which includes the 653,000 acres of BLM-administered surface land. Other limitations are based only on surface acres. Monitoring of the existing habitat management plans (HMPs) and crucial big game winter range, birthing areas, and raptor sites would continue until integrated activity plans (IAPs) are prepared. All other nongame wildlife would be managed consistent with *Wildlife 2000*. In all vegetation manipulation areas, DPC would be determined.

TABLE 3-7
Analysis of Wildlife Habitat Managment by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Wildlife habitat would be managed under existing HMPs. Areas requiring special management would be considered on a case-by-case basis.	Land would be managed to maintain or enhance wildlife habitat. Conflicts between wildlife and commodity uses would be resolved in favor of wildlife.	Habitat would be managed for increased big game production through vegetation manipulation. Conflicts between wildlife and commodity uses would be resolved in favor of commodity uses.	Wildlife habitat would be managed to maintain and enhance habitat values. Conflicts with other uses; e.g., livestock grazing, mineral development, etc., would be resolved in favor achieving vegetation management goals.
Allocations		Big game birthing and critical winter habitat on 191,605 subsurface acres would be protected by no surface occupancy stipulations.	Big game birthing and critical winter habitat on approximately 191,605 sub-surface acres would be managed under standard lease stipulations for fluid minerals.	
		Big game birthing areas on 17,499 surface acres would be protected as follows: - closed to mineral materials disposal - closed to mineral entry - closed to coal leasing - recommended termination of waterpower/reservoir withdrawals - excluded to major ROWs - limited seasonally for OHV use.		All big game birthing habitat on 17,499 acres would be protected as follows: - closed to mineral materials disposal - closed to coal leasing - excluded from major ROWs - limitation of OHV use to designated roads and trails
		Big game critical winter habitat on 94,389 surface acres would be protected as follows: - avoided by major ROWs - elimination of livestock grazing in areas of known conflict - limited seasonally for coal leasing and OHV use.		Big game critical habitat with identified conflict would be addressed through cooperative efforts with Federal and state agencies and private groups (i.e. Colorado Habitat Partnership Program).

Table 3-7 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)	Wildlife habitat would be protected with the following fluid mineral leasing seasonal stipulations : - raptor nesting and fledgling habitat on 4,500 subsurface acres 3/1 - 7/31 - big game critical winter habitat on 164,500 subsurface acres 12/1 - 3/31 - bighorn sheep critical winter habitat and lambing areas on 6,580 subsurface acres 11/15 - 6/30.	Wildlife habitat would be protected with the following fluid mineral leasing seasonal stipulations : - raptor nesting and fledgling habitat on 59,566 subsurface acres 3/1 - 7/31 - wild turkey winter habitat on 29,000 subsurface acres 12/1 - 4/1 - all big game winter habitat on approximately 597,218 subsurface acres 12/1 - 4/30.		Wildlife habitat would be protected with the following fluid mineral leasing seasonal stipulations : - big game critical winter and birthing habitat on approximately 191,605 subsurface acres 12/1 - 4/30 - big game birthing areas (by species) - elk calving and deer fawning 4/16 - 6/30 - pronghorn antelope fawning 5/1 -7/15 - bighorn sheep lambing 5/1-7/15 - wild turkey winter habitat on 29,000 acres 12/1 - 4/1.
		Wildlife habitat would be seasonally limited to mineral operations through claimant notification as follows: - raptor nesting and fledgling habitat on 59,566 surface acres 3/1 - 7/31 - wild turkey winter habitat on 10,712 surface acres 12/1 - 4/1 - all big game critical winter habitat on approximately 94,389 surface acres 12/1 - 4/30.		Same as Alternative B.
Actions	New HMPs would be developed as necessary.		Restrictions, other than those listed previously, would be removed.	Activity planning would be accomplished within IAPs.

Fishery Habitat Management

Existing stream fisheries would be maintained. Improvements in condition and stability would be accomplished through the riparian, wildlife, forestry, grazing, and recreation programs where the potential exists. All fishery habitat is on BLM-administered surface lands, and mineral estate lands are not involved.

Supplemental releases and re-introduction of native fish species could be authorized by the area manager following environmental analysis. Special Status Animal Species Management has additional information.

TABLE 3-8
Analysis of Fishery Habitat Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Existing fishery habitat would be enhanced; other uses would be continued in the resource area; uses that conflict with fisheries would be adjusted.	Fishery habitat would be enhanced and conflicting uses would be discontinued.	Fishery habitat would be protected by minimum legislative requirements; commodity uses would continue.	Fishery habitat would be managed to maintain and enhance habitat values. Conflicts with other uses; e.g., livestock grazing, mineral development, etc., would be resolved in favor of fisheries.
Allocations	Fishery habitat within the Texas Creek exclosure (15 acres) and on Trout Creek ponds (40 acres) would continue to be closed to livestock grazing. All streams/lakes/ponds (131 miles of streams and 11,108 acres) would be protected with standard lease terms for fluid minerals.	Same as Alternative A plus all streams (131 miles) and lakes and ponds with fishery habitat (11,108 acres) would be: - closed to mineral entry - leased for fluid minerals with NSO stipulations - closed to disposal of mineral materials - off-highway vehicle use would be limited to designated roads and trails on 2,550 acres. Livestock grazing would be discontinued in areas with conflicts to fisheries on approximately 650 acres.	Same as Alternative A.	Same as Alternative B except 11,108 acres would be protected with standard lease terms for fluid minerals. Improved livestock grazing management would reduce conflicts to fisheries on approximately 325 acres; livestock grazing would be discontinued in areas with conflicts to fisheries on approximately 325 acres[1/].
Actions				Activity planning would be accomplished within IAPs.

[1/]These areas are scattered throughout the planning area in numerous places and have not been identified because the inventory is incomplete.

Special Status Plant/Community Species Management

Threatened and endangered and sensitive species and plant communities would be inventoried and monitored as necessary to provide information for proper management. Management of uses in areas with special status plants would be in compliance with the *Endangered Species Act*. Any reintroduction of Federal or state listed endangered, threatened, candidate, and sensitive species would be achieved following environmental analysis and consultation with the U.S. Fish and Wildlife Service (USFWS), Colorado Division of Wildlife (DOW), Colorado Natural Areas Program (CNAP), and other affected parties. Federal agencies are directed by the *Endangered Species Act* to avoid actions that would further jeopardize listed and sensitive species and to enhance these species when possible. DPC would be determined in vegetation manipulation areas to enhance habitat for the species.

TABLE 3-9
Analysis of Special Status Plant/Community Species Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Minimum protection required by law would continue.	Special status plants would be protected by special management actions, including elimination of identified and verified conflicting uses.	Same as Alternative A.	Same as Alternative B.
Allocations	*Eriogonum brandegei* would be protected in Garden Park (3,759 acres)and the relict plant community in High Mesa Grasslands (1,560 acres) would be protected through ACEC designation (NSO, closed to mineral entry, no disposal of mineral materials, OHV restrictions).	*Eriogonum brandegei* would be protected in Garden Park (3,759 acres) and Droney Gulch (644 acres); the relict plant community in High Mesa Grasslands (1,560 acres); and *Eutrema pendlandii* would be protected on Mosquito Pass (5,440 acres) through ACEC designation (NSO, withdrawn from mineral entry, no disposal of mineral materials, OHV restrictions).	Same as Alternative A.	Same as Alternative B.
Actions		IAPs would be developed for Droney Gulch, and Mosquito Pass.		Same as Alternative B.

Special Status Animal Species Management

Threatened and endangered and sensitive species would be inventoried and monitored as necessary to provide information for proper management. Limitations on fluid minerals are based on 2.5 million acres of subsurface, which includes the 653,000 acres of BLM-administered surface land. Other limitations are based only on surface acres. Supplemental releases and reintroduction of Federal and state listed endangered, threatened, candidate, and sensitive species would be achieved following environmental analysis and consultation with the U.S. Fish and Wildlife Service (USFWS), the Colorado Division of Wildlife (DOW), and other affected parties. Federal agencies are directed by the *Endangered Species Act* to avoid actions that would further jeopardize listed and sensitive species and to enhance these species when possible.

TABLE 3-10
Analysis of Special Status Animal Species Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Protection and enhancement of special status animals would be continued through full-range management of land uses in areas with these species.	Protection and enhancement of special status animals would be continued by eliminating identified and verified land uses that conflict with these species.	Minimum protection of special status animals required by law would be provided.	Same as Alternative B.
Allocations		Special status animals would be protected with no surface occupancy stipulations as follows: - Mexican spotted owl (one-half mile buffer around core area) on 2,000 acres - raptor nesting and fledgling habitat on 14,900 acres - peregrine falcon nesting habitat (one-half mile buffer) on 4,000 acres - lesser prairie chicken lek (one-fourth mile buffer) on 2,800 acres	Special status animal habitat on 206,400 acres would be protected with standard lease stips only.	Same as Alternative B except no NSO on peregrine falcon nesting habitat.
	Special status animal habitat would be protected with seasonal stipulations as follows: - lesser prairie chicken habitat on 10,500 acres 3/1-7/31 - raptor nesting and fledgling habitat on 14,900 acres 2/1-8/15 - bald eagle winter roosting habitat on 44,000 acres (one-half mile buffer) 11/16-4/15 - least tern/piping plover nesting habitat on 13,000 acres 4/1-7/31.	Special status animal habitat would be protected with seasonal stipulations as follows: - ferruginous hawk nesting and fledgling habitat on 10,000 acres 2/1- 8/15 - lesser prairie chicken habitat on 10,500 acres 3/1-7/31 - least tern/piping plover nesting habitat on 13,000 acres 4/1 - 7/31 - Mexican spotted owl habitat on 124,000 acres 2/1- 7/31 - bald eagle winter roosting habitat on 44,000 acres 11/16 - 4/15 - peregrine falcon nesting habitat on 157,576 acres 3/16 -7/31.		Special status animal habitat would be protected with seasonal stipulations as follows: - ferruginous hawk nesting and fledgling habitat on 10,000 acres 2/1- 8/15 - lesser prairie chicken habitat on 10,500 acres 3/1-7/31 - least tern/piping plover nesting habitat on 13,000 acres 4/1-7/31 - Mexican spotted owl habitat on 124,000 acres 2/1-7/31 - bald eagle winter roosting habitat on 44,000 acres 11/16-4/15 - peregrine falcon nesting habitat on 157,576 acres 3/16-7/31.

Table 3-10 (Continued)

Management	Exisitng - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Actions	HMPs would be developed as needed.	IAPs would be developed for ACECs.	If more protection than required by law is needed, an IAP would be prepared.	Same as Alternative B.

Fluid Minerals Management

One of the primary purposes of the RMP is to determine what BLM-administered mineral estate within the 2.5 million acres of the planning area would be available for fluid mineral leasing. Decisions by alternatives would also consider which, if any, additional mitigative measures or stipulations would be necessary for protection of the environment and other resource values. These stipulations would be in addition to those contained in the standard lease terms, regulations, and conditions of approval for operations conducted following lease issuance. These requirements and procedures are identified in Appendix G. Federal mineral estate would be open to leasing as identified in each alternative with the exception of the following nondiscretionary closure: WSAs (70,984 acres) within the planning area pending final designation by Congress. Wilderness lands would be withdrawn from all forms of minerals appropriation subject to valid existing rights in accordance with Section 4(d)(3) of the *Wilderness Act.* Lands not designated wilderness would return to multiple use management subject to the applicable leasing decisions of this plan. In addition the following BLM-administered mineral estate would have a no surface occupancy stipulation under all alternatives: Lake DeWeese Recreation Area, St. Scholastica, Deer Mountain Fire Station, Odd Fellows Lodge, Five Points Recreation Area, Arkansas Headwaters Recreation Area (14 developed recreation sites), Chaffee and Park County landfills, and Class I (Garden Park) paleo aeas.

The reasonably foreseeable development as identified in Appendix G indicates the projected disturbance resulting from fluid mineral operations would be approximately 20 acres annually or a total of about 400, which would be less than .02 percent of the BLM-administered mineral estate in the planning area.

TABLE 3-11
Analysis of Fluid Minerals Management by Alternative

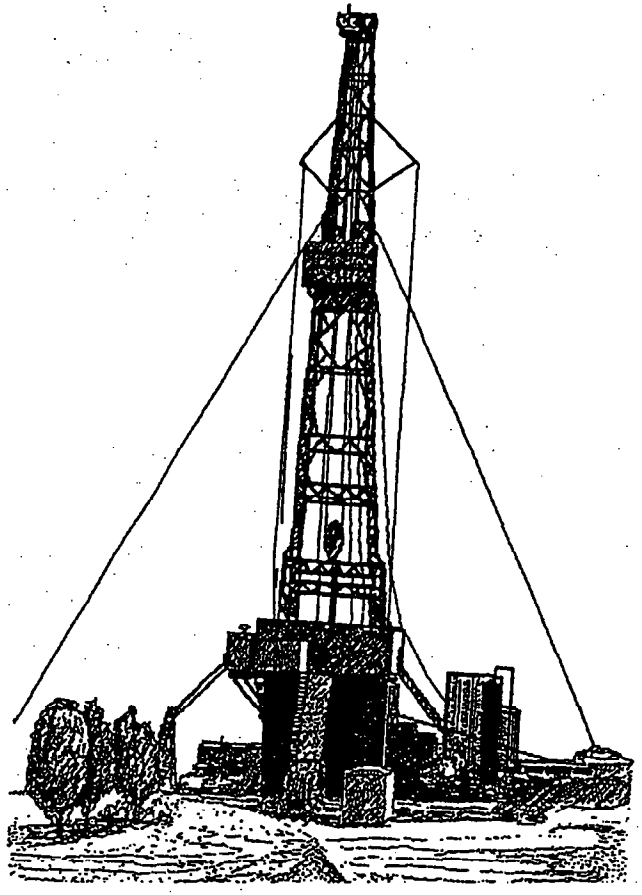
Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Oil and gas leasing would be allowed; protection for other natural values would be provided.	Oil and gas development would be allowed; maximum protection/ enhancement would be provided for other resource values.	Oil and gas development would be encouraged; minimum restrictions necessary to provide protection for other resource values would be imposed on development.	Oil and gas development would be authorized through standard lease procedures with additional mitigation applied where necessary to protect other natural values.
	Fluid mineral development areas and historic fluid mineral development would be interpreted to the public in cooperation with other resource programs.	Interpretation areas would not occur.	Same as Alternative A, except the program would be enhanced and accelerated.	Same as Alternative A.
Allocations	Of 2,562,988 acres of BLM-administered mineral estate, 2,489,972 acres would be open to leasing as follows:	Of 2,562,988 acres of BLM-administered mineral estate, 2,489,972 acres would be open to leasing as follows:	Of 2,562,988 acres of BLM-administered mineral estate, 2,489,972 acres would be open to leasing as follows:	Of 2,562,988 acres of BLM-administered mineral estate, 2,489,972 acres would be open to leasing as follows:
	2,200,864 acres with standard lease terms only;	854,116 acres would be under standard lease terms only;	2,486,718 acres would be under standard lease terms only;	1,715,897 acres would be under standard lease terms only;

Table 3-11(Continued)

Management	Existing - Alternative - A	Resource Conservation - Alternative B	Resource Utlization - Alternative C	Preferred - Alternative D
Allocations (Continue)	4,254 acres with no surface occupancy stipulations; i.e., - High Mesa Grasslands ACEC - Garden Park ACEC.	650,136 acres with no surface occupancy stipulations; i.e., - big game critical winter habitat - big game birthing areas - VRM Class II areas - riparian habitat - wild and scenic river corridors - 14 ACECs - 8 potential NRHP sites - fishery habitat - Mexican spotted owl (one-half mile buffer around core area) - raptor nesting and fledgling habitat (one-fourth mile buffer) - peregrine falcon nesting habitat (one-half mile buffer) - lesser prairie chicken lek (one-fourth mile buffer).	4,254 acres with no surface occupancy stipulations; i.e., - High Mesa Grasslands ACEC - Garden Park ACECS.	37,220 acres with no surface occupancy stipulations; i.e., - High Mesa Grasslands ACEC - Garden Park ACEC - Mosquito Pass ACEC - Droney Gulch ACEC - reservoir and railroad ROWs - raptor nesting and fledgling habitat (one-fourth mile buffer) - Mexican spotted owl (one-half mile buffer around core area) - lesser prairie chicken lek (one-fourth mile buffer).
	284,854 acres with seasonal limitations; i.e.; - big game critical winter range 12/1-4/30 - lesser prairie chicken habitat 3/1-7/31 - least tern/piping plover nesting habitat 4/1 - 7/31 - riparian habitat 5/1-7/31 - raptor nesting and fledgling habitat 2/1-8/15 - bald eagle winter roosting areas (one-half mile buffer) 11/16 - 4/15 - bighorn sheep lambing habitat 4/1-7/1.	985,720 acres with seasonal limitation; i.e., - big game winter habitat 12/1-4/30 - wild turkey winter habitat 12/1-4/1 - lesser prairie chicken habitat 3/1-7/31 - least tern/piping plover nesting habitat 4/1 - 7/31 - ferruginous hawk nesting and fledgling habitat 2/1-8/15 - Mexican spotted owl habitat 2/1 - 7/31 - bald eagle winter roosting habitat, 11/16-4/15 - peregrine falcon habitat 3/16-7/31.		412,517 acres with seasonal limitations; i.e., - big game birthing areas (by species) - elk calving and deer birthing 4/16 - 6/30 - pronghorn antelope fawning 5/1 -7/15 - bighorn sheep lambing 5/1-7/15 - wild turkey winter habitat 12/1 - 4/1 - big game critical winter habitat 12/1-4/30 - Mexican spotted owl habitat 2/1 - 7/31 - bald eagle winter roosting habitat (one-half mile buffer) - lesser prairie chicken habitat 3/1-7/31 - least tern/piping plover nesting habitat 4/1 - 7/31. - peregrine falcon nesting habitat 3/16-7/31
				324,338 acres with controlled surface use stipulation; i.e., - riparian areas - VRM Class II areas.

Table 3-11(Continued)

Management	Existing - Alternative - A	Resource Conservation - Alternative B	Resource Utlization - Alternative C	Preferred - Alternative D
Actions	The Sheep Mountain showcase area would be continued.	The Sheep Mountain showcase area would be discontinued.	The Sheep Mountain showcase area would be emphasized in various resource programs. Other showcase projects would be considered on a case-by-case basis.	Same as Alternative C.



Locatable Minerals Management

Locatable minerals would continue to be managed under 43 CFR 3809 regulations. All areas within the resource area, unless specifically withdrawn from mineral entry or seasonally limited, would be open. Closures would be made through withdrawals. Operations conducted under 3809 regulations shall conform with specified seasonal limitations to avoid unnecessary and undue degradation. In all disturbed areas, DPC would be determined. Operations failing to follow or provide reasonable mitigation may be subject to the nonconformance provisions as identified in 43 CFR 3809.3-2. Those areas identified within WSAs (70,984 acres) would be managed under the 43 CFR 3802 regulations. Locatable minerals within any area designated wilderness would be managed according to the specific wilderness legislation. Class I paleo areas and developed recreation sites would be closed to mineral entry. This management would be the same in all alternatives. See Appendix H for more details.

TABLE 3-12
Analysis of Locatable Minerals Management by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Areas open to mineral entry would be administered under the existing regulations and limited by current closures.	Mineral entry would be allowed; maximum protection/ enhancement would be provided to other resource values.	All areas within the resource planning area would be open to mineral entry; existing laws and regulations (i.e., 3809) would protect other resource values. Development or enhancement of mineral-oriented recreational or interpretive programs would be developed.	Areas open to mineral entry would be administered under the existing regulations and limited by closure if necessary. Special mitigation would be developed to protect other identified values on a case-by-case basis.
Allocations	Of 653,000 acres of BLM-administered potential locatable minerals, 648,761 acres would be open for mineral entry, and 4,239 acres would continue to be closed to mineral entry	Of 653,000 acres of BLM-administered potential locatable minerals, 332,426 acres would be open to mineral entry, and 187,597 acres would be closed to mineral entry.	Of 653,000 acres of BLM-administered land, all acres would be open to mineral entry.	Of 653,000 acres of BLM-administered potential locatable minerals, 435,180 acres would be open to mineral entry, and 84,843 acres would be closed to mineral entry.
	4,239 acres would continue to be closed to mineral entry - High Mesa Grassland ACEC - Garden Park ACEC.	187,597 acres would be closed to mineral entry: - VRM Class II areas - big game birthing areas - 14 ACECs - 2 wild and scenic river corridors - 8 potential NRHP sites - fishery habitat - riparian areas	Same as Alternative A.	84,843 acres would be closed to mineral entry: - big game birthing areas - 7 ACECs - 8 potential NRHP sites - fishery habitat - riparian areas.

Table 3-12 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)		132,977 acres would be seasonally limited to mineral operations through claimnant notification: - big game winter habitat 12/1-3/31 - wild turkey winter habitat 12/1-4/1 - lesser prairie chicken habitat 3/1-7/31 - least/tern/piping plover nesting habitat 4/1-7/31 - raptor nesting/fledgling areas 2/1 - 8/15 - ferruginous hawk nesting/ fledgling areas 2/1-8/15 - Mexican spotted owl habitat 2/1-7/31 - bald eagle winter roosting areas 11/16-4/15 - peregrine falcon habitat 3/16-7/31.		Same as Alternative B. 51,097 acres in 3 ACECs would be covered by a plan of operation
Actions	Current mineral entry closures would be continued; proposed withdrawals would be considered on a case-by-case basis	Existing closures would be reviewed and those different from the closures listed under allocations would be removed	All current closures to mineral entry would be recommended for removal, except class I paleo areas. Other mineral-oriented projects; i.e., interpretive historical mine areas, recreational mineral collecting, gold panning, and geological interpretive programs would be developed in cooperation with other resource programs.	Same as Alternative B.

Mineral Materials Management

Salable minerals would continue to be managed under the 43 CFR 3600 in all alternatives. In all disturbed areas, DPC would be determined. Disposal of mineral materials would not occur within WSAs (70,984 acres). Class I paleo areas and developed recreation sites would be closed to disposal of mineral materials in all alternatives.

TABLE 3-13
Analysis of Mineral Materials Managment by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Activities would be administered on a case-by-case basis; other resource values would be mitigated for each specific proposal.	Areas with critical resource values would be closed to mineral materials development.	The planning area would be open to development; other resource values would be mitigated through existing regulations.	The planning area would be open to development; mitigation or closures would be applied if necessary to protect other natural values. Preferred areas of sales would be identified.
Allocations	Of 653,000 acres of BLM-administered mineral materials, 648,761 acres would be available for disposal on a case-by-case basis.	Of 653,000 acres of BLM-administered mineral materials, 332,426 acres would be available for disposal under standard stipulations.	Same as Alternative A.	Of 653,000 acres of BLM-administered mineral materials, 435,180 acres would be available for disposal under standard stipulations.
	4,239 acres would be closed to - mineral materials disposal - High Mesa Grassland ACEC - Garden Park ACEC.	187,597 acres would be closed to - mineral materials disposal - VRM Class II areas - big game birthing areas - 14 ACECs - 2 wild and scenic river corridors - 8 potential NRHP sites - fishery habitat - riparian areas.	Same as Alternative A except 5 additional NRHP sites would be considered on a case-be-case basis.	84,843 acres would be closed to - mineral materials disposal - big game birthing areas - 7 ACECs - 8 potential NRHP sites - fishery habitat - riparian areas.

Table 3-13 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternativer C	Preferred Alternative
Allocations (Continued)	0 acres under seasonal limitations.	132,977 acres under seasonal limitations; - big game winter habitat 12/1-3/31 - wild turkey winter habitat 12/1-4/1 - lesser prairie chicken habitat 3/1-7/31 - least tern/piping plover nesting habitat 4/1-7/31 - raptor nesting/fledgling areas 2/1-8/15 - ferruginous hawk nesting/ fledgling areas 2/1-8/15 - Mexican spotted owl habitat 2/1-7/31 - bald eagle winter roosting areas, 11/16-4/15 - peregrine falcon habitat 3/16-7/31.	Same as Alternative A.	Same as Alternative B.
Actions	Existing common use areas and community pits would be continued.	Existing common use areas and community pits would be eliminated where critical resource values would be adversely affected; these would be developed if resource values would be enhanced.	Community gravel pits and common use areas would be developed proactively.	Area-wide activity plan to locate and establish community mineral material pits would be developed.
			One mineral materials showcase project would be developed in cooperation with other resource programs.	Same as Alternative C.

Coal Minerals Management

Existing leases would be continued in all alternatives. In all disturbed areas, DPC would be determined. The coal screening process would be used in all alternatives to determine areas to be further considered for leasing. Only areas with potential for development would be considered; areas that meet the 20 standard coal unsuitability criteria would be further considered; areas that pass the surface owner screen would then be further considered. Areas acceptable for coal leasing would be prioritized for timely scheduling and completion of data collection. Appendix I of this document contains more detailed information.

TABLE 3-14
Analysis of Coal Minerals Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	New leases would be issued on a case-by-case basis and would require a plan amendment.	Areas would be identified for further consideration of future coal leasing; coal unsuitability criteria would provide protection of resource values. Maximum protection for surface owners, special status animal habitat, big game birthing and critical winter habitat, and VRM Class II areas would be provided.	Areas would be identified for further consideration of future coal leasing; coal unsuitability criteria would provide protection of resource values.	Same as Alternative C.
Allocations	The total 131,000 acres of BLM-administered coal would be suitable for further consideration for underground or surface mining.	Of 131,000 acres of BLM-administered coal, approximately 53,000 acres would be suitable for further consideration for underground or surface mining - 167 acres of big game birthing habitat would be suitable but unavailable for surface mining - 23,788 acres of big game critical winter habitat would be suitable but unavailable seasonally - 29,045 acres would be suitable and available for surface mining. Approximately 78,000 acres would be available for further consideration for underground mining only.	Same as Alternative A.	Same as Alternative B, except 23,788 acres of big game critical winter habitat would be available.
Actions	Specific proposals would be considered on a case-by-case basis.	The coal screening process would be applied. The first three coal screens would be applied. The fourth screen would be applied to screen out all unincorporated communities (subdivisions), big game birthing, big game critical winter habitat, and VRM Class II areas (Appendix I).	Same as Alternative A	Same as Alternative B.

Paleontological Resources

Paleontology would be managed in accordance with existing BLM manual guidance in all alternatives, which requires clearances and necessary mitigation in class I areas identified as having potential for discovery of scientifically significant fossils. Guidance also outlines procedures required for paleontological permitting. Existing inventories would be updated as needed. Various educational programs using paleontological resources could be developed on a case-by-case basis. A visitor center would be established in the Garden Park Paleo Area, and this area would be designated an ACEC. Class I paleo areas (Garden Park) would be leased for fluid minerals with NSO stipulations and closed to mineral entry and to mineral materials disposal in all alternatives. Class I paleo areas also would be retained in public ownership and have limitations on OHV use to designated roads and trails.

TABLE 3-15
Analysis of Paleontological Resources by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Utilization of paleo resources for educational and research purposes would be encouraged with special emphasis on the Garden Park Paleo Area.	Paleo resources would be protected for scientific research purposes.	Same as Alternative A.	Utilization of paleo resources for educational, research, and other public uses such as tourism would be encouraged with special emphasis on the Garden Park Paleo Area.
Allocations		Class I area (2,728 acres) would be protected from timber harvesting and wood gathering.		Same as Alternative B.
Actions			Establishment of invertebrate collecting areas would be considered through activity plans.	Establishment of invertebrate collecting areas to provide fossil materials for public domain collections at area; regional schools would be considered through integrated activity plans. Cyclic inventories of Class I and some Class II paleo areas would be conducted.

Historical Resources

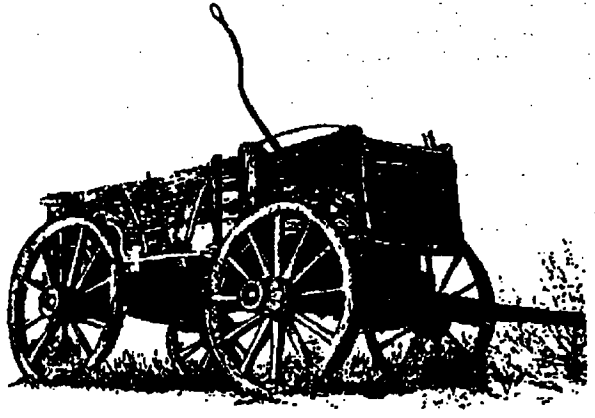
All historical sites/districts would receive protection in compliance with procedures in Sections 106 and 110 of the *National Historic Preservation Act.*

TABLE 3-16
Analysis of Historical Resources by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Information potential would be used for interpretation and scientific values.	Same as Alternative A.	Information potential would be developed to the maximum extent possible through appropriate study	Same as Alternative A
	Sites would be used for their interpretive value.	Same as Alternative A.	Resources would be managed extensively to provide for educational, scientific, and recreational purposes	Same as Alternative A
		Conservation of historical sites through preservation and stabilization would be emphasized through protective restrictions.		
Allocations	Conservation of historical resources would be provided through designation of Garden Park ACEC - 2,728 acres.	Conservation of historical resources would be provided through: - designation of Mosquito Pass, Browns Canyon, Arkansas Canyonlands, Phantom Canyon, Garden Park, Cucharas Canyon, Beaver Creek, Grape Creek ACECs; Six potential NRHP sites/districts would be protected as follows: - NSO for fluid minerals; - closed to mineral entry - no disposal of minerals materials on 2,960 acres: (Florence and Cripple Creek RR railbed, segments, bridges, abutments/ tunnels - 960 acres; Garden Park Historical Dinosaur dig sites - 320 acres; Leadville stage road/ settlement sites - 320 acres; Midland RR railbed segments/ abutments, 480 acres; Denver and Rio Grande RR railbed segments/ abutments - 720 acres; and all the DeReemer Forts - 160 acres) - OHV use limited to designated roads and trails.	Conservation of historical resources would be provided through: - designation of Garden Park ACEC - 2,728 acres - disposal of minerals materials on a case-by-case basis on five NRHP sites/districts - 2,640 acres.	Same as Alternative B except NSO would not be used for fluid mineral mitigation.

Table 3-16 (Continued)

Management	Existing - Alternativer A	Resource Conservation Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Actions	Reactive inventories would be conducted as needed.	Active patrol and surveillance would be conducted for significant sites. Appropriate techniques would be used to stabilize deteriorating sites.	Information potential would be promoted through involvement with interested universities. Active programs for interpretive scientific and recreational use of historic sites would be developed.	Same as Alternative C.



Archaeological Resources

All archaeological sites/districts would receive protection in compliance with procedures in Section 106 of the *National Historic Preservation Act*. Archaeological resources would be inventoried. National Register of Historic Places (NRHP) sites would be retained in BLM-administration in all alternatives.

TABLE 3-17
Analysis of Archaeological Resources by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Information potential would be preserved for the future, but minimally utilized for educational/ research purposes.	Information potential would be developed to the maximum extent possible through appropriate study.	Same as Alternative B.	Same as Alternative B.
	Resources would be preserved for the future.	Conservation of sites would be emphasized through preservation and stabilization.	Resources would be managed intensively to fully provide for recreational purposes.	Same as Alternative A.
Allocations	Conservation of archaeological resources would be provided through designation of Garden Park ACEC - 2,728 acres.	Conservation of archaeological resources would be provided through - designation of five ACECs: Arkansas Canyonlands, Phantom Canyon, Garden Park, Cucharas Canyon, and Badger Creek. Two NRHP potential sites/ districts - 8,800 acres (Badger Creek 7,200 acres and Cucharas Canyon 1,600 acres) would be protected as follows: - NSO for fluid minerals - no entry for locatables - no disposal of mineral materials - OHV use limited to designated roads and trails.	Conservation of archaeological resources would be provided through - designation of Garden Park ACEC - 2,728 acres; - standard stipulations for fluid minerals leasing - case-by-case analysis of disposal of mineral materials on two NRHP potential sites/districts on 8,800 surface acres (Badger Creek - 7,200 acres and Cucharas Canyon - 1,600 acres).	Same as Alternative B except 2 NRHP (8,800 acres) sites would be leased for fluid minerals under standard stips.
Actions	Reactive inventories would be conducted as needed.	Active patrol and surveillance would be conducted for significant sites Appropriate techniques would be used to stabilize and preserve deteriorating sites.	Information potential would be promoted through involvement with interested educational entities. Active programs for interpretive and recreational use of archaeological sites.	Same as Alternative C.

Transportation and Access Management

Access to BLM-administered lands would be primarily provided by county roads in all alternatives. Other means of obtaining public access would be investigated and documented within the transportation plan. Miles shown are the maximum expected and may include multiple routes believed necessary for adequate access. Acres are the approximate land area presently inaccessible that would become accessible. Roads and trails on BLM-administered lands would be maintained by the appropriate holder of rights. BLM would maintain those transportation system roads and trails needed for agency resource management and public use. Unneeded and unmaintained roads and trails would be closed and reclaimed. Vehicle use would be limited seasonally, as needed, by public notice. Comprehensive transportation planning would be maintained.

TABLE 3-18
Analysis of Transportation and Access Management by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Transportation (roads and trails) system as it currently exists would be maintained. Maintenance would occur on an as-needed or emergency basis.	Transportation system would be improved and maintained according to resource ranking for this alternative to provide for management of critical resources. A maintenance schedule would be established for BLM-system roads on an average of once every 5 years.	Same as Alternative B except maintenance would be based on a 50-year schedule.	Transportation system would be improved and maintained to facilitate public access and administrative monitoring as well as minimizing roads on BLM-administered lands. A maintenance schedule would be established for BLM-system roads on an average of once every 10 years. Roads not maintained in good condition under this schedule would either have limited use or be closed and reclaimed.
	New access would be provided on a case-by-case basis or as funding allows and would include new road construction, easement acquisiton, trails, etc.	New access would be provided according to resource ranking.	Same as Alternative B.	New access would be provided to all BLM-administered lands identified for retention and multiple use management guided by recreation needs (ROS). Public (exclusive) easements would be used where ever public resources are available and public access is needed. Administrative (nonexclusive) easements would be used where there is no public access need and only BLM employee, contractor, and licensee access is needed.

Table 3-18 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives (Continued)	Unnecessary roads would closed and rehabilitated on a case-by-case basis for mitigation of specific problems.	Unnecessary or unmaintained existing roads would be closed and rehabilitated in special status plant/animal species habitat, riparian, sensitive soils/water quality, wildlife/ fishing habitat, and paleo/ historical/ archaeological areas.	Same as Alternative A.	Unnecessary or unmaintained existing roads would be closed and rehabilitated as appropriate. Only Federal, state, county, BLM-system roads, and roads with valid rights-of-way for maintenance would remain open.
	Specific problem mitigation would occur through signing, fencing, and marking boundaries.	Signing, fencing, and marking boundaries would continue according to resource ranking.	Same as Alternative B.	Signing, fencing, and marking boundaries would continue on all BLM-administered land identified for retention and multiple use management. The degree of access would be guided by the designated recreation opportunity spectrum; i.e., - Wilderness - 5-mile access points - SPNM - 5-mile access points - SPM - 3-mile access points - RN - 1-mile access points.
Allocations	Permanent transportation system would include: - BLM system roads/trails 263 miles - non-BLM authorized public roads 132 miles - non-BLM unauthorized public roads 73 miles - private authorized roads/trails 15 miles - private unauthorized roads/trails 470 miles - corporate authorized roads/ railroads 89 miles -corporate unauthorized roads/ railroads 14 miles - total BLM system roads, trails, and railroads) 1,056 miles - total BLM system roads/trails to be maintained 263 miles.	Permanent transportation system would include: - BLM system roads/trails 316 miles - non-BLM authorized public roads 132 miles - non-BLM unauthorized public roads 73 miles - private authorized roads/trails 15 miles - private unauthorized roads/trails 0 miles - corporate authorized roads/ railroads 89 miles -corporate unauthorized roads/ railroads 14 miles - total BLM system roads, trails, and railroads) 625 miles - total BLM system roads/trails to be maintained 302 miles.	Permanent transportation system would include: - BLM system roads/trails 258 miles - non-BLM authorized public roads 132 miles - non-BLM unauthorized public roads 73 miles - private authorized roads/trails 15 miles - private unauthorized roads/trails 470 miles - corporate authorized roads/ railroads 89 miles -corporate unauthorized roads/ railroads 14 miles - total BLM system roads, trails, and railroads) 1,051 miles - total BLM system roads/trails to be maintained 728 miles.	Permanent transportation system would include: - BLM system roads/trails 314 miles - non-BLM public authorized roads 132 miles - non-BLM unauthorized public roads 73 miles - private authorized road/trails 15 miles - private unauthorized roads/trails 240 miles - corporate authorized roads/ railroads 89 miles -corporate unauthorized roads/ railroads 14 miles - total BLM system roads, trails, and railroads) 877 miles - total BLM system roads/trails to be maintained 554 miles.

Table 3-18 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)	New access would include: Priority areas: - Twin Mountain - 3.5 miles; 8,000 acres - Big Hole - 3 miles; 18,000 acres - Barnard Creek/Booger Red - 4 miles; 9,000 acres.	New access by easement acquisition or new construction would include: Priority areas: -Twin Mountain - 3.5 miles; 8,000 acres - Big Hole - 3 miles; 18,000 acres - Barnard Creek/Booger Red - 4 miles; 9,000 acres - 31 Mile Mountain/Mill Gulch - 4 miles; 5,000 acres - Rye Slough - 6 miles; 3,400 acres - Grape Creek - 6 miles; 19,000 acres - Beaver Creek - 13.5 miles; 15,000 acres - Arkansas River sites - 2 miles; 4,000 acres - Mt. Mestas - 5 miles; 3,800 acres - Sheep and Little Sheep Mountain - 3 miles; 5,100 acres.	New access by easement acquisition or new construction would include: Priority areas: - Garden Park - 4 miles; 0 acres - Calcite area - 1 mile; 1,800 acres - West Waugh Mountain - 1 mile; 1,400 acres.	New access by easement acquisition or new construction would include: Priority areas: - Twin Mountain - 3.5 miles; 8,000 acres - Big Hole - 3 miles; 18,000 acres - Barnard Creek/Booger Red - 4 miles; 9,000 acres - Calcite area - 1 mile; 1,800 acres - West Waugh Mountain - 1 mile; 1,400 acres - Garden Park - 4 miles; 0 acres - 31 Mile Mountain/Mill Gulch - 4 miles; 5,000 acres - Rye Slough - 6 miles; 3,400 acres - Grape Creek - 6 miles; 19,000 acres - Beaver Creek - 13.5 miles; 15,000 acres - Arkansas River sites - 2 miles; 4,000 acres - Mt. Mestas - 5 miles; 3,800 acres - Sheep and Little Sheep Mountain - 3 miles; 5,100 acres.
	BLM-administered land in the retention category with adequate, permanent, legal public access would be 78 percent.	BLM-administered land in the retention category with adequate, permanent, legal public access would be 79 percent.	BLM-administered land in the retention category with adequate, permanent, legal public access would be 73 percent.	BLM-administered land in the retention category with adequate, permanent, legal public access would be 87 percent.

Rights-of-Way Management

Existing rights-of-ways (ROWs) and the 1986 Western Utility Group (WUG) study would be considered in all alternatives when designating utility corridor locations.

Corridors for major ROWs. The preferred location for future major ROW grants.

Avoidance areas for major ROWs. Areas with values that *could* be adversely affected by new major ROW grants. These are areas where future major ROWs and areal sites (i.e., communication sites and reservoirs) could be granted only when a feasible alternative route or designated corridor is unavailable.

Exclusion areas for major ROWs. Areas with values that *would* be adversely affected by new major ROW grants. These are areas where future major ROWs and areal sites would not be granted, unless mandated by law. WSAs (70,984 acres) would be treated as exclusion areas in all alternatives.

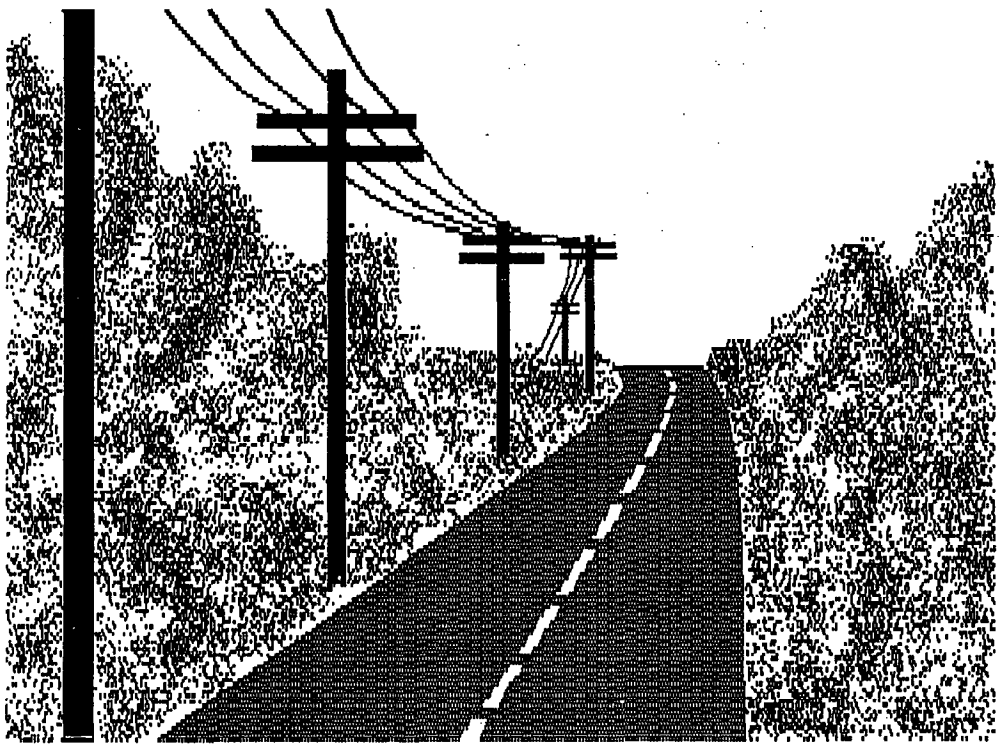
Minor ROWs. These ROWs and areal sites would be allowed only when a clear need is demonstrated, and the beneficial environmental effects outweigh the costs. They would be authorized on a case-by-case basis utilizing criteria in the Objectives below.

TABLE 3-19
Analysis of Rights-of-Way Management by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Corridor applications would be considered on a case-by-case basis. Existing major ROWs would be managed as corridors for future projects. Width would be limited to the grant width.	Corridors would be designated with emphasis on avoidance and exclusion to prevent resource damage. Designated corridors would be limited to one-quarter mile width.	WUG study recommendations for corridor designation would be adopted. The corrridors would be 3 miles wide.	WUG study recommendations for corridor designation would be adopted with addition of existing transportation utility corridors. The corridors would be limited to 2 miles wide.
	ROWs would be authorized on a case-by-case basis. Attempt would be made to mitigate or avoid conflicts with resources.	ROWs would be authorized on a case-by-case basis only if resource values could be protected by exclusion and avoidance.	ROWs would be authorized on a case-by-case basis with a minimum of restrictive stipulations, including criteria for avoidance and exclusion designations.	ROWs would be authorized on a case-by-case basis only when avoidance and exclusion designation criteria are protected and when additional stipulations protect resources and values not included in the criteria.
Allocations	Exclusion areas (0 acres).	Exclusion areas (340,350 acres) would include: - special status plant and animals - critical big game birthing areas - NRHP sites - ACECs with VRM II - 14 developed recreation sites - wild and scenic river corridors.	Same as Alternative A.	Exclusion areas (264,462 acres) would include: - special status plant and animals - NRHP sites

Table 3-19 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)				
	Avoidance areas (4,318 acres) would include: - 2 ACEC s (Garden Park Paleo Area and High Mesa Grassland) - 14 developed recreation sites.	Avoidance areas (241,666 acres) would include: - riparian areas - ACECs with VRM III - SRMAs - critical big game winter habitat.	Avoidance areas (80 acres) would include: - 14 developed recreation sites.	Avoidance areas (52,358 acres) would include: - 14 developed recreation sites - ACECs with VRM II - critical big game birthing habitat.
	Designated corridors (0 acres).	Same as Alternative A.	Designated corridors (47,992 acres).	Designated corridors (24,938 acres).
	Unrestricted areas (577,698 acres).	Unrestricted areas (0 acres).	Unrestricted areas (533,944 acres).	Unrestricted areas (240,258 acres).



Land Ownership Adjustments

In all alternatives, land ownership adjustment opportunities (by sale, exchange, or acquisition) would be used to improve BLM-administered land patterns for management efficiency, to enhance public values, and to reduce potential for land use conflicts meeting the criteria established in FLPMA, Sec. 203:
Category I lands are: land, because of location or other characteristics, difficult and uneconomical to manage and unsuitable for mangement by another Federal entity; e.g., urban areas, agricultural lands, commercial areas, individual areas; BLM-administered land acquired for a specific purpose, and no longer required for that or any other Federal purpose; disposal would serve important public objectives that could not be achieved prudently or feasibly on land other than that administered by BLM; and other public objectives and values, which would be served by maintaining the tract in Federal ownership, are outweighed;
Category II lands are: lands to be retained or exchanged for other lands within a Category II area. Non-Federal lands in these areas could be acquired from willing sellers by any number of methods.
Category III lands are: lands difficult and uneconomical to manage because of land pattern and/or access problems and lands with public values that would be more appropriate to exchange for other lands with greater public value, which could be managed more effectively.

Acquisition from willing sellers would occur to meet priority needs for resource management. Suitability for disposal by specific authority would be determined on a case-by-case basis through NEPA compliance.

In all land ownership adjustments, it would be desirable to avoid splitting surface and mineral estate, and it would also be desirable to reunite split estate through acquisition or disposal when opportunities arise and appropriate regulatory requirements are met. Developed recreation sites would be retained in public ownership.

TABLE 3-20
Analysis of Land Ownership Adjustments by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Parcels/areas difficult and uneconomical to manage with no significant resource values would be identified for sale. Exhange could be used when the result is clearly in the best interest of the public and BLM management would be improved. Areas identified for retention or acquisition would provide values for public use or have public access. Natural resource values and commodity values would be considered equally in analyzing proposals on a case-by-basis.	Same as Alternative A, except natural resource values would have higher priority than commodity values.	Same as Alternative A, except commodity values would have higher priority than resource values..	Same as Alternative A, except provision would be made for a mixture of public use.

Table 3-20 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations	Category I lands (approximately 71,500 acres) would be identified for disposal if they meet FLPMA criteria,but are not valued for the following resources: - Lands with resource values listed below: primitive areas, SPNM, SPM, and SRMAs big game birthing and critical winter habitat riparian areas or wetlands special status plant and animal species 2 ACECs Class II VRM areas productive forestland Improve category grazing allotments NRHP eligible cultural or historical sites high potential mineral areas reviewed and valid withdrawals - FLPMA criteria would be applied on a case-by-case basis as land ownership adjustment opportunities develop (usually by request).	Category I lands (33,056 acres) would be identified for disposal if they meet FLPMA criteria, but are not valued for the following resources: - Lands with resource values listed below: special status plant and animal species wild and scenic river corridors riparian areas or wetlands big game birthing and critical winter habitat 14 ACECs Class II VRM areas primitive areas, SPNM, SPM, and SRMAs NRHP eligible cultural and historical sites Improve category grazing allotments productive forestland high potential mineral areas reviewed and valid withdrawals.	Category I lands (102,553 acres) would be identified for disposal if they meet FLPMA criteria, but are not valued for the following resources: - Lands with resource values listed below: special status plant and animal species 2 ACECs NRHP eligible cultural and historical sites riparian acres or wetlands. high potential mineral areas reviewed and valid withdrawals	Category I lands (83,134 acres) would be identified for disposal if they meet FLPMA criteria, but are not valued for the following resources: - Lands with resource values listed below: special status plant and animal species wild and scenic river corridors wilderness study areas NRHP eligible cultural and historical sites.
	Category II lands (approximately 563,500 acres) with resource values listed in Category I would be identified for retention or exchange.	Category II lands (616,187 acres) with resource values listed in Cateogry I would be identified for retention or exchange.	Category II lands (420,003 acres) with resource values listed in Cateogry I would be identified for retention or exchangec.	Category II lands (462,141 acres) with resource values listed in Cateogry I would be identified for retention or exchange.
	Category III lands (approximately 18,000 acres) with resource values listed in Category I would be identified for disposal through exchange, R&PP lease, or transfer.	Category III lands (3,757 acres) would be those lands with resource values listed in Category I and not identified as Category I or II.	Category III lands (130,444 acres) with resource values listed in Category I would be identified for disposal through exchange, R&PP lease, or transfer.	Category III lands (107,725 acres) with resource values listed in Category I would be identified for disposal through exchange, R&PP lease, or transfer and not identified as Category I or II.

Withdrawals and Classifications

All classifications and withdrawals would be reviewed periodically to determine whether they should be continued, modified, or revoked/terminated.

Withdrawals to protect special values such as recreation and wildlife would preclude settlement, sale, location, or entry under the general land laws, including the mining laws (30 U.S.C. Ch. 2). Withdrawals to protect waterpower/reservoir values would preclude settlement, sale, location, or entry under the general land laws, including the mining laws. Mineral entry, however, would be permitted under the provisions of P.L. 359. Withdrawals for Public Water Reserves would prevent any activities that would disturb or destroy Federal interest in waters on BLM-administered lands. These withdrawals are not open to nonmetaliferous mineral entry. All withdrawals for other agencies (approximately 158,000 acres) would be continued subject to periodic review. If withdrawals of BLM-administered land are relinquished, these lands would be managed according to applicable management prescription described in this plan.

Classifications for R&PP leases would be allowed only on Category I and III lands as prescribed in the Land Ownership Adjustment section. *Classification and Multiple Use Act* (CMU) classifications would be reviewed and replaced, as appropriate, by more recent authorities.

TABLE 3-21
Analysis of Withdrawals and Classifications by Alternative

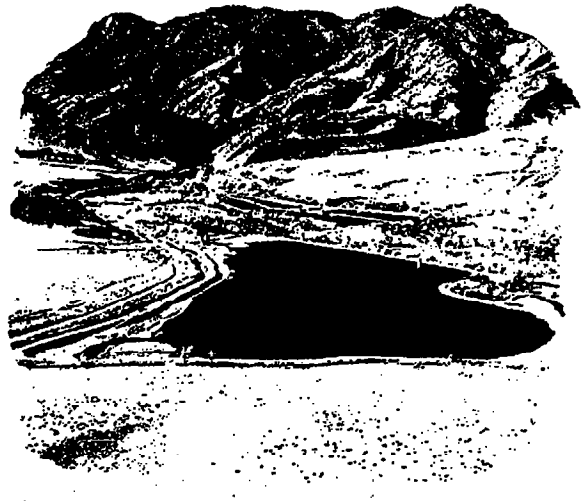
Management	Existing - Alternativer A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Current withdrawals and classifications on BLM-administered lands would continue, subject to periodic review.	Withdrawals to protect waterpower/ reservoir interests along the Arkansas River would be recommended for termination.	Current withdrawals of BLM-administered lands would be recommended for revocation, except waterpower/reservoir withdrawals, which would continue.	Same as Alternative A.
	New withdrawals would be considered on a case-by-case basis.	Withdrawals would be initiated for all unprotected lands recommended for special designation and for areas with other critical resource needs.	Withdrawals would be initiated to protect important waterpower/ reservoir potential.	Withdrawals would be initiated to protect special values in the Arkansas River SRMA and 3 ACECs.
Allocations	Existing BLM withdrawals would be : - other withdrawals continued 3,596 acres - waterpower/reservoir withdrawals continued 7,994 acres.	Existing BLM withdrawals would be : - other withdrawals continued 3,596 acres - water/power reservoir withdrawals terminated 6,753 acres - waterpower/reservoir withdrawals continued 1,241 acres.	Existing BLM withdrawals would be : - other withdrawals continued 2,496 acres - other withdrawals revoked 1,100 acres - waterpower/reservoir withdrawals continued 7,994 acres.	Same as Alternative B.
	New BLM withdrawals would be initiated: 2,728 acres.	New BLM withdrawals would be initiated: 110,571 acres .	New BLM withdrawals would be initiated: 2,728 acres.	New BLM withdrawals would be initiated: 77,046 acres .

Waterpower/Reservoir Resources

All waterpower/reservoir withdrawals would be reviewed to determine if they are still warranted. Appropriate action would be taken to continue or recommend termination. Levels of management are as follows: Intensive: Areas where waterpower/reservoir is the priority use among a number of others. Restricted: Areas where other resource uses are emphasized in lieu of a permit or license application. Unsuitable: Areas where development of waterpower or reservoirs is excluded or recommended for exclusion.

TABLE 3-22
Analysis of Waterpower/Storage by Alternatives

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Only waterpower/reservoir resources providing significant potential for development would continue.	High emphasis of other resource values would be provided over waterpower/reservoir resources.	High emphasis on waterpower/ reservoir resources as a commodity would be provided over other resource values.	Waterpower/reservoir resources providing significant potential for development would continue; emphasis on recreational values would be provided in the NRA corridor.
Allocations	Management for waterpower/ reservoir sites would occur as follows: - suitable for intensive management (7,994 acres); - suitable for restricted management (0 acres) - unsuitable for management (0 acres).	Management for waterpower/ reservoir sites would occur as follows: - suitable for intensive management (1,241 acres); - suitable for restricted management (0 acres) - unsuitable for management (6,753 acres).	Same as Alternative A.	Same as Alternative B.



Areas of Critical and Environmental Concern Designations

Two areas designated for special management would be designated areas of critical environmental concern (ACECs) in all alternatives. These two areas are High Mesa Grassland, an existing research natural area, and Garden Park Paleontological Area, an existing research natural area and a national natural landmark. Any additional areas meeting relevance and importance criteria would be considered for designation at any time. See Appendix K for more details.

All areas designated an ACEC in any of the alternatives would have all off-highway vehical travel limited to designated roads and trails. Visual rating would be re-evaluated to ensure existing rating is appropriate to protect any outstanding scenic qualities of the area. An integrated activity plan (IAP) would be completed on all areas designated ACECs during the early years of RMP plan implementation. This integrated plan would replace and supercede any multiple overlapping single use activity plans completed on the same area.

TABLE 3-23
Analysis of Areas of Critical and Environmental Concern Designations by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Conservation - Alternative C	Preferred - Alternative D
Objectives				
High Mesa Grassland	Sensitive and unique resources would be managed to protect, enhance, and interpret the scenic values, key raptor habitat, unique relict plant community, and would receive special management as an area of critical environmental concern (ACEC).	Same as Alternative A.	Same as Alternative A.	Same as Alternative A; plus this unit would be combined with Arkansas Canyonlands.
Garden Park Paleontological	Sensitive and unique resources would be managed to protect, enhance, and interpret the nationally significant paleontological values, rare fossils, a threatened and endangered plant, and would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
Browns Canyon	Sensitive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the scenic values, and endangered peregrine falcon and bighorn sheep habitat, and would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives (Continued)				
Beaver Creek	Sensitive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the scenic values, endangered peregrine falcon, bighorn sheep, mountain lion habitat, and threatened Mexican spotted owl habitat. The watershed would be managed to protect significant fisheries and riparian values. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.
Grape Creek	Sensitive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the scenic values and endangered peregrine falcon and bighorn sheep habitat. The watershed would be managed to protect significant fisheries and riparian values. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.
Phantom Canyon	Sensitive resources would be managed under existing plans, laws, and regulations and would not receive special management as an ACEC. This area would continue to be managed as part of the Gold Belt National Back Country Scenic Byway and as a special recreation management area (SRMA).	Sensitive resources would be managed to protect and enhance the scenic, historical, paleontological, and riparian values and threatened Mexican spotted owl habitat. The area would continue to be managed as part of the Gold Belt National Back Country Scenic Byway, as an SRMA, and would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.
Droney Gulch	Sensitive resources would be managed under existing plans, laws, and regulations and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the rare population of a threatened and endangered plant species and would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives (Continued)				
Mosquito Pass	Sensitive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the scenic and historic values as well as the candidate threatened and endangered plant species. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.
Cucharas Canyon	Sensitive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the scenic, historic, archaeologic, and significant riparian values. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B.
La Veta Pass	Sensistive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance big game habitat, scenic values, and rare geologic features. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative A.
Badger Creek	Sensistive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect and enhance the watershed, archaeological, riparian, and fishery values. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative A.
Twin Mountain	Unique resources would be managed under existing plans, laws, and regulations and would not receive special management as an ACEC.	Unique resources would be managed to protect, enhance, and interpret the significant and unique geological features. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative A.
Wellsville Area	Unique resources would be managed under existing plans, laws, and regulations and would not receive special management as an ACEC.	Unique resources would be managed to protect, enhance, and interpret the significant and unique geological features. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative A.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives (Continued)				
Arkansas Canyonlands	Sensistive resources would be managed under existing plans, laws, and regulations, and would not receive special management as an ACEC.	Sensitive resources would be managed to protect, enhance, and interpret the significant scenic, historic, and archaeological values, the threatened and endangered peregrine falcon, key raptor, and bighorn sheep habitat, and important fisheries. Additional public access along a nationally significant recreational river would be considered. The area would receive special management as an ACEC.	Same as Alternative A.	Same as Alternative B except the gorge area down river from the Parkdale bridge would be dropped, and High Mesa Grassland would be combined with the remaining area.
Allocations				
High Mesa Grasslands	This 1,510-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A except livestock grazing would be excluded.	Same as Alternative A.	Same as Alternative A, except this 1,510-acre area would be combined with Arkansas Canyonlands, would not be retained under BLM-administration, and livestock grazing would be limited.
Garden Park Paleo	This 2,728-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A except livestock grazing would be excluded.	Same as Alternative A.	Same as Alternative A except livestock grazing would be limited.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)				
Browns Canyon	This 11,697-acre area would not be designated an ACEC.	This 11,697-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative B except fluid minerals would be leased under standard stips.
Beaver Creek	This 12,081-acre area would not be designated an ACEC.	This 12,081-acre area would be designated an ACEC. Livestock grazing would be excluded; the area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources	Same as Alternative A.	Same as Alternative B except fluid minerals would be leased under standard stips, and only a portion (5,755 acres) would be excluded from livestock grazing.
Grape Creek	This 15,978-acre area would not be designated an ACEC.	This 15,978-acre area would be designated an ACEC. Livestock grazing would be excluded; the area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Altermative B except fluid minerals would be leased under standard stips, would not be retained in public ownership, and livestock grazing would be limited.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Phantom Canyon	This 6,096-acre area would not be designated an ACEC.	The 6,096-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Altermative B except fluid minerals would be leased under standard stips and area would not be retained in public ownership.
Droney Gulch	This 705-acre area would not be designated an ACEC.	This 705-acre area would be designated an ACEC. Livestock grazing would be excluded; the area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Altermative B except livestock grazing would be limited.
Mosquito Pass	This 4,036-acre area would not be designated an ACEC.	This 4,036-acre area would be designated an ACEC. Livestock grazing would be excluded; the area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, and closed to mineral materials disposal.	Same as Alternative A.	Same as Alternative B.
Cucharas Canyon	This 1,314-acre area would not be designated an ACEC.	This 1,314-acre area would be designated an ACEC. Livestock grazing would be excluded; the area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative B except fluid minerals would be leased under standard stips, would not be retained in public ownership, and livestock grazing would continue.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)				
La Veta Pass	This 3,419-acre area would not be designated an ACEC.	This 3,419-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A	Same as Alternative A
Badger Creek	This 28,660-acre area would not be designated an ACEC.	This 28,660-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, retained in public ownership, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative A.
Twin Mountain	This 1,063-acre area would not be designated an ACEC.	This 1,063-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative A.
Wellsville	This 403-acre area would not be designated an ACEC.	This 403-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative A.

Table 3-23 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)				
Arkansas Canyonlands	This 22,411-acre area would not be designated an ACEC.	This 22,411-acre area would be designated an ACEC. The area would be closed to locatable mineral entry, leased for fluid minerals with NSO stipulations, closed to mineral materials disposal, and timber harvesting and wood gathering would be allowed for enhancement of protected resources.	Same as Alternative A.	Same as Alternative B, except 1,200 acres down river from the Parkdale bridge off U.S. Highway 50 would be dropped and High Mesa Grasslands (1,510 acres) would be combined with this unit for a total of 23,921 acres. Fluid minerals would be leased under standard stipulations, livestock grazing would be limited, and timber and wood gathering would be allowed to enhance wildlife values.

Wild and Scenic River Designations

Special values within the wild and scenic river (W&SR) study segments in the Arkansas River and Beaver Creek corridors would receive some type of protective management. The RGRMP W&SR Study Team determined 20 miles of Beaver Creek and 126 miles of the Arkansas River meet eligibility criteria. The study team also determined 146 stream miles, or approximately 21,931 acres, suitable for W&SR designation. Existing land and water uses and valid existing rights (mining claims, grazing permits, etc.) would continue in most cases with or without W&SR designation. New uses and land developments would conform with general guidelines in the *Wild and Scenic Rivers Act*. Details on the wild and scenic river analysis are in Appendix L.

TABLE 3-24
Analysis of Wild and Scenic River Designations by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C[1/]	Preferred - Alternative D[1/]
Objectives	Eligible and suitable river segments would be managed under a protective management prescription (interim management would continue for 3 years after the approved RMP/ ROD is signed).	Eligible and suitable river segments would be managed under a protective management prescription (interim management would continue until congressional action occurs).	Same as Alternative A.	Same as Alternative A.
Allocations	Recommend 0 miles and acres to Congress for W&SR designation.	The following management would occur: - recommend 20 miles of Beaver Creek and 126 river miles of the Arkansas River for designation as wild and scenic river - all 146 miles (21,931 acres) would be leased with NSO stips, withdrawn from mineral entry, closed to timber harvest, excluded from additional ROWs, closed to land disposal, limit OHV use to designated roads and trails, and approximately 10,966 acres would be closed to mineral materials disposal.	Same as Alternative A.	Same as Alternative A.
Actions	Monitor special values determining eligibility, guided by interim management prescription.	Same as Alternative A, plus a detailed management plan would be developed and followed until congressional action occurs.	Same as Alternative A.	Same as Alternative A.

1/Table 3-28 also describes management for some of these values.

Off-Highway Vehicle Use

All BLM-administered lands in all alternatives would be formally designated in the *Federal Register* as open, limited, or closed. The authorized officer (district manager) would determine on a case-by-case basis special restrictions to be imposed on off-highway vehicle (OHV) related activity causing significant damage to wildlife, cultural, historical, paleontological, or other natural resouces. OHV use would be limited to designated roads and trails during the time of the year when seasonal stipulations are not in effect. Motorized events requiring a special recreation permit could be allowed in areas with limitations at the discretion of the authorized officer and completion of required NEPA documentation. Direct travel to a suitable parking site within 300 feet of an existing or designated road or trail would be authorized if damage to the land or streams would not occur. Emergency limitations or closures (not a part of the OHV designation process) could be imposed by the authorized officer to protect all resource values (43 CFR 8341.2). Colorado State laws regarding motorized vehicle use would be enforced on all BLM-administered lands in all alternatives. In all areas disturbed by OHV activities, the desired plant community (DPC) would be determined, and necessary actions taken to mitigate the impact. Until congressional action occurs, all WSAs (70,984 acres) would be closed to OHV activity. Management actions identified within WSAs would conform with wilderness interim management policies until congressional decision is made regarding designation. If WSAs are not designated wilderness by Congress, OHV travel in these areas would be managed as shown in the Areas of Critical and Environmental Concern section of this chapter. All designated roads and trails in the RGPA would be recommended for inclusion in the Colorado State Master Trails Plan.

TABLE 3-25
Analysis of Off-Highway Vehicle Use by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objective	OHV use (motorized) problems would be resolved on a case-by-case basis. Additional limitations would be placed in areas with existing or expected conflicts.	OHV use would be managed through limitations or closures to protect other resource values.	Recreation OHV (motorized) opportunities would be enhanced. OHV closures or limitations would be utilized only if needed to prevent unnecessary and undue degradation of resources.	Recreation OHV (motorized) opportunities would be enhanced. OHV use would be managed through limitations or closures in areas with special natural or primitive recreational values; responsible OHV use would be encouraged throughout the planning area where use is allowed.

Table 3-25 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations	564,918 acres would be open; 10,240 acres would be seasonally limited (Kerr Gulch and Grand Canyon Hills); 77,842 acres would be closed (Beaver Creek, McIntyre Hills, Browns Canyon, Grape Creek WSAs and Deer Haven and 31 Mile Ranches).	0 acres would be open; 575,158 acres would be limited; limited to designated roads and trails only (ACECs, riparian areas including fishery habitat, SRMAs, Class II VRM areas, and wild and scenic river corridors) and limited seasonally (big game critical and birthing habitat and lesser prairie chicken habitat); and 77,842 acres would be closed (Beaver Creek, McIntyre Hills, Browns Canyon, Grape Creek WSAs and Deer Haven and 31 Mile Ranches).	24,358 acres would be open (OHV recreational areas in the Penrose Chaining, Grand Canyon Hills, Reese Gulch, Texas Creek Gulch, Sand Gulch near Howard, Fernleaf Gulch, and portions of the Gold Belt SRMA); 550,800 acres would be limited; limited to designated roads and trails only (riparian areas, ACECs); the remaining would be limited to existing roads and trails until completion of an IAP, which would change limitation to designated roads and trails; and 77,842 acres would be closed (Beaver Creek, McIntyre Hills, Browns Canyon, Grape Creek WSAs and Deer Haven and 31 Mile Ranches).	16,356 acres would be open (OHV recreational areas in the Penrose Chaining, and portions of Grand Canyon Hills, Reese Gulch, Texas Creek Gulch, and Sand Gulch near Howard); 558,802 acres would be limited; limited to designated roads and trails only (ACECs, riparian areas including stream fishery habitat, developed recreation sites and big game birthing habitat), and limited seasonally (big game critical winter and birthing habitat and lesser prairie chicken habitat); the remaining would be limited to existing roads and trails until completion of an IAP, which would change limitation to designated roads and trails; and 77,842 acres would be closed (Beaver Creek, McIntyre Hills, Browns Canyon, Grape Creek WSAs and Deer Haven and 31 Mile Ranches).
Actions	Authorized officer would determine additional limitations needed to protect values.	Incorporate emphasis for public awareness to national programs; e.g., Tread Lightly, into activity plans.	Same as Alternative B.	Same as Alternative B.
		Develop partnerships with local OHV clubs to assist in coordinating and enhancing OHV opportunities.	Same as Alternative B.	Same as Alternative B.
			IAPs would be developed for the recreational OHV areas and areas with designated roads and trails.	Same as Alternative C.
			Informational materials for motorized OHV opporunities would be developed.	Same as Alternative C.
			Media, informational materials, and possibly physical barriers would be used to encourage users to stay on existing roads in open and limited areas.	Same as Alternative C.

Visual Resource Management

Visual management objective classes would be assigned to all BLM-administered lands in the planning area in all alternatives. The VRM system would be used only as a tool to assist land managers to accomplish objectives for an area or project. Contrast rating forms would be required for high impact projects or proposed projects in highly sensitive areas. All environmental assessments would include mitigating measures to attempt to have surface disturbing activities meet VRM class guidelines. In all cases, visual impacts would be minimized. Designated wilderness areas would be managed as VRM Class I in all alternatives. Visual ratings in ACECs would be re-evaluated to ensure rating is appropriate to protect outstanding qualities of the area. Existing VRM management classes are: class II (206,436 acres); class III (350,357 acres); class IV (88,207 acres). These classes provide guidance for other resource development.

TABLE 3-26
Analysis of Visual Resource Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	Existing VRM classes would be utilized to guide resource management actions on BLM-administered lands. Adherence to criteria would occur according to respective class rating.	The natural character of landscapes would be maintained. Strict adherence to criteria would be mandatory.	Same as Alternative A.	Same as Alternative A.
Allocations	VRM Class II areas (206,436 acres) would be retained under BLM administration and protected from fluid mineral development by standard stipulations only; would be open to mineral materials disposal, mineral entry, surface and underground development from coal mining, and ROW/corridor development; OHV use would be limited on 2,407 acres to designated roads and trails.	VRM Class II areas (206,436 acres) would be protected by NSO stipulations; closed to mineral materials disposal, mineral entry, and unavailable for surface and underground development from coal mining; avoided for ROW/corridor development; retained under BLM administration, and OHV use would be limited to designated roads and trails.	Same as Alternative A except only 2,407 acres of VRM II areas would be retained under BLM administration.	Same as Alternative B except all VRM Class II areas (206,436 acres) would be protected with CSU stipulations and would not be retained under BLM administration.
Actions		Manage Turquoise Lake and Mt. Sherman from class III as class II areas.	BLM-administered lands with utility corridors and high potential fluid and salable mineral areas would be managed as class III areas.	

Recreation Management

Intensive recreation management would continue to be provided on lands along the Arkansas River (109,063 acres) and the Gold Belt tour area (126,248 acres) in all alternatives. These lands are identified as special recreation management areas (SRMAs) and would be managed in accordance with existing and new plans and in accordance with BLM policy and *Recreation 2000* initiative The remaining lands outside the SRMAs (approximately 417,689 acres) would be managed custodially as an extensive recreation management area (ERMA). Primitive and semiprimitive nonmotorized settings would be maintained for all WSAs until a congressional decision is made. These values in designated wilderness areas would continue to be maintained.

In all SRMAs and the ERMA, a continued proactive approach in the use of volunteers and the development of partnerships would be pursued in support of recreational opportunities throughout the planning area. Visitor safety and resource protection would be provided as necessary. In all alternatives, existing developed sites (80 acres) and all new developed sites would be withdrawn from mineral entry and leased for fluid minerals with NSO stipulations, closed to disposal of mineral materials, timber cutting, and livestock grazing, excluded from major ROW/corridor development, and retained in public ownership.

Arkansas River Special Recreation Management Area: Management for this SRMA would provide upland recreational opportunities that compliment the water-based oppportunities in semi-urban, rural, semiprimitive motorized, and nonmotorized settings (i.e., watchable wildlife, natural resource interpretation, hiking, biking, and OHV use). A supplementary plan to the Arkansas River Recreation Management Plan (RAMP) and Environmental Analysis would be completed emphasizing upland opportunities outside the 5,000 acres in the DPOR/BLM cooperative management agreement (CMA) area . Additional recreation and public purpose (R&PP) leases within the CMA area would be issued if the following criteria are met: 1) The site should be programmed for capital investment including permanent facilities and services for the benefit of the public; 2) Proposals for use of a site should satisfy an identified need; 3) Proposals for use of a site should accomplish the management objectives outlined in the Arkansas River RAMP for that location; 4) The site should be of minimum acreage needed to accomplish what is proposed; 5) Proposals for use of a site should alleviate existing environmental impacts and prevent future impacts; 6) Proposals for use and development of a site should be suitable for the selected location; and 7) The proposal must meet the requirements of the *R&PP Act.* All decisions in the existing Arkansas River RAMP and Record of Decision would be carried forward in this plan. Semiprimitive nomotorized settings in the Browns Canyon and McIntyre Hills WSAs (5,461 acres) would be maintained in all alternatives.

Gold Belt Special Recreation Management Area: Management of this SRMA would provide a variety of land-based opportunities and experiences that compliment activities associated with the scenic byway (sightseeing, wildlife viewing cultural/paleo viewing, rock climbing, target shooting, back-country OHV travel) in urban, rural, roaded natural, semiprimitive motorized, nonmotorized, and primitive settings. The Gold Belt Tour National Back Country Byway would be managed and maintained. A corridor integrated activity plan following BLM and Colorado Byway Commission planning guidelines would be completed and implemented for this SRMA, which would involve all partners and the public with interests in the Gold Belt Scenic Byway. Primitive and semiprimitive nonmotorized settings in the Beaver Creek WSA (20,492 acres) would be maintained in all alternatives.

Royal Gorge Extensive Recreation Management Area: Management of this area would provide for a variety of dispersed recreation opportunities and experiences (camping, hunting, hiking, OHV use, biking, and horseback riding) in semiprimitive motorized, nonmotorized, and primitive settings. Facility development would be less intensive than in the SRMAs and would provide for reduction of user conflicts. New initiatives or demands would continue to be evaluated for benefits to the public and impacts to the natural resources. Appropriate management actions would accommodate new activities and provide opportunities for the public. Semiprimitive nonmotorized settings in the McIntyre Hills and Grape Creek WSAs (18,347 acres) would be maintained.

TABLE 3-27
Analysis of Recreation Management by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives				
Arkansas River SRMA	A variety of recreational opportunities would be provided and settings (from rural to primitive) would be maintained. Interpretive facility development would reduce user conflict. Development would be emphasized in the rural, roaded natural, semiprimitive motorized, and nonmotorized settings.	A variety of recreation opportunities would be provided and settings, especially for the enjoyment of primitive and natural values, would be maintained. Opportunities in the semiprimitive motorized and nonmotorized settings would be emphasized to provide a natural experience. Facility development would provide for visitor health. Offsite public information would be provided.	A variety of recreational opportunities would be provided and settings, especially rural and roaded natural, would be maintained. Promotion of recreational activities would be emphasized. Facility development would provide for visitor convenience and health and would occur at different levels in all settings.	A variety of recreational opportunities would be provided and settings (from rural to semiprimitive nonmotorized settings) would be maintained. Additional opportunities for mountain biking, hiking, OHV use, interpretation, and horseback riding, would be provided. Facility development would provide for visitor health and other needs.
Gold Belt SRMA	A variety of recreational opportunities would be provided and settings (from rural to primitive) would be maintained. Additional facilities would be developed to maintain the visitor opportunities and reduce user conflict. Development would be emphasized in the roaded natural and semiprimitive motorized settings with lesser development in the urban, rural, semiprimitive nonmotorized, and primitive settings.	A variety of recreation opportunities would be provided and settings, especially primitive and natural, would be maintained. Opportunities in the semiprimitive nonmotorized and primitive settings would be emphasized. Offsite public information would be provided	A variety of recreational opportunities would be provided and settings, especially in rural and roaded natural, would be maintained. Management to provide opportunities that compliment auto touring in all settings would be emphasized. Tourism infrastructure development and promotion would be emphasized to increase visitor use. Facility development would provide for visitor convenience and services.	A variety of recreational opportunities would be provided and settings (from rural to semiprimitive nonmotorized settings) would be maintained. Emphasis on maintaining the scenic and historical integrity would be emphasized. Facility development would focus on historical and natural resource interpretation, public health, and other visitor needs.
Grape Creek SRMA	A variety of recreational opportunities would be provided and settings (from urban to semiprimitive nonmotorized) would be maintained. Limited onsite management would enhance existing experiences and activities. Off-site management would provide visitor information.	A variety of recreation opportunities would be provided and settings, especially primitive and natural, would be maintained.	A variety of recreational opportunities would be provided and settings, especially semiprimitive motorized and nonmotorized, would be provided. Management would provide opportunities for hiking, mountain biking, OHV use, horseback riding, camping, hunting, and fishing. Facility development would provide for visitor convenience and health.	A variety of recreational opportunities would be provided and settings (from urban to semiprimitive settings) would be maintained. Minimal onsite management would be provided to maintain opportunities.

Table 3-27 (Continued)

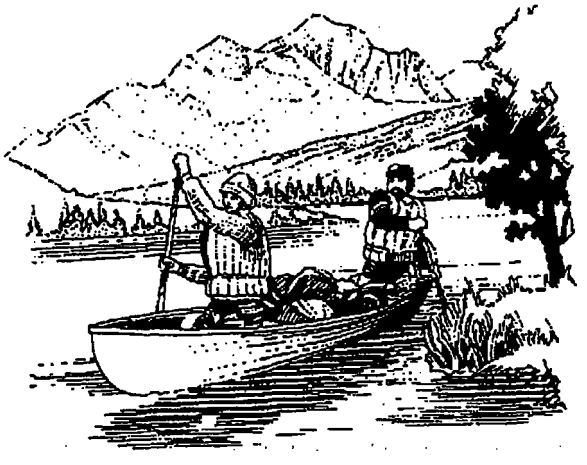
Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives (Continued)				
Royal Gorge ERMA	A variety of recreational opportunities would be provided and settings (from urban to semiprimitive nonmotorized) would be maintained. Limited onsite management would enhance existing experiences and activities. Off-site management would provide visitor information.	A variety of recreation opportunities would be provided and settings, especially primitive and natural, would be maintained.	A variety of recreational opportunities would be provided and settings (urban to primitive) would be maintained. Facilities would be developed for basic public visitor needs.	A variety of recreational opportunities would be provided and settings (from urban to semiprimitive settings) would be maintained. Minimal onsite management would be provided to maintain opportunities.
Allocations				
Arkansas River SRMA	Within the 109,000-acre SRMA, semiprimitive nonmotorized settings and recreational values on 4,877 acres would not be protected through NSO stipulations, no mineral materials disposal, closure to mineral entry, and limitations of OHV use to designated roads and trails.	Within the 109,000-acre SRMA, semiprimitive nonmotorized settings and recreational values on 10,338 acres would be protected through NSO stipulations, no mineral materials disposal, closure to mineral entry, and limitations of OHV use to designated roads and trails.	Same as Alternative A except 109,000 acres would be recommended as part of the 125,000-acre NRA.	Same as Alternative C.
				Acquisitions/easements to enhance water-based recreation, mountain biking, OHV use, hiking, horseback riding, hunting, and natural resource interpretation opportunities would be considered and pursued.
	ROWs would be evaluated on a case-by-case basis.	A total of 10,338 acres of semiprimitive nonmotorized settings and opportunities would be protected from ROWs and utility corridors as follows: - 5461 acres excluded - 4,877 acres avoided.	Same as Alternative A.	Same as Alternative B.
Gold Belt SRMA	Primitive and semiprimitive nonmotorized settings and recreational opportunities on 11,505 acres would not be protected through NSO stipulations, no mineral materials disposal, closure to mineral entry, and limitations of OHV use to designated roads and trails.	Primitive and semiprimitive nonmotorized settings and recreational opportunities on 31,997 acres would be protected through NSO stipulations, no mineral materials disposal, closure to mineral entry, and limitations of OHV use to designated roads and trails.	Same as Alternative A.	Same as Alternative A.

Table 3-27 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Allocations (Continued)				
				Acquisitions/easements to enhance mountain biking, rock climbing, interpretation, tourism promotion, hunting, watachable wildlife, and scenic byways would be considered and pursued.
	ROWs would be evaluated on a case-by-case basis.	A total of 31,492 acres of semiprimitive nonmotorized settings and opportunities would be protected from ROWs and utility corridors as follows: - 20,492 acres excluded - 11,505 acres avoided.	Same as Alternative A.	Same as Alternative B.
Grape Creek SRMA	Presently administered as part of the Royal Gorge ERMA.	Same as Alternative A.	Identify 15,978 acres as an SRMA.	Same as Alternative A.
Royal Gorge ERMA	Dispersed recreation opportunities would be emphasized on 413,413 acres of semiprimitive nomotorized settings outside SRMAs.	Same as Alternative A.	The remaining 397,435 acres would be managed with emphasis on dispersed recreation opportunities.	Same as Alternative A.
	Extensive recreation management would occur on the remaining 942 acres.	Semiprimitive nonmotorized settings and recreational opportunities on 18,347 acres would be protected through NSO stipulations, no mineral materials disposal, closure to mineral entry, and limitations of OHV use to designated roads and trails.	Same as Alternative A.	Same as Alternative B, except fluid minerals would be leased under standard stipulations.
	ROWs would be evaluated on a case-by-case basis.	A total of 19,289 acres of semiprimitive nonmotorized settings and opportunities would be protected from ROWs and utility corridors as follows: - 18,347 acres excluded - 942 acres avoided.	Same as Alternative A.	Same as Alternative A.
				Provision of visitor information would be emphasized.

Table 3-27 (Continued)

Management	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Actions				
Arkansas River SRMA	Develop IAP addressing upland recreation opportunities.	Develop IAP addressing upland recreation opportunities with emphasis on resource protection rather than tourism.	Develop IAP addressing upland recreation opportunities with emphasis on intensive onsite management and marketing efforts to encourage tourism.	Develop IAP addressing upland recreation opportunities with emphasis on balance between resource protection and toursim. Coordinate activities with various volunteer and user groups.
Gold Belt SRMA	Develop IAP with emphasis on onsite management actions to encourage tourism. Corrdinate activities with various interest, volunteer, and tourism groups.	Develop IAP with emphasis on resource protection rather than visitor services. Provide off-site public information through brochures, tourist centers, etc.	Develop IAP with emphasis on intensive onsite management and marketing efforts to encourage tourism.	Develop IAP with more intensive onsite management; emphasis on balance between resource protection and toursim. Same as Alternative A.
Grape Creek SRMA			Develop IAP.	
Royal Gorge ERMA	Provide monitoring to ensure visitor safety and resource protection.	Same as Alternative A.	Provide monitoring and visitor contacts to ensure visitor safety, resource protection, and visitor information.	Same as Alternative C, plus additional information regarding availability of recreational opportunities.



National Recreation Area Designations

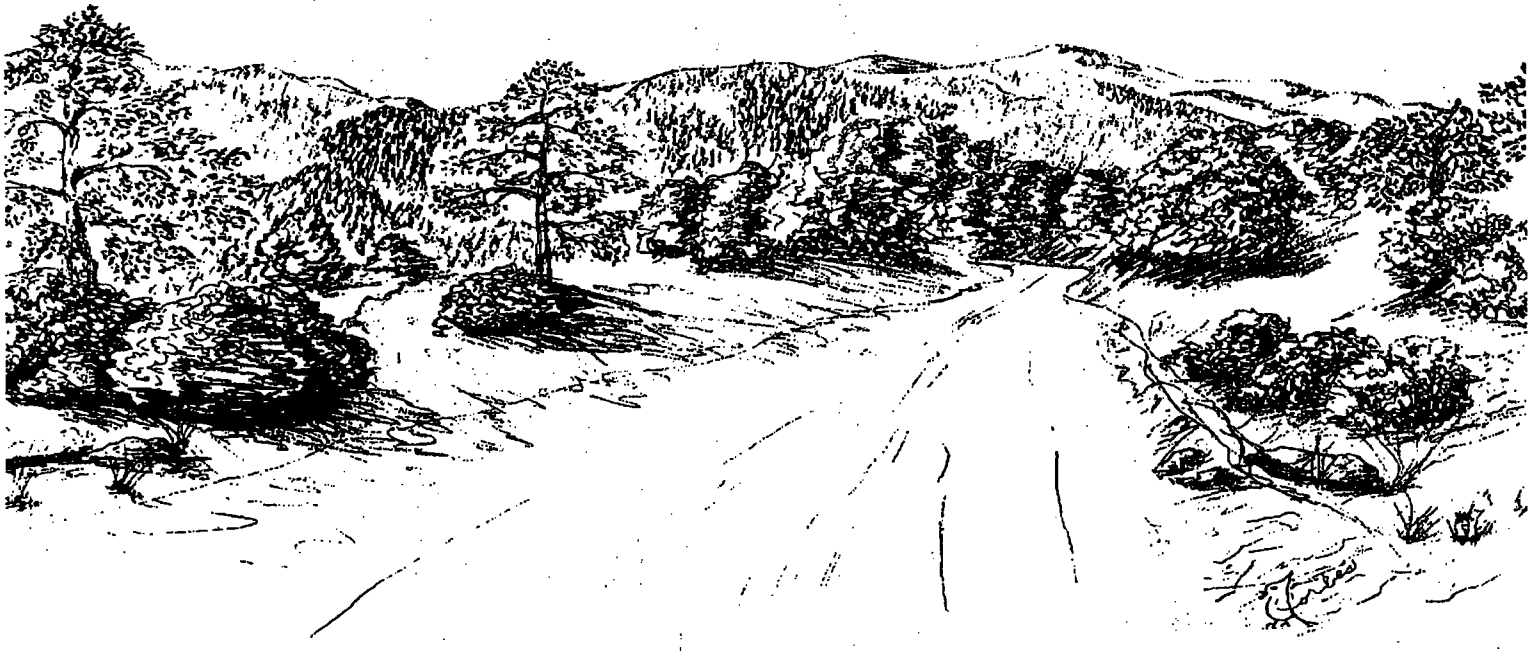
River recreation values within the Arkansas River Corridor would continue to be managed under joint management by the Colorado Division of Parks and Outdoor Recreation (DPOR) and BLM as detailed in the Arkansas River Recreation Activity Management Plan (RAMP). This joint management would continue whether or not the river corridor is designated a national recreation area (NRA) by Congress.

TABLE 3-28
Analysis of National Recreation Area Designations by Alternative

Management	Existing - Alternative A	Resource Conservation - Alternative B[1/]	Resource Utilization - Alternative C	Preferred - Alternative D
Objectives	River values would be managed as detailed in the current Arkansas River RAMP.	Same as Alternative A.	River recreation values would be managed as detailed by recommendation for congressional action to establish a national recreation area (NRA).	Same as Alternative C.
Allocations	The existing SRMA would continue on approximately 109,000 acres in the river corridor (approximately 5,000 acres of this is jointly managed by BLM and DPOR).	Same as Alternative A.	Approximately 125,000 acres in the river corridor would be recommended for designation by Congress as an NRA.	Same as Alternative C.
Action	As detailed in the RAMP and future updates.	Same as Alternative A.	A management plan would be developed for the designated corridor as specified by Congress.	Same as Alternative C.

1/Table 3-24 also describes management for some of these values.

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES



CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter describes the physical, biological, and economic consequences of implementing the various resource management alternatives as presented in Chapter 3 of this document. Only resources and resource uses that would have consequences as a result of implementing the decisions within this proposed plan are discussed.

Both adverse and beneficial consequences, based on the effects of the proposed resource condition objectives, land use allocations, and the management actions are discussed. Mitigating measures in manuals, policy statements, congressional acts, etc., designed to avoid or reduce environmental consequences are incorporated into this environmental analysis. Those identified consequences are considered unavoidable with the prescribed mitigation.

ASSUMPTIONS FOR ANALYSIS

An interdisciplinary approach was used in developing and analyzing environmental consequences. The general and resource/resource use-specific assumptions, which defined the parameters of the analysis within this draft resource management plan/environmental impact statement (RMP/EIS), are addressed in the first section of this chapter.

General Assumptions

Implemented actions from decisions made in each management plan alternative would be in compliance with all valid existing rights, Federal regulations, Bureau policies, etc.

Implementation of the approved RMP at the end of this planning process would begin 30 days after the approved RMP and record of decision (ROD) are signed by the BLM state director, and all implemented actions would subsequently conform to the specific approved RMP decisions.

The life of the plan is approximately 15 to 20 years. Changes or effects described during the life of the plan would be short term unless otherwise stated and would occur during or immediately following implementation of an action. Short-term impacts would occur over a 5-year period following implementation; long-term impacts would occur over a 5- to 20-year period.

Analysis of each plan alternative is based on the assumption that adequate finances and personnel would be available to implement the decisions of that plan alternative.

Effects, for the purpose of this analysis, are the net unavoidable changes, impacts, etc., to a resource or resource use after mitigation. An Impact Conclusions statement at the end of each table addresses irreversible, irretrievable, and cumulative impacts.

Only significant changes or effects that vary by resource/value are analyzed. Also, those actions with significant changes or effects that would subsequently be fully mitigated by existing Bureau and Bureau-adopted stipulations would not need to be analyzed. Fully mitigated effects would have no net adverse unavoidable change or effect.

The stated net unavoidable effects would be monitored and continually evaluated during the life of the plan. Where necessary, adjustments in the actions would be made to achieve the minimum level possible of adverse consequences based on the data from plan action monitoring.

Effects from actions not covered in this plan or accompanying documents would be analyzed as needed through plan amendments/environmental assessments or environmental impact statements. This additional analysis would be done in accordance with Bureau planning/environmental guidance prior to BLM consideration for approval of that action.

Resources and values with insignificant net unavoidable effects are analyzed in the resource/value analysis section of Chapter 3 and are not further addressed in this chapter. Those resources or values include: climate, air quality, wilderness management, sensitive soils, water rights, water quality, hazards management, topography/geology, noxious weeds, national conservation area, fire management, and economic conditions and social environment. All other resources and resource uses are analyzed in this chapter.

Climate, Air Quality, Wilderness Management, Sensitive Soils, Water Rights, Water Quality, Hazards Management, Topography/Geology, Noxious Weeds, National Conservation Area, and Fire Management

Significant impacts are not expected to occur in any of the alternatives.

Economic Conditions and Social Environment

The socio-economic analysis is adequate to analyze local/regional social and economic effects; effects on the BLM Royal Gorge Resource Area management costs; and effects on national values for recreation activities. No significant population change would result from land use allocation. The impacts tend to be site-specific and confined to a particular type of user group. Any decision would usually produce trade-offs with social advantages for some persons or groups and social disadvantages for others.

Currently there are no up-to-date models specific to the economic study area (ESA) that could be used to measure total employment and income changes for this plan. The Bureau of Economic Analysis Regional Input-Output Modeling System (RIMS II), however, has multipliers for Colorado, which are used in this analysis. The expenditure data was developed from studies by the U.S. Fish and Wildlife Service and other studies for Colorado (Appendix C, Table C-18 and Table C-19). Management under each alternative would affect employment, population, and income in the area. Most of the effects would occur because of impacts on the forestry sector, and retail and service sectors. These economic sectors would be affected by changes in grazing, forestry, and recreation opportunities occurring from the land uses in the plan. The potential economic impacts are insignificant as they relate to local and regional impact.

The expenditure data is used to measure economic effects on the ESA, and national values are defined as the net economic gain from an activity. Expenditures are important to local and state economies, but they do not reflect the total recreation values of the resource, which include the personal benefits one receives from participation in that activity. Thus, national values measure these additional benefits. For example, the net gain or national values from a recreation activity are what the recreator is willing to pay over their actual costs to participate in the activity. Net gains are portrayed on an annual basis for this analysis.

These national values are estimates of "willingness to pay" (wtp). Wtp values are easy to determine when goods and services are bought and sold in well-defined markets. Recreation wtp values, however, usually have to be estimated from secondary sources (Table C-20).

Some resource products on BLM land can be valued; others cannot. Dollar values can be assigned to timber and other resources (Tables C-20 and C-21). All of these values were estimated as wtp values. Some of the values were determined by observation of goods and services bought and sold in well-defined markets. For example markets exist for grazing; however, other resources such as recreation do not have established markets. These values were based on various wtp studies.

Examples of other benefits not assigned monetary values include the value to future generations of protecting and preserving cultural resources, the benefits of maintaining viable populations of wildlife species, and the satisfaction derived by those who do not have any intention of seeing these populations.

Mineral values are also not considered. Mineral activity on BLM-administered lands respond mostly to changes in market prices over time, rather than to changes in land management plans. Price changes in minerals or the amount of minerals that can be produced in the future on these lands cannot be predicted. Thus minerals are not valued for the trade-off analysis, but are considered during the decision-making process.

The average rate for an animal-unit month on nonirrigated privately-owned lands in the 11 western states is about $8. This value is used as a correlative equal value for ranch income per AUM on BLM lands.

The BLM resource area base cost of $1.7 million per year is not expected to change. The actual dollar amount may change because of inflation. In terms of 1991 dollars, however, the $1.7 million is not expected to increase.

In both Existing and Preferred Alternatives, annual sales of 140 Mbf of sawtimber would benefit the ESA income and employment. In the Resource Conservation Alternative, restrictions on sawtimber sales would decrease income and employment in the ESA. In both the Existing and the Resource Utilization Alternative, annual sales of 1,300 Mbf of sawtimber would increase income and employment in the ESA.

In all alternatives, land tenure adjustments would primarily occur on a case-by-case basis and would be unpredictable; therefore, impacts cannot be determined. Basically land tenure adjustments would insignificantly affect county payment in lieu of taxes (PILT) money.

In the Existing Alternative, recreational economic benefits would occur, however, not in large amounts. Recreational economic benefits in the Resource Conservation Alternative would be insignificant. Recreational economic benefits in the Resouce Utilization Alternative would result in 52 potential new jobs. Recreational economic benefits in the Preferred Alternative would result in 283 potential new jobs.

In the Existing Alternative, impacts to national values, mainly from recreational expenditures, would be about $19.8 million. In the Resource Conservation Alternative, impacts to the national values would approximately $18.7 million or 5.5 percent decrease. In the Resource Utilization Alternative, impacts to the national values would be about $20 million or 1.5 percent increase. In the Preferred Alternative, impacts to the national values would be about $22 million or 11.6 percent increase. BLM Royal Gorge Resource Area costs can be compared to the benefits over time using 8-7/8 percent discount rate.

In the Existing Alternative, a benefit/cost ratio of approximately 10.5 to 1 ($19.5 million in benefits to $1.7 million in costs) would occur. In the Resource Conservation Alternative, a benefit/cost ratio of about 9.9 to 1 ($18.7 million in benefits to $1.7 million in costs) would occur. In the Resource Utilization Alternative, a benefit/cost ratio of about 10.6 to 1 ($20 million in benefits to $1.7 million in costs) would occur. In the Preferred Alternative, a benefit/cost ratio of about 11.6 to 1 ($22 million in benefits to 1.7 million in costs) would occur.

Vegetation Management

Vegetation (253 acres) would be disturbed annually by harvest, thinning, prescribed burns, or other silvicultural treatment resulting in a change in plant succession. Vegetation on 80 acres of developed recreation sites, as well as future developed recreation sites, would be disturbed in all alternatives. Range improvement projects (e.g., pipelines and fences) would be designed to minimize disturbance. A large percentage of the acres in poor resource condition would remain in custodial management because of scattered land ownership patterns, which limit management opportunities.

TABLE 4-1
Impacts to Vegetation Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Livestock grazing (Allotment categorization)	152,000 acres in unsatisfactory resource condition (23%) would continue to be managed on a custodial basis with no improvement.	66,016 acres (10%) in unsatisfactory resource condition currently managed on a custodial basis would be managed for improvement. 85,984 acres in unsatisfactory condition (13%) would continue to be managed custodially with no improvement	42,000 acres (6%) in unsatisfactory resource condition currently managed on a custodial basis would be managed for improvement. 110,000 acres in unsatisfactory condition (17%) would continue to be managed custodially with no improvement.	46,000 acres (7%) in unsatisfactory resource condition currently managed on a custodial basis would be managed for improvement. 106,000 acres in unsatisfactory condition (16%) would continue to be managed custodially with no improvement.
Wildlife habitat	1,510 acres of vegetation would be enhanced. 61,440 acres would not be enhanced.	62,950 acres of vegetation would not be enhanced.	Same as Alternative A.	638,000 acres of vegetation could be potentially enhanced.
Fluid minerals	Of 2.3 million subsurface acres of vegetation, approximately 20 acres could be disturbed annually.	Of 2.3 million subsurface acres of vegetation, approximately 15 acres could be disturbed annually.	Same as Alternative A.	Same as Alternative A.
Locatable minerals Mineral materials	640,761 acres of vegetation could be disturbed by mineral development.	457,635 acres of vegetation could be disturbed by mineral development.	Same as Alternative A.	560,389 acres of vegetation could be disturbed by mineral development.
Rights-of-way	All 653,000 acres of vegetation would be open to disturbance, which could result in a change in plant succession.	0 acres of vegetation would be open to disturbance; a change in plant succession would not occur.	Same as Alternative A.	572,176 acres of vegetation would be open to disturbance, which could result in a change in plant succession.
Off-highway vehicle use	Approximately 582,000 acres of vegetation would be open to disturbance, which could result in a change in plant succession.	0 acres of vegetation would be open to disturbance; a change in plant succession would not occur.	24,708 acres of vegetation would be open to disturbance, which could result in a change in plant succession.	11,500 acres of vegetation would be open to disturbance, which could result in a change in plant succession.

Impact Conclusions: Large acreages of vegetation disturbance that might produce a significant cumulative impact to vegetation would likely occur in Alternatives A and C. This disturbance would be substantially reduced in Alternatives B and D. The 106,000 acres of vegetation in unsatisfactory condition would continue to be managed custodially for livestock forage. Off-highway vehicle disturbance on 11,500 acres would likely result in a change of plant succession. None of these potential effects are irretrievable or irreversible.

Livestock Grazing Management

Changes in the livestock market will continue. BLM has no control over market fluctuations, and, therefore, management would not be affected by the changing livestock market. Assessments of vegetative effects would be based on expectations of normal precipitation during the life of the plan. Long-term grazing use levels would be based on the effectiveness of the allotment management plan (AMP) process, through evaluation of monitoring information (e.g., utilization studies and actual use data) and modifications of those use levels as the need occurs. Approximately 3,000 acres of grazing (150 AUMs) would be lost in all alternatives because of fencing developed recreation sites and historical sites.

Grazing decisions in this RMP replace grazing EIS decisions and range program documents (summary updates). These RMP decisions would be implemented after the approved RMP/ROD is signed.

TABLE 4-2
Impacts to Livestock Grazing Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Vegetation (Development of desired plant community)(DPC)	No positive/negative impacts.	Livestock grazing would be diminished on 30,000 acres because of low productivity of forage from DPC.	Livestock grazing would be enhanced by woodland manipulation on 151,000 acres resulting in an increase of 15,000 AUMs.	Same as Alternative B, except livestock grazing would be enhanced by woodland manipulation on 20,000 acres resulting in an increase of 2,000 AUMs.
Wildlife habitat	No positive/negative impacts.	Allocation of new forage (89,996 acres, 5,000 AUMs) to wildlife could result in loss of incentive to livestock grazing permittees to practice improved range management.	Allocation of new forage to livestock until suspended nonuse is restored (15,000 AUMs) would enhance livestock grazing.	Allocation of an estimated 5,000 acres (500 AUMs) to big game would result in a loss of forage for livestock.
Livestock grazing Riparian areas Wildlife habitat (Allotment categorization)	No positive/negative impacts.	Range improvement funds would be spent on Improve category allotments for fences and vegetation treatment to increase forage production on 385,917 acres on 80 allotments.	Range improvement funds would be spent on Improve category allotments for fences and vegetation treatment to increase forage production on 367,676 acres on 65 allotments.	Range improvement funds would be spent on Improve category allotments for fences and vegetation treatment to increase forage production on 287,878 acres on 55 allotments.
Livestock grazing (Fencing of allotment boundaries)	Increased financial commitment would be required from private landowners, grazing permittees/lessees, grazing advisory board, and BLM for fence construction.	Increased financial commitment would be required from pemittees/lessees for fence construction on 10 Improve and Maintain category allotments and on an unknown number of Custodial category allotments.	Grazing trespass would continue on private land because of lack of boundary fencing on BLM allotments.	Same as Alternative B plus more public funding would be used on boundary fence construction resulting in less funds for range improvement projects.

Table 4-2 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Riparian areas	No positive/negative impacts.	Livestock grazing on aproximately 650 acres (500 AUMs) would be eliminated, on 5 allotments. This represents at least 30 percent reduction to 3 operators.	Same as Alternative A.	Livestock grazing would be eliminated on 325 acres of poor riparian condition and severely restricted on 325 additional acres.
ACEC designations	No positive/negative impacts.	Livestock grazing would be eliminated or severely restricted on approximately 62,950 acres (3,000 AUMs).	Same as Alternative A.	Livestock grazing would be eliminated on approximately 9,791 acres in Mosquito Pass and Beaver Creek (450 AUMs) and restricted on 21,221 acres (250 AUMs).

Impact Conclusions: Livestock grazing administration would likely be enhanced in Alternatives A and C, with a slightly enhanced quantity of AUMs available. Expenditures of range improvement funds would potentially increase forage production on 287,878 to 385,917 acres on 55 to 80 allotments in Alternatives B and D. A net loss of livestock grazing on 325 to 650 acres (up to 500 AUMs) would potentially adversely affect up to three operators. None of these potential effects are to be irretrievable or irreversible.

Riparian Area Management

Management would continue to improve. Full compliance with and implementation of the new Bureau guidance to maintain and/or improve current conditions in riparian zones would be a significant and positive effect. Prior to implementation, all actions within riparian areas would be assessed for the effects on the resource.

TABLE 4-3
Impacts to Riparian Area Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Livestock grazing (Eliminating grazing in riparian areas where conflicts exist)	No positive/negative impacts.	Riparian areas (650 acres) would change from fair or poor condition to good or excellent.	Same as Alternative A.	Riparian areas (650 acres) in poor condition would be protected through restriction or elimination of livestock grazing. Riparian areas (1,913 acres or 75 percent) along 200 miles of streams would improve to a properly "functioning condition"; 637 acres or 25 percent along 37 miles of stream would be nonfunctional because of land-ownership patterns and upstream watershed conditions in areas not under BLM administration.
Fluid minerals (Limitation on surface use)	Riparian areas (2,550 acres) would be protected by standard lease terms.	Riparian areas (2,550 acres) would be protected by no surface occupancy stipulations.	Same as Alternative A.	Same as Alternative B except NSO would be changed to CSU.
Locatable minerals (Closure to mineral entry)	Riparian areas (2,550 acres) would not be protected from damage.	All riparian areas (2,550 acres) would be protected.	Same as Alternative A.	Riparian areas (1,275 acres) would be protected. Riparian areas (1,275 acres) could be lost through mineral entry.
Mineral materials	Riparian areas (2,550 acres) would be protected by standard stipulations.	All riparian areas (2,550 acres) would be protected through no disposal of mineral materials..	Same as Alternative A.	Riparian areas (1,275 acres) would be protected through no disposal of mineral materials. Riparian areas (1,275 acres) could be lost through disposal of mineral materials.
Waterpower/reservoir resources	Riparian areas (2,550 acres) could be lost.	Riparian areas (2,550 acres) would be protected by withdrawal.	Same as Alternative A.	Riparian areas (1,275 acres) would be protected by withdrawal. Riparian areas (1,275 acres) could be lost.
Off-highway vehicle use	Riparian areas with conflicts (2,550 acres) because of OHV use, would remain in unsatisfactory condition.	Riparian areas (2,550 acres) would be protected through closure to OHV use.	Same as Alternative A.	Riparian areas (2,550 acres) would be protected through limitation of OHV use to designated roads and trails.

Impact Conclusions: Riparian (2,550 acres) could be lost or adversely affected in Alternatives A and C and would likely be enhanced or improved in Alternative B. About 75 percent of the riparian would likely be improved to a properly "functioning condition" in Alternative D. None of these effects are irretrievable or irreversible.

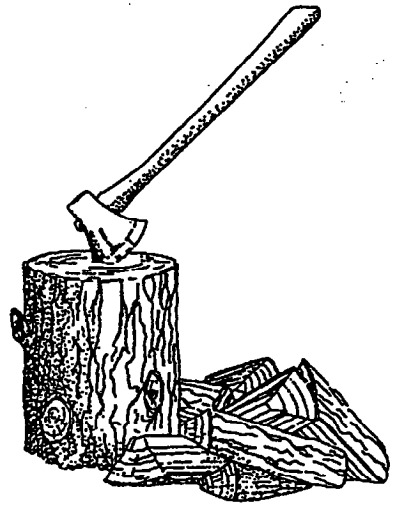
Forest and Woodland Management

Timber stand quality would continue to decline on old harvest areas, and pests and disease problems would increase if the infected residual stands remain. Appropriate timber stand harvest and improvement (e.g., proper silviculture practices) would enhance most other resources. Typically rangeland resources (e.g., wildlife and livestock forage) would not be affected. Timber harvesting and wood gathering would occur in special status animal habitat only for enhancement of the protected species. New road construction would benefit management through reduction of transportation costs, which would reduce harvest costs. New easements would open previously unavailable harvest areas. An adverse activity for forest and woodland management is one that either would reduce available acreage for intensive management; i.e., lands available for intensive management (LAIM) or would eliminate certain intensive practices; i.e., reduce potential volume per acre.

TABLE 4-4
Impacts to Forest and Woodland Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Paleontological resources	No positive/negative impacts.	Class I areas (3,757 acres) would be closed to intensive forest management.	Same as Alternative A.	Same as Alternative B.
Land ownership adjustments	Most productive forest land would be retained in BLM administration.	Same as Alternative A.	Some productive forest land could be transferred to the private sector.	Same as Alternative C.

Impact Conclusions: Productive forest land would likely not have any adverse or positive effects in any alternatives; nor would any irretrievable or irreversible effects occur.



Wildlife Habitat Management

Any quality changes in wildlife habitat could cause an increase or decrease in populations dependent on that habitat. A direct relationship exists between the quality (e.g., condition and trend) of wildlife habitat and the wildlife populations (e.g., numbers of animals) using that habitat. Minor disturbance of habitat could occur from recreation facility development. Big game habitat on 62,657 acres would be protected from OHV use in all alternatives. Big game movement could be slightly inhibited by fence construction.

TABLE 4-5
Impacts to Wildlife Habitat Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Vegetation	Enhancement of big game habitat on 1,510 acres would occur; 61,440 acres of big game habitat would not be enhanced.	Enhancement of big game habitat on 62,950 acres would occur.	Same as Alternative A.	Potential enhancement of wildlife habitat could occur on 638,000 acres.
Fluid minerals	Big game critical winter habitat on 164,500 subsurface acres (100 percent), bighorn sheep lambing on 1,900 subsurface acres (100 percent), and wild turkey winter habitat on 29,000 subsurface acres (100 percent) would be protected through seasonal limitations.	Big game critical winter and birthing habitat on 191,600 subsurface acres (100 percent) would be protected through NSO stipulations. Big game winter habitat on 597,218 subsurface acres (100 percent) and wild turkey winter habitat on 29,000 subsurface acres (100 percent) would be protected with seasonal limitations.	Big game critical winter and birthing habitat on 191,600 subsurface acres (100 percent) would be protected under standard lease stipulations only. Big game winter habitat on 405,618 subsurface acres (68 percent) could be degraded from potential mineral development.	Big game critical winter and birthing habitat on 191,600 subsurface acres (100 percent) would be protected through seasonal limitations Big game winter habitat on 405,618 subsurface acres (68 percent) would be protected under standard lease stipulations only.
Locatable minerals	Big game birthing habitat on 17,499surface acres could be degraded from potential mineral development. Big game critical winter habitat on 94,389 surface acres could be degraded from potential mineral development.	Big game birthing habitat on 17,499 surface acres would be closed to mineral entry. Big game critical winter habitat on 94,389 surface acres would be protected under seasonal limitations through claimant notification.	Same as Alternative A.	Same as Alternative B.
Mineral materials	Big game birthing habitat on 17,499 surface acres could be degraded from potential mineral development. Big game critical winter habitat on 94,389 surface acres could be degraded from potential mineral development.	Big game birthing habitat on 17,499 surface acres would be closed to disposal of mineral materials.. Big game critical winter habitat on 94,389 surface acres would be protected under seasonal limitations.	Same as Alternative A.	Same as Alternative B.

Table 4-5 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Forest and woodlands	Wildlife habitat values on 253 acres of timber would be diminished annually; habitat would be enhanced on 215 acres of woodlands annually.	Wildlife habitat on 248,767 acres of forest/woodlands would be managed to enhance wildlife.	Same as Alternative A.	Same as Alternative A.
Rights-of-way	Wildlife habitat values on 111,888 acres of wildlife habitat could be diminished by utility corridor development.	Big game critical winter habitat on 94,389 acres would be avoided by major ROWs. Big game birthing habitat on 17,499 acres would be excluded from major ROWs.	Same as Alternative A.	Same as Alternative B.
Land ownership adjustments	Wildlife habitat would be retained in BLM-administration; acquisition could provide additional habitat.	Big game birthing areas and critical winter habitat on 111,888 acres would be protected through retention.	Wildlife habitat could be lost through land disposal; acquired lands could provide additional habitat.	Same as Alternative C.
Waterpower/reservoir resources	Wildlife habitat values on 17,499 acres could be lost.	Wildlife habitat values on 17,499 acres would be protected.	Same as Alternative A.	Same as Alternative A.
ACEC designattions				
Browns Canyon	Bighorn sheep habitat on 11,697 acres could be lost because of inadequate protection.	Bighorn sheep habitat on 11,697acres would be protected.	Sane as Alternative A.	Same as Alternative B.
Beaver Creek	Bighorn sheep and mountain lion habitat on 12,081 acres could be lost because of inadequate protection.	Bighorn sheep and mountain lion habitat on 12,081 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Grape Creek	Bighorn sheep habitat on 15,978 acres could be lost because of inadequate protection.	Bighorn sheep habitat on 15,978 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Phantom Canyon	Bighorn sheep, deer, and turkey habitat on 6,096 acres could be lost because of inadequate protection.	Bighorn sheep, deer, and turkey habitat on 6,096 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Mosquito Pass	Elk and deer habitat on 4,036 acres could be lost because of inadequate protection.	Elk and deer habitat on 4,036 acres would be protected.	Same as Alternative A.	Same as Alternative B.

Table 4-5 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
LaVeta Pass	Elk, deer, and bighorn sheep habitat on 3,419 acres could be lost because of inadequate protection.	Elk, deer, and bighorn sheep habitat on 3,419 acres would be protected.	Same as Alternative A.	Same as Alternative A.
Badger Creek	Elk, deer, bighorn sheep, and antelope habitat on 28,640 acres could be lost because of inadequate protection.	Elk, deer, bighorn sheep, and antelope habitat on 28,640 acres would be protected.	Same as Alternative A.	Same as Alternative A.
Arkansas Canyonlands	Bighorn sheep and deer habitat on 22,411 acres could be lost because of inadeqaute protection.	Bighorn sheep and deer habitat on 22,411 acres would be protected.	Same as Alternative A.	Same as Alternative B, plus an additional 1,510 acres of key raptor habitat (High Mesa Grasslands) would be added to this unit for a total of 23,921 acres.
Off-highway vehicle use	Big game critical winter and birthing habitat on 107,573 acres would not be protected.	Big game critical winter and birthing habitat on 107,573 acres would be protected through seasonal limitations.	Same as Alternative A.	Big game critical winter and birthing habitat on 107,573 acres would be protected through seasonal limitations. Big game birthing habitat would also be protected through limitation of OHV use to designated roads and trails.

Impact Conclusions: Substantial big game wildlife habitat (about 62,000 acres) would not be enhanced in Alternatives A and C, but significantly enhanced in Alternatives B and D. Big game birthing habitat (about 17,000 acres) and critical winter habitat (about 90,000 acres) could be degraded in Alternatives A and C, but significantly enhanced in Alternatives B and D. Designation of only 2 of 14 potential ACECs in Alternatives A and C would likely diminish wildlife habitat in those areas not designated; however, designation of all 14 ACECs in Alternative B would provide for substantial protection. Designation of 10 ACECs in Alternative D would significantly enhance these areas of wildlife habitat. Significant degradation of big game birthing habitat might potentially be considered irretrievable or irreversible.

Fishery Habitat Mangement

Any quality changes in fishery habitat could cause an increase or decrease in poplulations dependent on that habitat. A direct relationship exists between the quality (e.g., stream condition and trend) and populations.

TABLE 4-6
Impacts to Fishery Habitat Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Vegetation *Riparian areas*	Poor condition on 32 stream miles (650 acres) would continue.	Fishery habitat on 32 stream miles (650 acres) would improve.	Same as Alternative A.	Same as Alternative B except fishery habitat on 27 stream miles (540 acres) would improve.
Fluid minerals *Locatable minerals* *Mineral materials*	Stream and lake fishery habitat (11,108 acres) could be damaged or lost.	Stream and lake fishery habitat (11,108 acres) would be protected by NSO stipulations and closure to mineral entry and disposal of mineral materials.	Same as Alternative A.	Same as Alternative C, except 1,275 acres would be leased with controlled surface use stipulations. The remaining 9,369 acres would be protected by standard stipulations.
ACEC designations				
Grape Creek **Badger Creek** **Phantom Canyon** **Arkansas Canyonlands** **Cucharas Canyon**	Poor condition of fishery habitat in these areas (32 miles) would continue; no improvement of quality would occur.	Fishery habitat quality on these areas (32 stream miles) would improve.	Same as Alternative A.	Fishery habitat quality on these areas (27 stream miles) would improve.
Off-highway vehicle use	Degradation of stream fishery habitat (131 miles) would continue.	Stream fishery habitat (2,550 acres) would be protected by limiting use to designated roads and trails only.	Same as Alternative A.	Same as Alternative B.

Impact Conclusions: Poor condition on 32 miles of streams and significant adverse impacts to 11,108 acres of fishery habitat would likely continue in Alternatives A and C. In Alternative B, the 32 miles of streams would likely improve, and the 11,108 acres of fishery habitat would likely be protected. In Alternative D, 27 miles would likely improve and 9,369 acres of fisheries would likely be protected. None of these impacts are irretrievable or irreversible.

Special Status Plant/Community Species Management

In all cases, full compliance with Section 7 of the *Endangered Species Act* (1973) would be completed before invoking specific actions resulting from RMP decisions. This requires mandatory consultation and coordination with the USFWS and clearance of lands inhabited by these species. Inventory analysis and monitoring would be done for special status plant/community species. Clearances for special plant species would be completed for all proposed management actions. Sensitive plant species in High Mesa Grasslands and Garden Park Paleo AECs (4,238 acres) would be protected in all alternatives.

TABLE 4-7
Impacts to Special Status Plant/Community Species Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Livestock grazing Vegetation	Sensitive plant species would not be protected on 14,943 acres.	Sensitive plant species would be protected on 8,979 acres through exclusion of grazing.	Same as Alternative A .	Sensitive plants on Mosquito Pass (4,036 acres) would be protected through exclusion of grazing. Sensitive plant species would be protected in Droney Gulch, High Mesa, and Garden park Paleo ACECs (4,943 acres) through stocking rates and season-of-use adjustments.
Fluid minerals Locatable minerals Mineral materials	Sensitive plant species in High Mesa Grasslands and Garden Park (4,238 acres) would be protected through NSO stipulations for fluids and closure to mineral entry and mineral materials disposal. Sensitive plant species in Droney Gulch and Mosquito Pass (4,741 acres) would not be protected.	Sensitive plant species in High Mesa Grasslands, Garden Park, Droney Gulch, and Mosquito Pass (8,979 acres) would be protected through NSO stipulations for fluids and closure to mineral entry and mineral materials disposal.	Same as Alternative A.	Same as Alternative B.
ACEC designations				
Droney Gulch	Sensitive plant species on 705 acres would not be protected.	Sensitive plant species on 705 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Mosquito Pass	Sensitive plant species on 4,036 acres would not be protected.	Sensitive plant species on 4,036 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Off-highway vehicle use	Sensitive plant species in Droney Gulch and Mosquito Pass (4,741 acres) would not be protected.	Sensitive plant species in Droney Gulch and Mosquito Pass (4,741 acres) would be protected.	Same as Alternative A.	Same as Alternative B.

Impact Conclusions: Substantial degradation or loss could occur to sensitive plants in Alternatives A and C. Sensitive plants would receive critical protection in Alternatives B and C. Potential irretrievable or irreversible impacts could occur in Alternatives A and C.

Special Status Animal Species Management

In all cases, full compliance with Section 7 of the *Endangered Species Act* (1973) would be completed before invoking specific actions resulting from RMP decisions. This requires mandatory consultation and coordination with the USFWS and clearance of lands inhabited by these species. Inventory analysis and monitoring would be done for special status animal species. Sensitive animal species habitat would be retained in public ownership. Clearances for special animal species would be completed for all proposed management actions.

TABLE 4-8
Impacts to Special Status Animal Species Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Fluid minerals	Sensitive species habitat on 284,854 subsurface acres would be protected with seasonal stipulations. Sensitive species habitat on 124,000 subsurface acres could be degraded.	Sensitive species habitat would be protected as follows: - NSO 650,136 subsurface acres - seasonal stipulations 985,720 subsurface acres.	Same as Alternative A except sensitive species habitat on 284,854 subsurface acres would be protected by standard lease stipulations only.	Sensitive species habitat would be protected as follows: - NSO 37,220 subsurface acres - seasonal stipulations 412,517 subsurface acres.
Locatable minerals *Mineral materials*	Sensitive species habitat on 206,400 surface acres could be degraded.	Sensitive species habitat on 359,076 surface acres would be protected by seasonal limitations .	Same as Alternative A.	Same as Alternative B.
ACEC designations				
High Mesa Grasslands **Browns Canyon** **Beaver Creek** **Phantom Canyon** **Arkansas Canyonlands**	Sensitive species habitat on 1,510 acres would be protected. Sensitive species habitat on 52,285 acres could be degraded.	Sensitive species habitat on 53,795 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Wild and scenic river designations	Sensitive species habitat on 21,931 acres could be degraded.	Sensitive species habitat on 21,931 acres would be protected.	Same as Alternative A.	Same as Alternative A.
Forest and woodlands	Sensitive species habitat on 124,000 acres could be degraded.	Sensitive species habitat on 124,000 acres would be protected.	Same as Alternative A.	Same as Alternative B.
Off-highway vehicle use	Sensitive species habitat for lesser prairie chicken on 10,500 acres would not be protected through seasonal limitations.	Sensitive species habitat for lesser prairie chicken on 10,500 acres would be protected through seasonal limitations.	Sensitive species habitat for lesser prairie chicken leks on 2,800 acres would be protected.	Same as Alternative B.

Table 4-8 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Recreation resources	Sensitive species habitat for Mexican spotted owl on 124,000 acres could be degraded through intensive recreation management along the Gold Belt National Back Country Byway. Sensitive species habitat for peregrine falcon on 23,778 acres in Beaver Creek and Browns Canyon could be threatened.	Sensitive species habitat for Mexican spotted owl on 124,000 acres and peregrine falcon on 23,778 acres would be protected by limiting intensive recreation development.	Same as Alternative A.	Same as Alternative B.

Impact Conclusions: Special animal species on substantial acres could be adversely degraded in Alternatives A and C and protected significantly in Alternatives B and D. Potential irretrievable or irreversible impacts could occur to special animal habitat in Alternatives A and C.

Fluid Minerals Management

The reasonably foreseeable level of fluid mineral operations per year within the planning area (see Chapter 2) represents an estimated maximum disturbance of about 20 acres per year or a total of about 400 acres. Wilderness designation would not result in any significant impacts to mineral resources in any of the alternatives because of the low mineral potential of these particular lands. Since there is no mineral potential in the wild and scenic river corridors, there would be no impact in any of the alternatives. Geophysical exploration operations would be subject to relatively the same management decisions and subsequent effects as identified for fluid mineral leasing and development. Although existing fluid mineral leases would not be modified by the decisions of this plan during the term of each lease, lessees and operators would be encouraged to voluntarily comply with such requirements if and when operations are conducted.

Most mineral rights on BLM-administered lands identified for disposal would be retained. This could, however, potentially create a split-estate situation; i.e., surface estate separated from the subsurface minerals. Exploration and development in these areas could cause some additional operational requirements; however, because of the assumed low-mineral values, the effect would be insignificant. Class I paleo areas and developed recreation sites would be protected by no surface occupancy stipulations on 2,728 acres in all alternatives.

TABLE 4-9
Impacts to Fluid Minerals Management

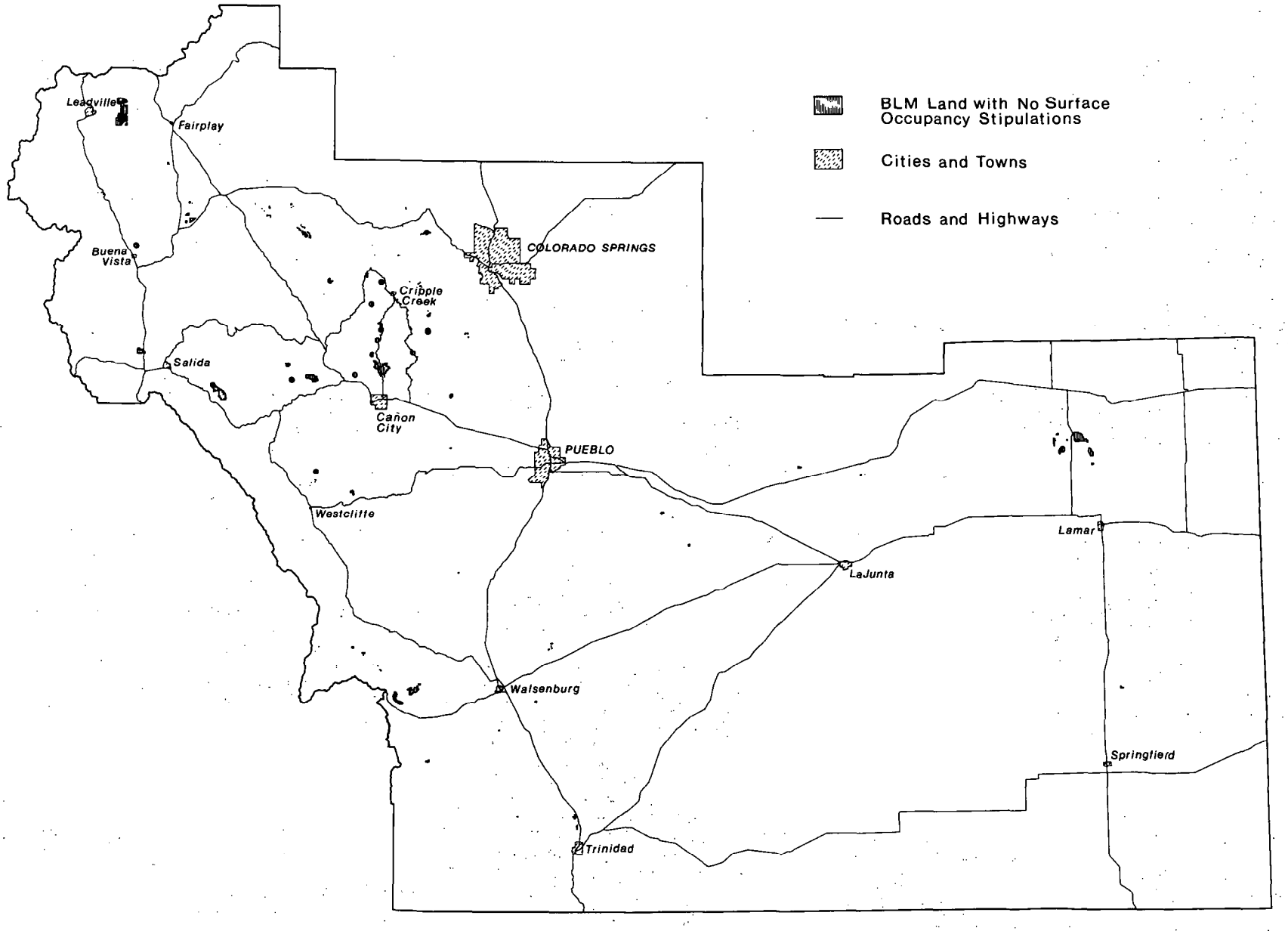
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Riparian areas Fisheries	Fluid minerals on 10,220 acres would be open for leasing under standard stipulations.	Fluid mineral operations would be severely restricted by NSO stipulations on the following resource potential: - 4,526 acres of high - 719 acres of moderate - 917 acres of low - 4,058 acres of no.	Same as Alternative A.	Fluid mineral operations would be severely restricted by CSU stipulations on the following resource potential: - 40 acres of high - 40 acres of moderate - 500 acres of low - 3,088 acres of no. Fluid mineral operations would be severely restricted by NSO stipulations on the following resource potential: - 4,486 acres of high - 679 acres of moderate - 417 acres of low - 970 acres of no.

Table 4-9 (Continued)

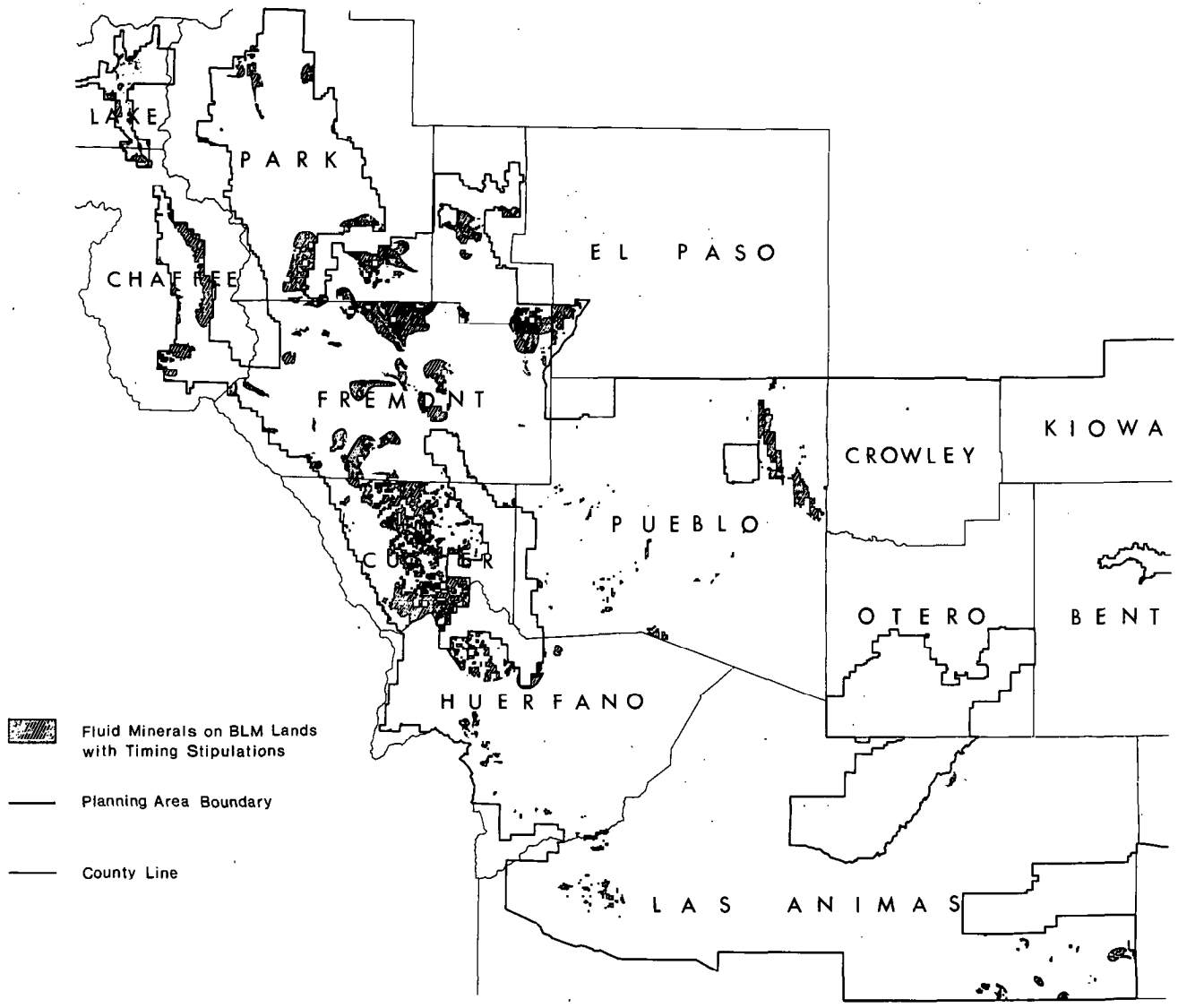
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Wildlife habitat *Special status animals*		Fluid mineral operations would be severely restricted by NSO stipulations by resource potential: - 9,361 acres of high - 15,933 acres of moderate - 46,810 acres of low - 141,118 acres of no.	Fluids would be open for leasing under standard stipulations.	
	Seasonal stipulations could result in moderate restriction based on the length of the limitation and the operation scheduling needs by resource potential: - 28,575 acres of high - 33,444 acres of moderate - 51,110 acres of low - 167,846 acres of no.	Seasonal stipulations could result in minor to moderate restriction based on the length of the limitation and the operation scheduling needs by resource potential: - 41,249 acres of high - 157,454 acres of moderate - 168,630 acres of low - 618,369 acres of no.		Seasonal stipulations could result in minor to moderate restriction based on the length of the limitation and the operation scheduling needs by resource potential: - 30,350 acres of high - 42,289 acres of moderate - 99,204acres of low - 240,674 of no.
Special status plants	Fluid mineral operations siting would be slightly modified by NSO stipulations.	Same as Alternative A.	No positive/negative impacts.	Same as Alternative A.
ACEC designations	Fluid mineral operations would be restricted or possibly precluded by NSO stipulations by resource potential: - 4,238 acres of no.	Fluid mineral operations would be severely restricted or precluded by NSO stipulations on the following areas by resource potential: - 1,758 acres of high - 4,115 acres of moderate - 45,350 acres of low - 102,326 acres of no.	Same as Alternative A.	Fluid mineral operations would be restricted or precluded by NSO stipulations by resource potential: - 9,062 acres of no.
Visual resources	Fluid mineral operations would be allowed on the following areas by resource potential: - 4,750 acres of high - 5,592 acres of moderate - 53,273 acres of low - 256,823 acres of no.	Fluid mineral operations would be severely restricted or precluded by NSO stipulations on the following areas by resource potential: - 4,750 acres of high - 5,592 acres of moderate - 53,273 acres of low - 256,823 acres of no.	Same as Alternative A.	Fluid mineral operations would be moderately to severely restricted by CSU stipulations because of screening requirements by resource potential: - 4,750 acres of high - 5,592 acres of moderate - 53,273 acres of low - 256,823 acres of no.

1/ See maps 4-1, 4-2, and 4-3.

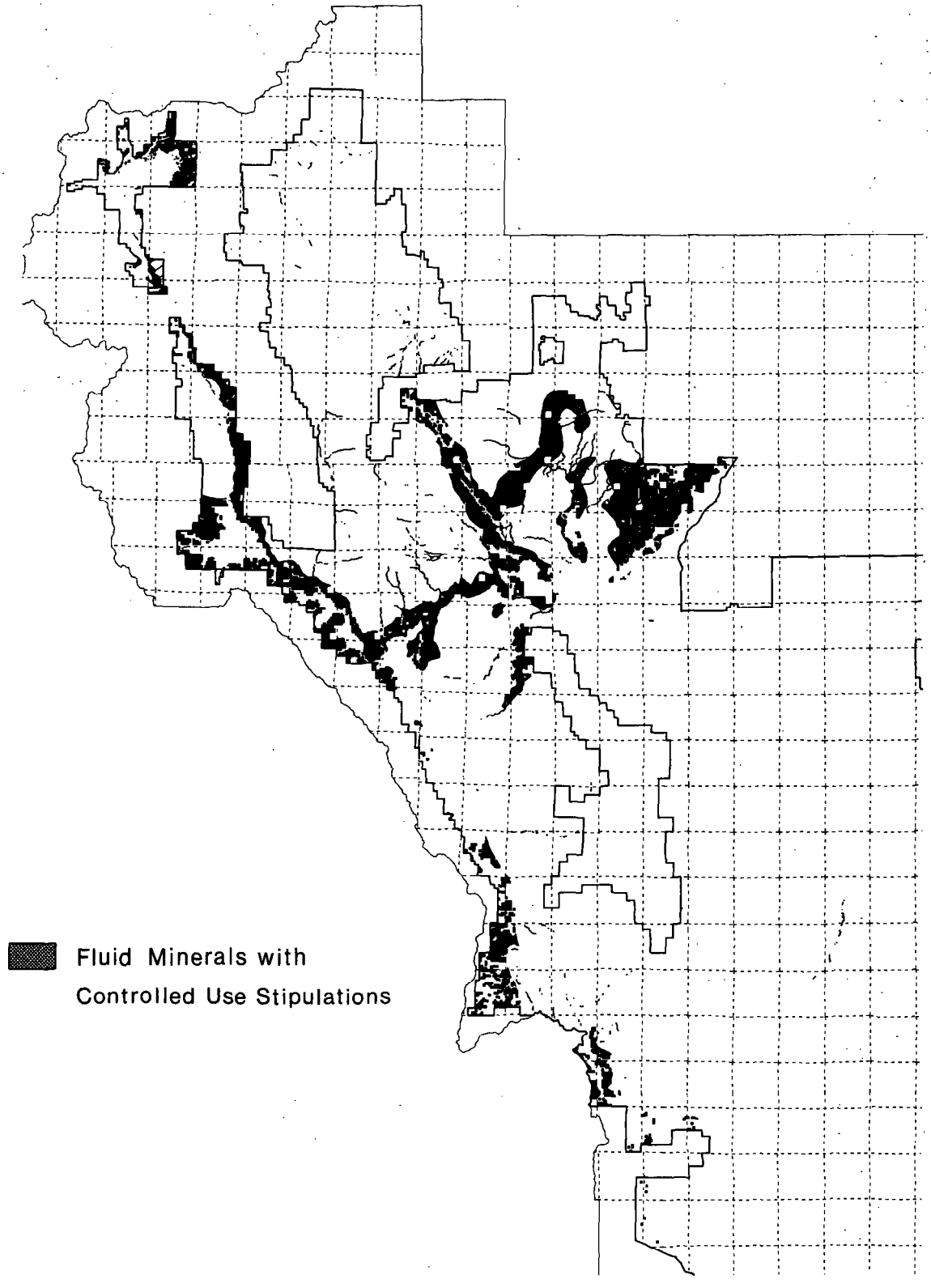
Impact Conclusions: Leasing would not be significantly adversely affected in Alternatives A and C. No surface occupancy stipulations, controlled surface use stipulations, and seasonal use restrictions on up to 2 percent of the high potential fluid minerals in Alternatives B and D could cause cumulative adverse affects on fluid mineral operations. None of these adverse affects are irretrievable or irreversible.



Map 4-1 - FLUID MINERALS (NSO Stips)
Preferred Alternative



Map 4-2 - FLUID MINERALS (Seasonal Stips)
Preferred Alternative



Map 4-3 - Fluid Minerals (CSU Stips)
Preferred Alternative

Locatable Minerals Management

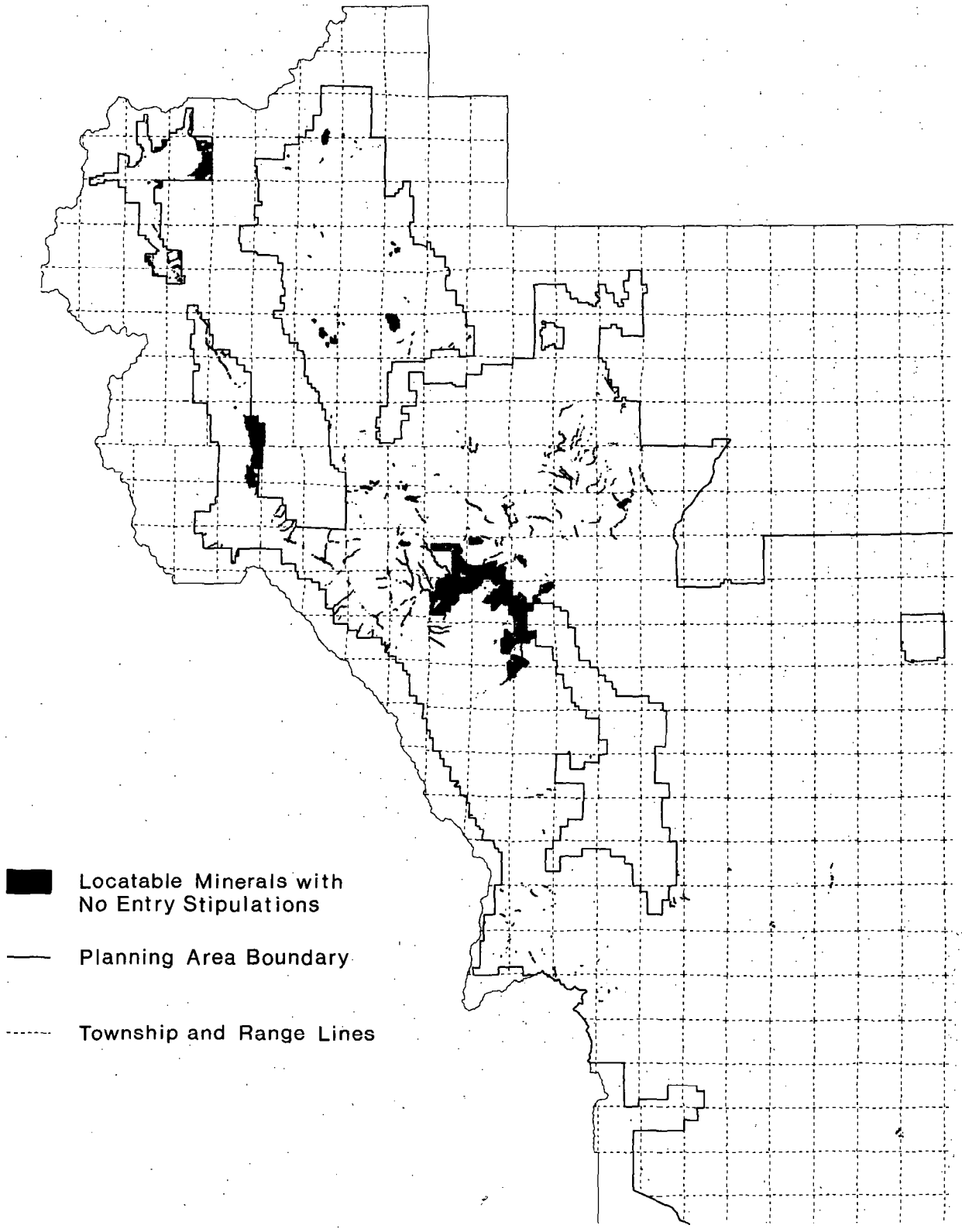
Minerals availability could increase through land acquisition. Class I paleo areas and developed recrereation sites would be closed to mineral entry in all alternatives.

TABLE 4-10
Impacts on Locatable Minerals Management

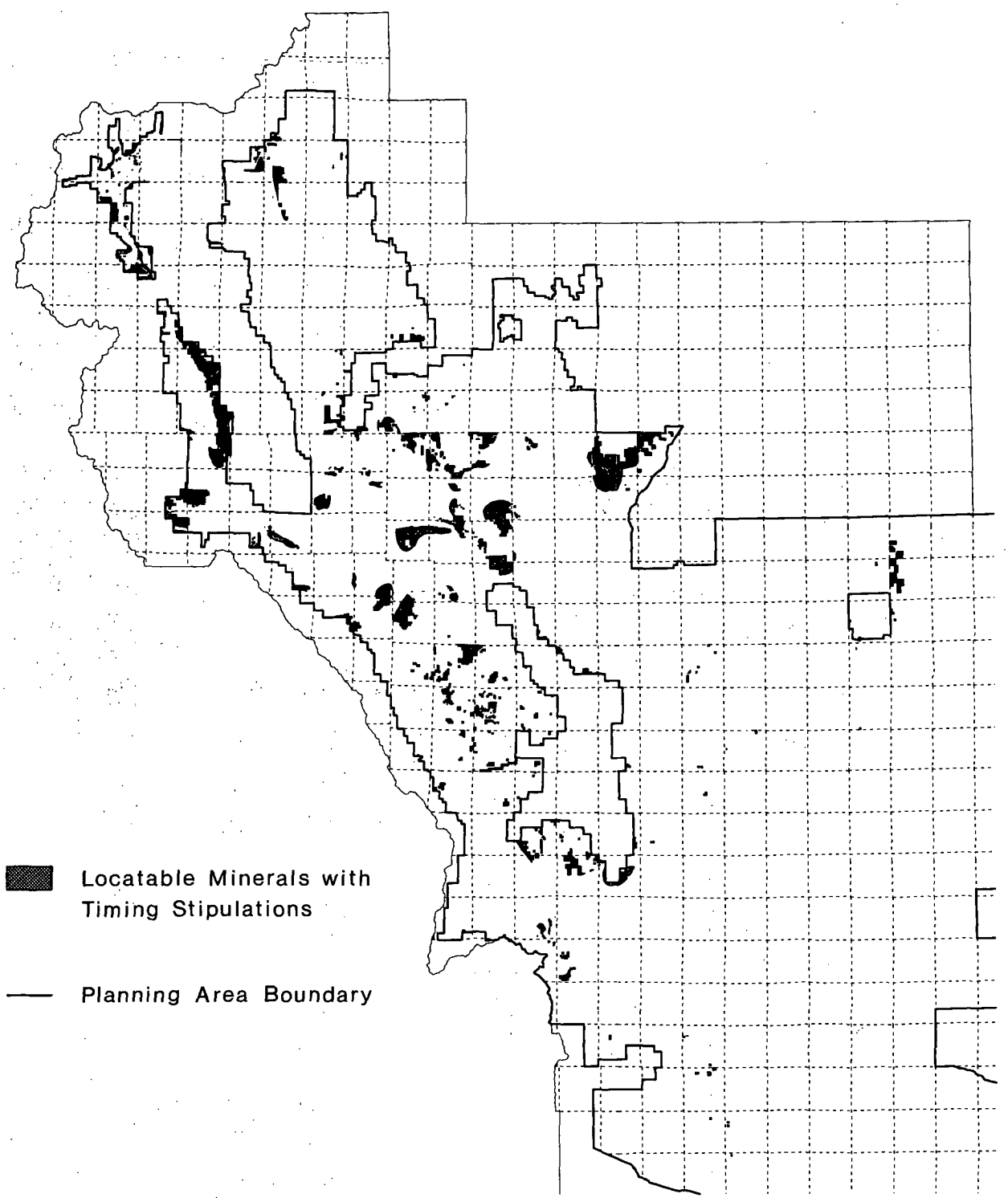
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Riparian areas	Mineral entry could occur on 2,550 surface acres.	Mineral entry would not occur on 2,550 surface acres.	Same as Alternative A.	Mineral entry could occur on 1,275 surface acres. Mineral entry would not occur on balance of 1,275 surface acres.
Wildlife habitat	Mineral entry could occur on big game birthing areas (17,499 surface acres). Mineral entry would not be restricted by various seasonal limitations on 94,389 surface acres.	Mineral entry would not occur on big game birthing areas (17,499 surface acres). Mineral entry would be restricted by various seasonal limitations on 94,389 surface acres.	Same as Alternative A.	Same as Alternative B.
Fisheries habitat	Mineral entry could occur on 11,108 surface acres..	Mineral entry would not occur on 11,108 surface acres.	Same as Alternative A.	Same as Alternative B.
Special status plants	Mineral entry would not occur on 4,741 surface acres. Mineral entry could occur on 4,741 surface acres.	Mineral entry would not occur on 8,979 surface acres.	Same as Alternative A.	Same as Alternative B.
Special status animals	Mineral entry would not be retricted on 259,700 surface acres.	Mineral entry would be seasonally restricted on 259,700 surface acres.	Same as Alternative A.	Same as Alternative B.
Historical resources Archaeological resources	Mineral entry would not occur in Garden Park Paleo ACEC (2,728 surface acres).	Mineral entry would not occur in 8 NRHP sites or districts (11,760 surface acres).	Same as Alternative A.	Same as Alternative B.
ACEC designations	Mineral entry would not occur on 4,238 surface acres.	Mineral entry would not occur on 14 ACECs (112,081 surface acres).	Same as Alternative A.	Mineral entry could occur on 3 ACECs (44,485 surface acres), but would require a plan of operations. Mineral entry would not occur on 6 ACECs (34,071 surface acres).
Wild and scenic river designations	Mineral entry could occur on 21,931 surface acres.	Mineral entry would not occur on 21,931 surface acres.	Same as Alternative A.	Same as Alternative A.
Visual resources	Mineral entry could occur on 206,436 surface acres.	Mineral entry would not occur on 206,436 surface acres.	Same as Alternative A.	Same as Alternative A.

[1/] See maps 4-4 and 4-5.

Impact Conclusions: Locatable minerals would not be significantly adversely affected in Alternatives A and C; approximately 653, 000 acres (100 percent) would be open to mineral entry. No mineral entry, claimant notifications for seasonal limitations, and requirements for advance plans of operations in ACECs in Alternatives B and D could cause cumulative adverse affects on mineral operations. Approximately 450,000 acres (70 percent) would be open to mineral entry in Alternatives B and D. None of these affects are irretrievable or irreversible.



Map 4-4 - LOCATABLE MINERALS (No Entry Stips)
Preferred Alternative



Map 4-5 - LOCATABLE MINERALS (Seasonal Stips)
Preferred Alternative

Mineral Materials Management

Mineral availability could increase through land acquisition. Class I paleo areas and developed recreation sites would be closed to mineral materials disposal in all alternatives.

TABLE 4-11
Impacts to Mineral Materials Management

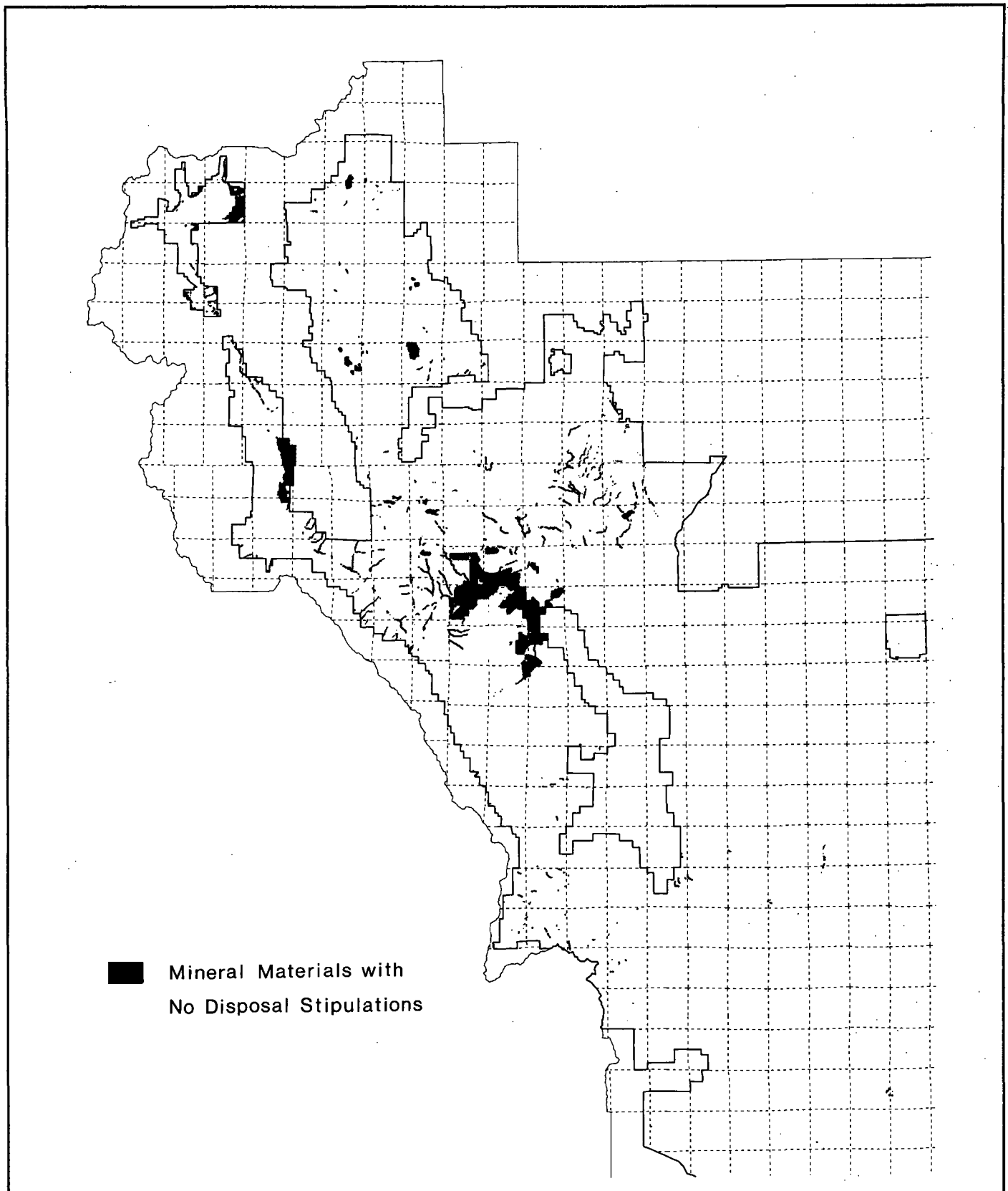
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Riparian areas	Mineral material disposal could occur on 2,550 surface acres.	Mineral material disposal would not occur on 2,550 surface acres.	Same as Alternative A.	Same as Alternative B.
Wildlife habitat	Mineral material disposal could occur in big game birthing areas (17,499 acres). Mineral material disposal would not be restricted by various seasonal limitations on 94,389 surface acres.	Mineral material disposal would not occur in big game birthing areas (17,499surface acres). Mineral material disposal would be restricted by various seasonal limitations on 94,389 surface acres.	Same as Alternative A.	Same as Alternative B.
Fisheries habitat	Mineral material disposal could occur on 11,108 surface acres.	Mineral material disposal would not occur on 11,108 surface acres.	Same as Alternative A.	Same as Alternative B.
Special status plants	Mineral material disposal would not occur on 4,238 surface acres. Mineral material disposal could occur on 4,741 surface acres.	Mineral material disposal would not occur on 8,979 surface acres.	Same as Alternative A.	Same as Alternative B.
Special status animals	Mineral material disposal would not be restricted on 259,700 surface acres.	Mineral material disposal would be seasonally restricted on 259,700 surface acres.	Same as Alternative A.	Same as Alternative B.
Historical resources Archaeological resources	Mineral material disposal could occur in 8 potential NRHP sites or districts (11,760 acres).	Mineral material disposal would not occur in 8 potential NRHP sites or districts (11,760 acres).	Mineral material disposal could occur and would be considered on a case-by-case basis on 11,760 acres.	Same as Alternative B.
ACEC designations	Mineral material disposal would not occur on 4,238 acres.	Mineral material disposal would not occur on 14 ACECs (112,081 acres).	No positive/negative impacts.	Mineral material disposal could occur on 3 ACECs (44,485 acres) but would enhance values. Mineral material disposal would not occur on 6 ACECs (34,071 acres).
Wild and scenic river designations	Mineral material disposal could occur on 21,931 acres.	Mineral material disposal would not occur on 21,931 acres.	Same as Alternative A.	Same as Alternative A.

Table 4-11 (Continued)

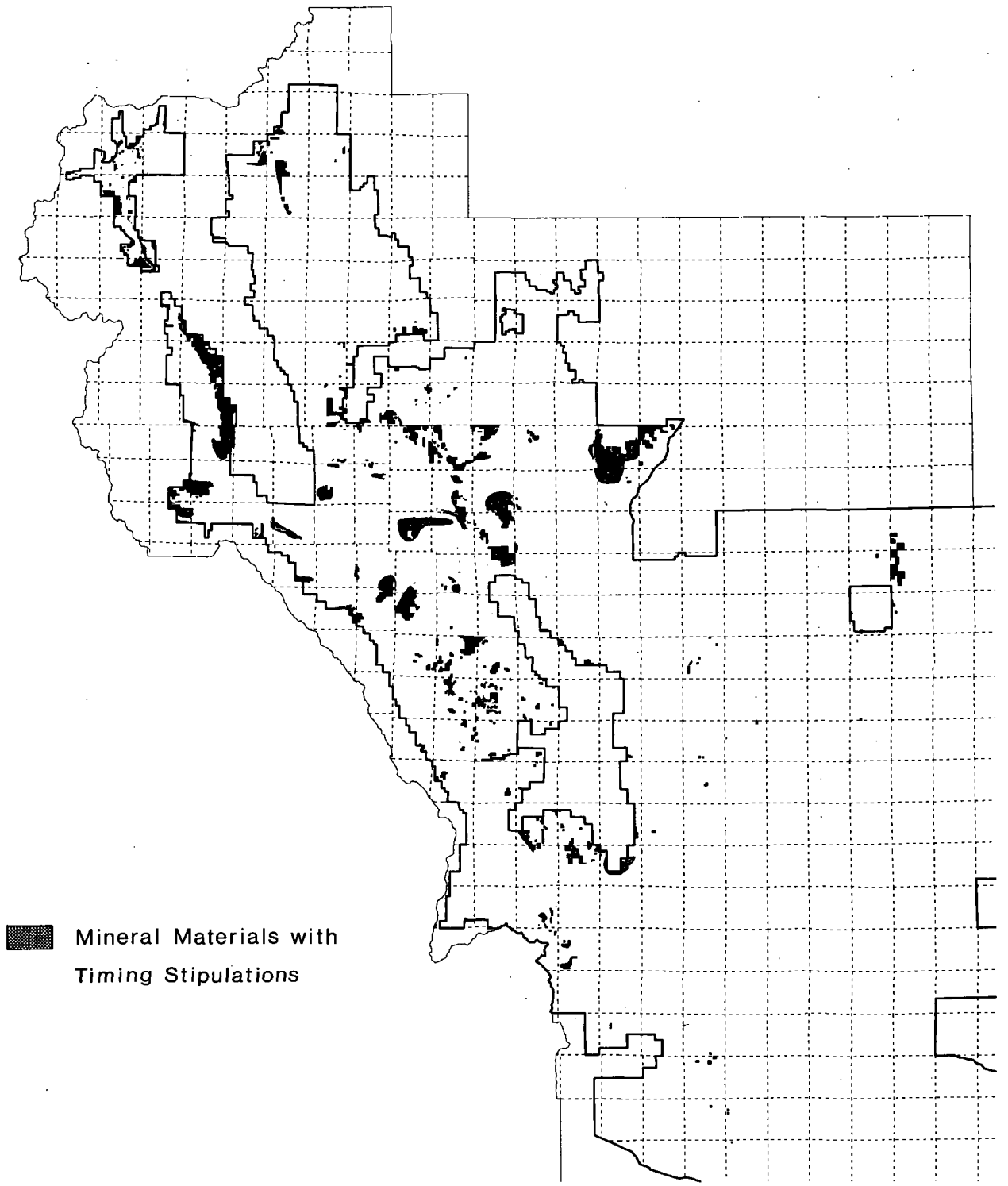
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Visual resources	Mineral material disposal could occur on 206,436 acres.	Mineral material disposal would not occur in VRM Class II areas (206,436 acres).	Same as Alternative A.	Mitigation would be required on a case-by-case basis on 206,436 acres.

1/See maps 4-6 and 4-7.

Impact Conclusions: Mineral materials disposal would likely not be significantly adversely affected in Alternatives A and C. Approximately 653,000 acres (100 percent) would be open to mineral disposal in Alternatives A and C. No mineral disposal and seasonal limitations in Alternatives B and D could cause cumulative adverse affects on mineral disposal operations. Approximately 450,000 acres (70 percent) would be open to mineral disposal in Alternatives B and D. None of these effects are irretrievable or irreversible.



Map 4-6 - MINERAL MATERIALS (No Disposal Stips)
Preferred Alternative



Map 4-7 - MINERAL MATERIALS (Seasonal Stips)
Preferred Alternative

Coal Minerals Management

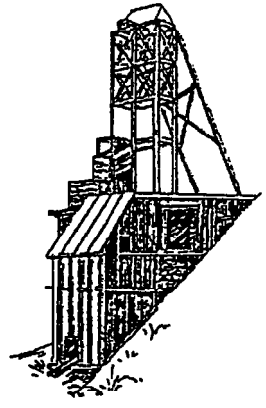
Mineral availability could be increased through land acquisition, and high potential minerals would be retained. All coal leasing for surface/underground mining would be affected.

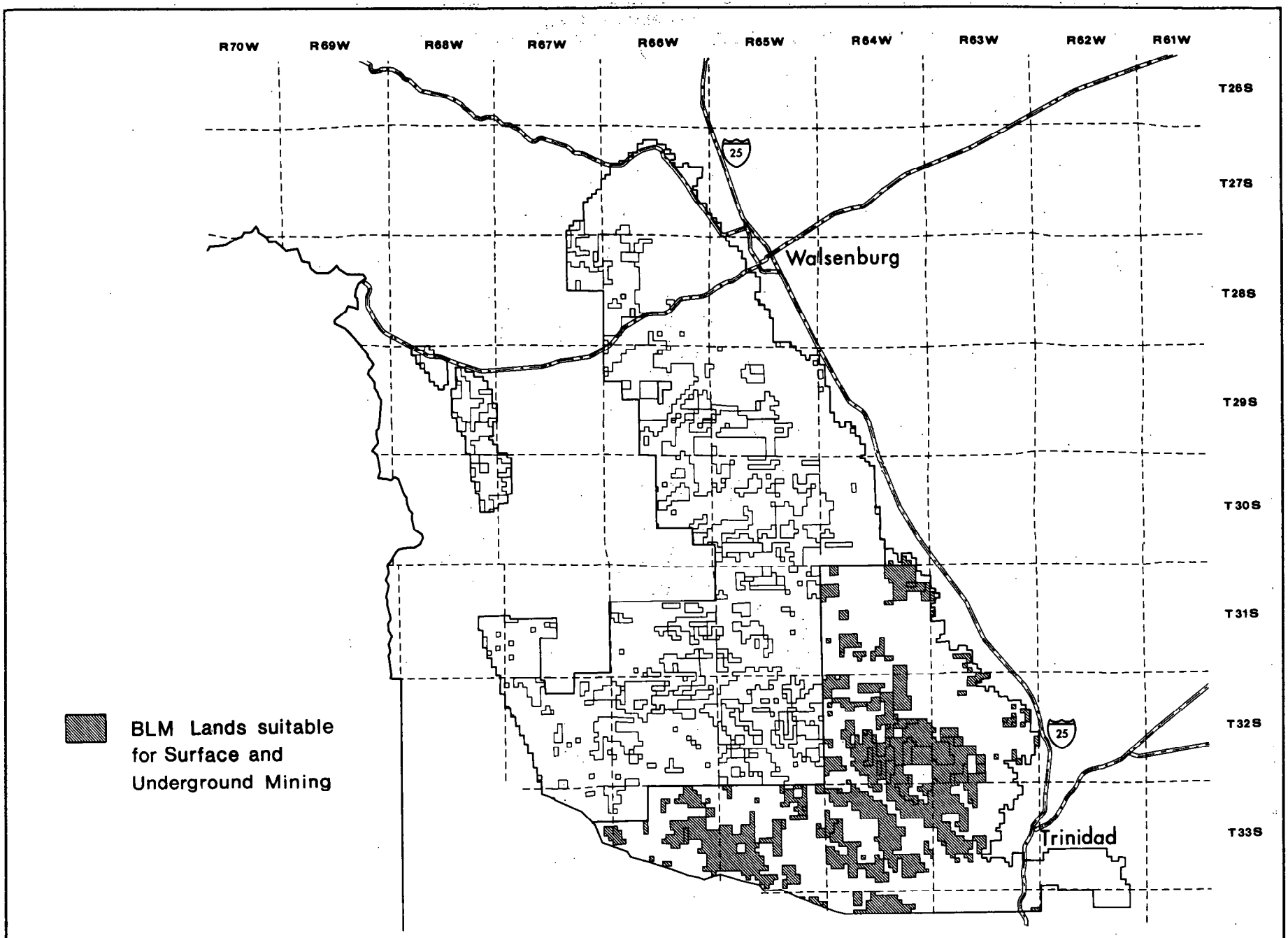
TABLE 4-12
Impacts to Coal Minerals Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Vegetation	No positive/negative impacts.	Coal leasing would require a desired plant community plan.	Same as Alternative A.	Same as Alternative B.
Wildlife habitat	No positive/negative impacts.	Coal leasing would not occur in big game birthing areas (167 acres). Coal leasing would be restricted by various timing limitations on 23,955 acres of big game critical winter habitat.	Same as Alternative A.	Same as Alternative B, except coal leasing would not be restricted through seasonal limitations on 23,955 acres of big game critical winter habitat.

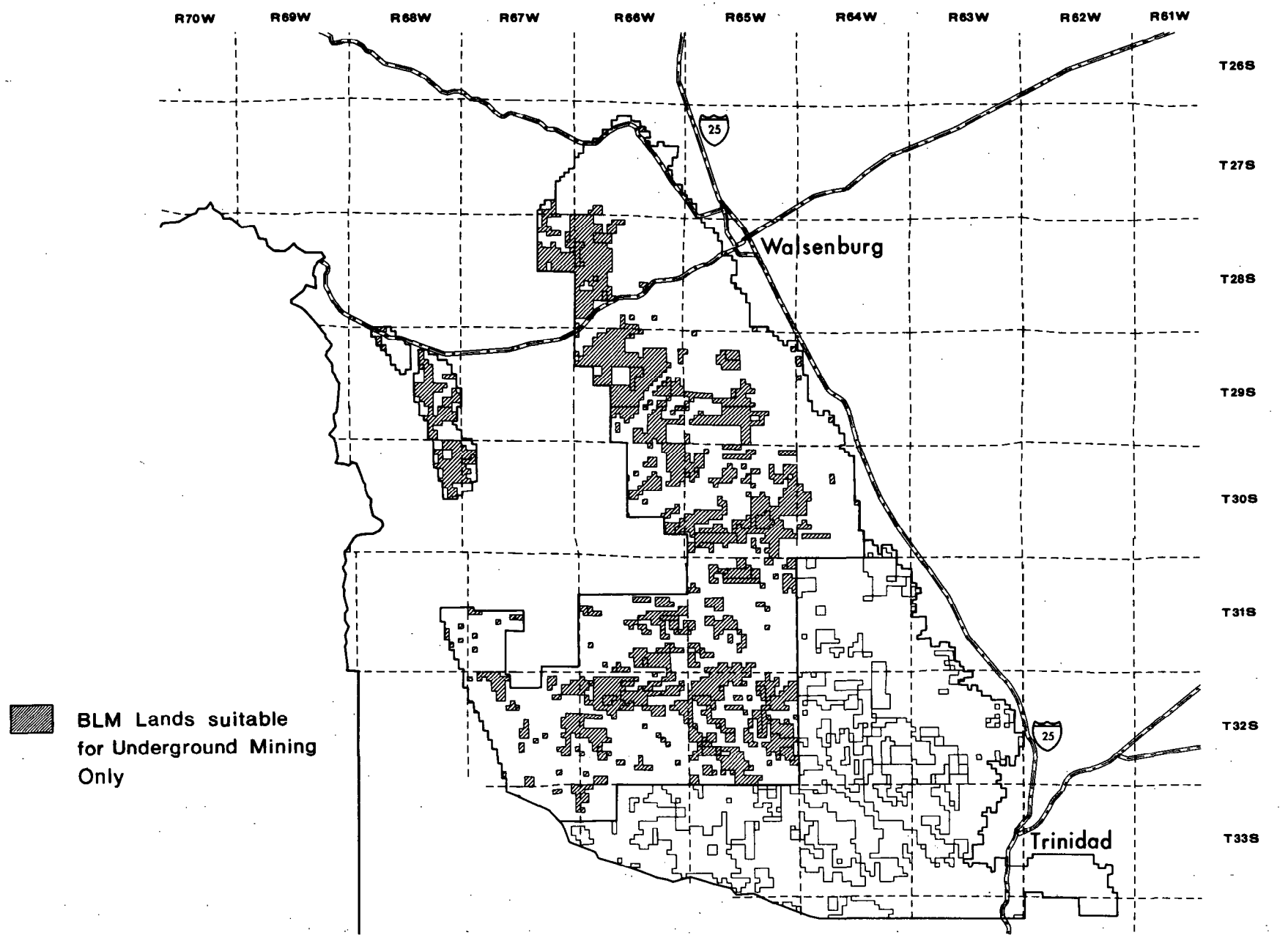
1/See maps 4-8 and 4-9

Impact Conclusions: Leasing would likely not be adversely affected in any of the alternatives. Approxmiately 131,000 acres (100 percent) would be available for coal leasing in Alternatives A and C with 78,000 acres (59 percent) available for underground mining only and 53,000 acres (41 percent) available for surface or underground mining. In Alternatives B and C, 167 acres (less than 1 percent) of big game birthing habitat would not be available for surface mining. In Alternative B, 23,955 acres (45 percent) of the 53,000 acres available for surface mining would have big game critical winter seasonal limitations for 4 months. The cumulative effect on coal leasing would be 99 percent of Federal coal mineral acres suitable for surface or underground mining would be available, and 100 percent of Federal coal mineral acres suitable for undergound mining would be available in Alternative D. None of these effects are irretrievable or irreversible.





Map 4-8 - COAL AREAS SUITABLE FOR SURFACE AND UNDGERGOUND MINING
Preferred Alternative



Map 4-9 - COAL AREAS SUITABLE FOR UNDERGROUND MINING ONLY
Preferred Alternative

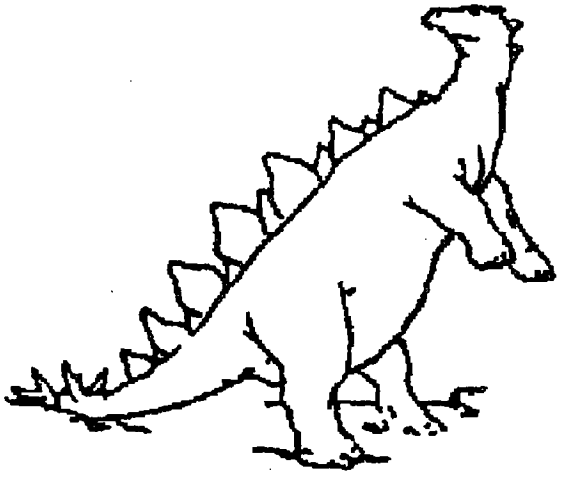
Paleontological Resources

Under current circumstances, paleontological resources would continue to deteriorate through natural forces, public visitation, and vandalism if no corrective nor preventive action is taken. Full compliance and implementation of the laws, regulations, and Bureau policy would be completed before beginning any actions resulting from approved RMP decisions; however, there would still be a net adverse effect to this resource.Class I resources on 2,728 acres would be protected from all surface disturbance except livestock grazing and intensive forest management.

TABLE 4-13
Impacts on Paleontological Resources

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Livestock grazing	All classes could be damaged by surface disturbance.	Class I resources on 2,728 acres (100 percent) would be protected through elimination of grazing.	Same as Alternative A.	Class I resources on 2,728 acres (100 percent) would be protected through grazing restrictions.
Forest and woodlands	Class I resources on 2,728 acres would not be protected.	Class I resources on 2,728 acres would be protected.	Same as Alternative A.	Same as Alternative B.

Impact Conclusions: Substantial Class I paleontological resources could be damaged in Alternatives A and C and protected in Alternatives B and D. Potential effects in Alternatives A and C might be considered irretrievable or irreversible.



Historical Resources

Under current circumstances, historical resources would continue to deteriorate through natural forces and from public use and vandalism if no corrective nor preventive action is taken. Identified potential NRHP sites would remain under BLM-administration in all alternatives. The remaining historical values could be lost even though recording and mitigation would occur prior to disposal. Clearance would be required pursuant to 36 CFR 800. Full compliance and enforcement of Sec. 106 of the *National Historic Preservation Act* (1966) would be completed before beginning any actions resulting from approved RMP decisions; however, there would still be a net adverse effect to this resource. Range improvement and land treatment projects would avoid historical sites.

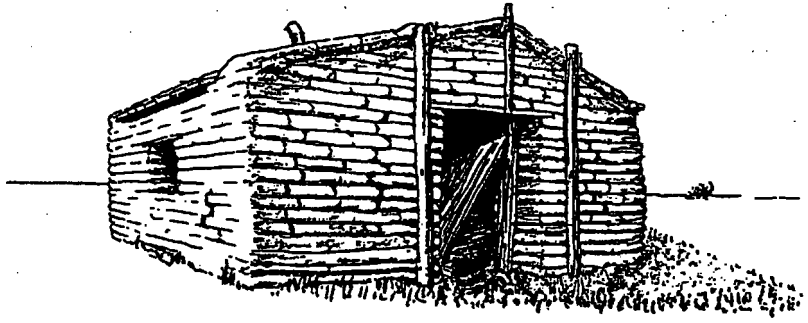
TABLE 4-14
Impacts to Historical Resources

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Off-highway vehicle use *Recreation resources*	Developments would cause direct and indirect damage to 2,960 acres.	Signs, fences, interpretation, and visitor education would provide some protection for the six identified potential NRHP sites (2,960 acres). Increased use resulting from interpretation, signing, and visitor education would damage Garden Park and Florence and Cripple Creek Railroads. Less damage would occur to the DeReemer Forts, Leadville Stage Line, and the Denver and Rio Grande Railline in Grape Creek because of the unsuitability for activities except hiking. Impacts from biking would continue on the Midland Railroad Railbed.	Same as Alternative A.	Same as Alternative B.
Fluid minerals *Locatable minerals* *Mineral materials*	Resources on 1 potential NRHP site (320 acres) would be protected through NSO stipulations for fluids and closure to mineral entry and disposal of mineral materials. Resources on 5 potential NRHP sites (2,640 acres) would not be protected.	Resources on all 6 potential NRHP sites (2,960 acres) would be protected.	Same as Alternative A.	Resources on all 6 potential NRHP sites (2,960 acres) would be protected by standard stipulations instead of NSO stipulations for fluids. Resources on all 6 potential NRHP sites (2,960 acres) would be protected by closure to mineral entry and mineral materials disposal.
Paleontological resources *Archaeological resources*	Damage from scientific uses would occur on Garden Park (320 acres) and some archaeological uses would impact historic railroad sites (2,160 acres). Sites excavated for research would be destroyed.	Damage and destruction would occur on most sites used for scientific use, particularly historic archaeology; i.e., Garden Park, Florence and Cripple Creek Railroad, and possibly DeReemer Forts (1,440 acres).	Same as Alternative A.	Same as Alternative B.

Table 4-14 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
ACEC designations	Designation of Garden Park Paleo area (2,728 acres) would provide protection of historical values.	Designation of eight sites (Mosquito Pass, Browns Canyon, Arkansas Canyonlands, Phantom Canyon, Beaver Creek, Garden Park, Cucharas Canyon, and Grape Creek) would enhance protection of historical values on 78,556 acres.	Same as Alternative A.	Same as Alternative B.
Recreation resources	Recreation development would give some protection to 1 potential NRHP site (320 acres) from weathering and deterioration. Damage would continue on the remaining 5 potential NRHP sites (2,640 acres). Increased use on sites developed for recreation or other uses; i.e., Garden Park and the Florence and Cripple Creek Railroad, would result in additional destruction.	Development (stabilization, site management, etc.) would give some protection to Garden Park, Florence and Cripple Creek Railroad, and the Midland Railroad (1,760 acres).	Same as Alternative A.	Same as Alternative A.

Impact Conclusions: Some damage to historical resources, including five potential NRHP sites, would likely occur in Alternatives A and C. These would be protected in Alternatives B and D. Potential effects in Alternatives A and C might be irretrievable or irreversible.



Archaeological Resources

Under current circumstances, archaeological resources would continue to deteriorate through natural forces and from public use and vandalism if neither corrective nor preventive action is taken. Designation of two potentially eligible NRHP areas (Badger Creek and Cucharas Canyon) would provide protection of archaeological values on 8,800 acres. Compliance with 36 CFR 800 would continue. Full compliance with Sec. 106 of the *National Historic Preservation Act* (1966) would be completed before beginning any actions resulting from approved RMP decisions; however, there would still be a net adverse effect to this resource. Development of recreation areas and construction of waterpower and reservoir facilities would cause increased destruction of sites; e.g., vandalism, theft, and alteration of the landscape. Range improvement and land treatment of projects would comply with the Act. "Significance thresholds" were not calculated for archaeological resources since the loss of potential scientific information is not measurable. The loss of a single artifact could be potentially significant. Cumulative effects are also not measurable since the resource is fragile and nonrenewable. NRHP sites would be retained in BLM-administration in all alternatives.

TABLE 4-15
Impacts to Archaeological Resources

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred -Alternative D
Fluid minerals *Locatable minerals* *Mineral materials*	Resources on 645,000 acres, which include 2 potential NRHP sites (8,800 acres), would be protected by standard stipulations for fluids and mineral materials; they would not be protected from mineral entry.	Resources on 2 potential NRHP sites (8,800 acres) would be protected through NSO stipulationss for fluids and closure to mineral entry and disposal of mineral materials. Resources on other areas protected from mineral development would be mitigated.	Same as Alternative A plus increased interpretation would enhance archaeological values.	Resources on 2 potential NRHP sites (8,800 acres) would be protected by standard stipulations instead of NSO stipulations for fluids. The other archaeological resources on areas with NSO stipulations would be protected as well as resources on areas protected from other mineral development. Resources on 2 potential NRHP sites (8,800 acres) would be protected through closure to mineral entry and disposal of mineral materials.
Transportation and Access *Off-highway vehicle use*	Opportunities for vandalism would increase if new access routes are developed. Archaeological resources in or near these areas would not be protected through control of public access or limitations of OHV use to designated roads and trails.	Archaeological resources in or near these areas (11,760 acres) would be protected through limitations of OHV use to designated roads and trails.	Same as Alternative A.	Same as Alternative B except Badger Creek ACEC (7,200 acres) would not be protected.
ACEC designations	Designation of Garden Park area (2,728 acres) would provide protection of archaeological values. Resources on 2 potential NRHP sites (8,800 acres) would not be protected.	Badger Creek, Cucharas Canyon, Arkansas Canyonlands, and Phantom Canyon (58,461 acres), which include 2 potential NRHP sites, would be protected.	Same as Alternative A.	Values on 29,821 acres, which include 1 potential NRHP site, would be protected. Values on 1 potential NRHP site (7,200 acres), which is included in the Badger Creek area, would not be protected.

Table 4-15 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred -Alternative D
Recreation	Public awareness and importance of preservation would be enhanced through interpretation of sites/districts (8,800 acres).	Same as Alternative A.	Maximum development of information potential and intensive management for recreation purposes would enhance public awareness of sites/districts (8,800 acres).	Same as Alternative A.

Impact Conclusions: Some damage to archaeological resources, including two potential NRHP sites, would likely occur in Alternatives A and C. These resources would be protected in Alternatives B and D. Potential effects in Alternatives A and C might be irretrievable or irreversible.

Transportation and Access Management

Acquisition of all identified access proposals would improve administration of resource programs. BLM collector and local roads would continue to be maintained, and BLM resource roads would not be routinely maintained. An active signing/barricading program would also be implemented on road closures and problem areas. Some roads would be system roads maintained by BLM for public benefit and general administration. System roads would be those necessary for significant administration. Cattleguards would be required for public roads on lands allocated for grazing. Roads would avoid historical/archaeological sites if possible; if not, sites would be recorded and mitigated.

TABLE 4-16
Impacts to Transportation and Access Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Forest and woodlands	Road construction would allow additional public access.	Road construction would be limited or not occur, and additional public access would be limited.	Same as Alternative A.	Same as Alternative A.
Wildlife habitat *Special status plants* *Special status animals*	Road construction would be limited and could restrict additional public access.	Road construction would not occur on areas with significant values, and additional public access would be limited.	Road construction would allow additional public access.	Same as Alternative A.
Mineral materials	Road construction would allow additional public access.	Road construction would be limited or not occur, and additional public access would be limited.	Same as Alternative A.	Same as Alternative A.
Off-highway vehicle use	Roads with limited use would be protected from additional deterioration; public access would be limited.	Roads closed or with limited use would be protected from damage and unnecessary deterioration; public access would be limited.	Same as Alternative A.	Same as Alternative A.
Visual resources	Minor restrictions on road development would reduce public access.	Major restrictions on road development or closures would reduce public access.	Same as Alternative A.	Same as Alternative A.
Recreation resources	New access routes and limited maintained roads would increase public access.	Limitations on new access and maintained roads would reduce public access.	Same as Alternative A.	Same as Alternative A.

Impact Conclusions: No significant adverse effects would occur in Alternatives A, C, and D. Significant adverse effects to road construction and enhancement of public access would likely occur in Alternative B. None of these effects are irretrievable or irreversible.

Rights-of-Way Management

Concentrated areas with existing major utility facilities and proposed corridors of the Western Regional Corridor Study (WRCS) are established as designated utility corridors. Future major rights-of-way (ROWs) would be restricted to these corridors unless appropriate justification is provided to do otherwise. Avoidance areas are designated where siting and construction would be difficult, and detailed analysis would be required to develop stipulations. Exclusion areas are designated where siting would be virtually impossible, only a thorough review and EIS analysis could jusitify locations in these area, and significant stipulations would be necessary.

Actions with site-specific impacts from development of facilities within communication sites, on smaller ROWs requested by the public, and in corridors (if designated) would be assessed in accordance with Bureau planning/environmental regulations prior to BLM consideration for approval.

TABLE 4-17
Impacts to Rights-of-Way Management

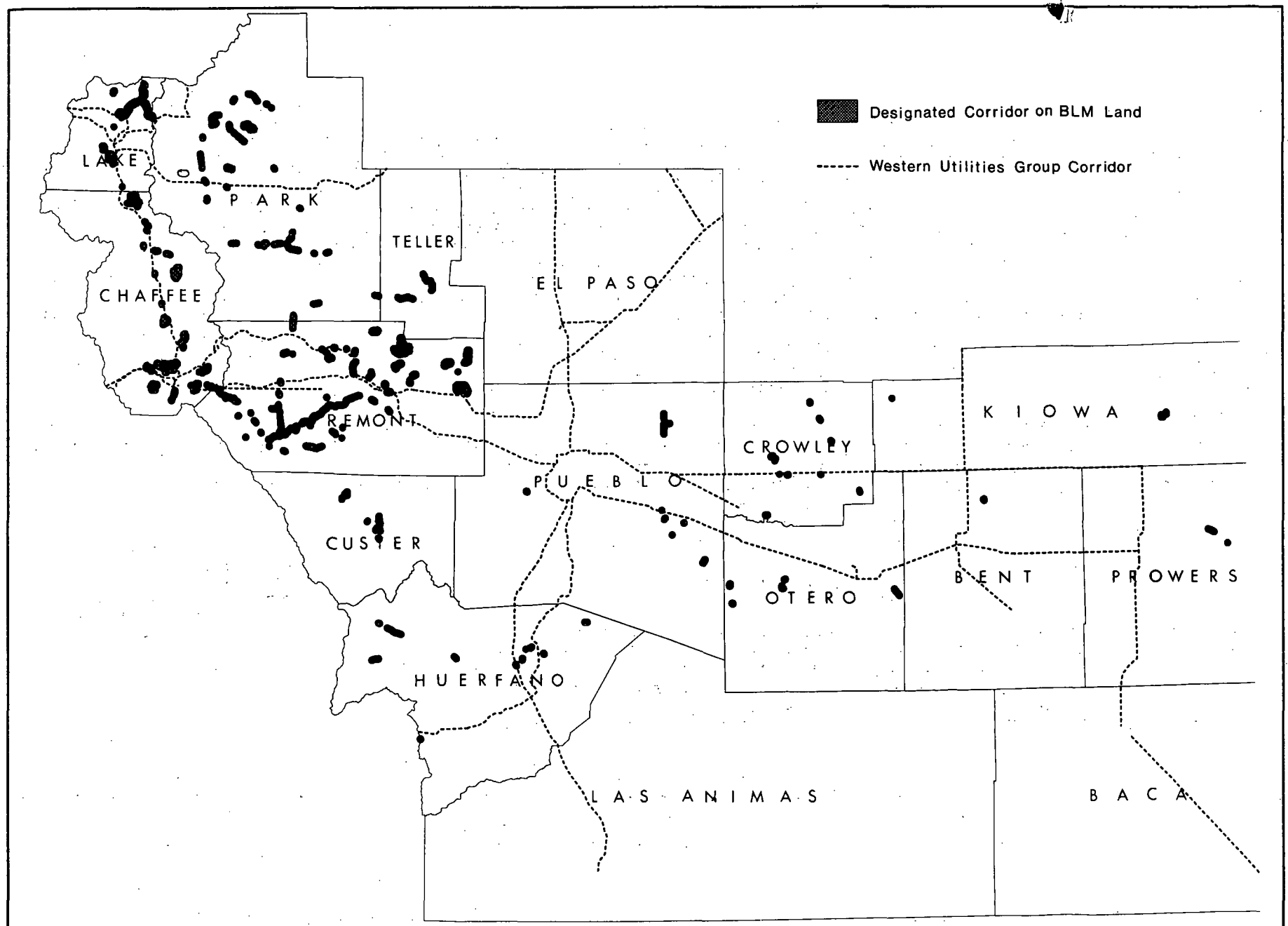
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Riparian areas	Increased costs would not occur from difficulty in locating routes on 2,550 acres.	Increased costs could occur from difficulty in locating routes on 2,550 acres.	Same as Alternative A.	Same as Alternative A.
Wildlife habitat	Increased costs would not occur from difficulty in locating routes in big game critical winter and birthing habitat (111,888 acres).	Increased costs could occur in excluding major ROWs from big game birthing habitat (17,499 acres). Increased costs could occur from difficulty in locating routes to avoid big game critical winter habitat (94,389 acres).	Same as Alternative A.	Same as Alternative B except increased costs would not occur from difficulty in locating routes to avoid big game critical winter habitat (94,389 acres).
Historical resources *Archaelogical resources*	Increased costs would not occur from difficulty in locating routes on 11,760 acres.	Increased costs could occur in excluding major ROWs from 8 potential NRHP sites (11,760 acres).	Same as Alternative A.	Same as Alternative B.
ACEC designations	Increased costs could occur from difficulty in locating routes in 2 ACECs (4,238 acres) in avoidance areas.	Increased costs could occur in excluding major ROWs from 5 ACECs with VRM II (33,538 acres). Increased costs could occur from difficulty in locating routes to avoid 9 ACECs with VRM III (78,543 acres).	Same as Alternative A.	Increased costs could occur from difficulty in locating routes to avoid 5 ACECs (33,538 acres).
Wild and scenic river designations	Two streams/rivers (21,931 acres) would not be exclusion areas.	Two streams/rivers (21,931 acres) would be considered exclusion areas.	Same as Alternative A.	Same as Alternative A.
Visual resources	Increased costs would not occur from difficulty in locating routes in class II areas (206,436 acres).	Increased costs could occur in excluding major ROWs in ACECs with VRM II (33,538 acres).	Same as Alternative A.	Increased costs could occur from difficulty in locating major ROWs to avoid ACECs (33,538 acres) with VRM II.

Table 4-17 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Recreation	Increased costs could occur from difficulty in locating routes through developed recreation sites (80 acres).	Increased costs could occur from difficulty in locating routes to avoid special recreation management areas (235,311 acres) and developed recreation sites (80 acres).	Same as Alternative A	Same as Alternative A.

[1/]*See map 4-10.*

Impact Conclusions: No significant adverse effects would occur in Alternatives A and C in locating rights-of-way routes. There would be some singificant adverse effects on locating new routes in Alternative B and D. Excluding location of new routes in seven ACECs and avoiding location of new routes in two ACECs would likely increase costs of location in Alternatives B and D. None of these effects are irretrievable or irreversible.



Map 4-10 - UTILITY CORRIDORS
Preferred Alternative

Land Ownership Adjustments

Land ownership adjustments (e.g., increases and/or decreases in BLM-administered lands) would be made. Preference would be given to those adjustments that would provide the most benefits to the public. Emphasis would be on increasing usable public resources (e.g., access or riparian zones). Various methods of landownership adjustment would be considered and would be accomplished according to FLPMA. In all cases, fair market value would be received for lands sold, and lands of equal value would be received in exchanges.

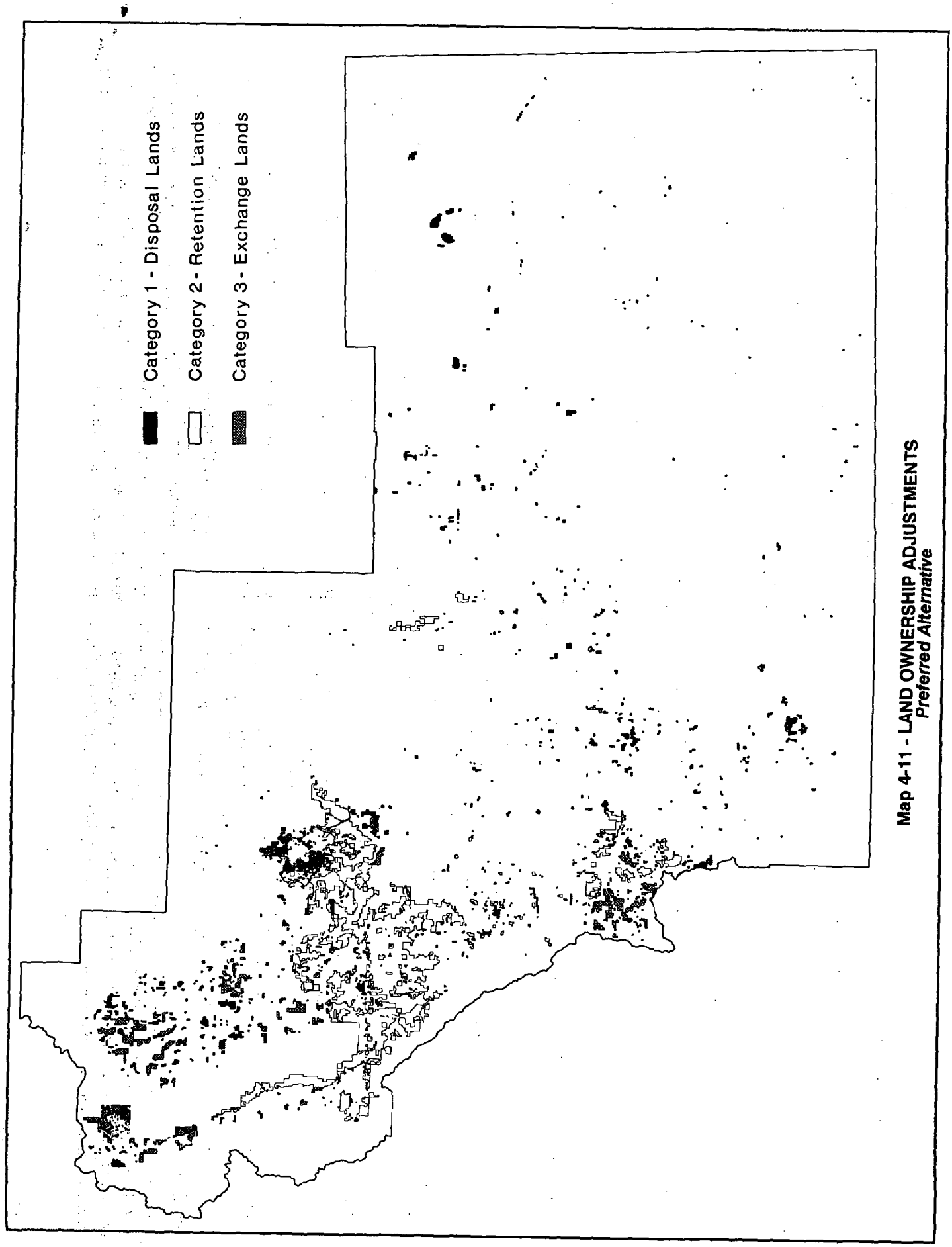
All land adjustments identified would be completed during the life of the plan. Also the adjustments would block up BLM-administered lands, and isolated BLM tracts would be available for disposal. Disposal of riparian areas, developed recreation sites, NRHP eligible cultural and historic sites, and special status species plant and animals habitat would not occur in any of the alternatives.

TABLE 4-18
Impacts on Land Ownership Adjustments

Cause	Exisiting - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Livestock grazing	Disposal of Improve category allotments (287,878 acres) would not occur.	Disposal of Improve category allotments (385,917 acres) would not occur.	Disposal of Improve category allotments (367,676 acres) could occur.	Same as Alternative A.
Forest and woodlands	Disposal of productive forest lands (92,854 acres) would not occur.	Same as Alternative A.	Disposal of productive forest lands (92,854 acres) could occur.	Same as Alternative C.
Wildlife habitat	Disposal of big game birthing and critical winter habitat (111,888 acres) would not occur.	Same as Alternative A.	Disposal of big game birthing and critical winter habitat (111,888 acres) could occur.	Same as Alternative C.
ACEC designations	Disposal of 4,238 acres would not occur.	Disposal of 112,081 acres would not occur.	Same as Alternative A.	Disposal of 75,828 acres could occur.
Visual resources	Disposal of class II areas on 206,436 acres would not occur.	Same as Alternative A.	Disposal of class II areas on 2,407 acres would not occur. Disposal of class II areas on 204,029 acres could occur.	Same as Alternative C.
Recreation resources	Disposal of primitive, SPNM, and SPM, areas (268,831 acres) would not occur.	Same as Alternative A.	Disposal of primitive, SPNM, and SPM, areas (268,831 acres) could occur.	Same as Alternative C.

[1/]See map 4-11.

Impact Conclusions: Land ownership adjustments would not likely be adversely affected in Alternatives A, C, and D. Land ownership adjustments would be significantly adversely affected because of limitations on lands available for disposal in Alternative B. In Alternative D, 83,135 acres (13 percent) would be available for disposal through any means, and 111,888 acres (17 percent) would be available for disposal through land exchanges only. None of these effects are irretrievable or irreversible.



Map 4-11 - LAND OWNERSHIP ADJUSTMENTS
Preferred Alternative

Withdrawals and Classifications

Review of each withdrawal and classification would be completed according to guidance of the RMP and appropriate action taken to continue, revoke/terminate, or modify. Any change in classification or withdrawal is a change in the planned land use for that particular area. Change in availability of the land for application of the public land laws and the mineral laws is the greatest impact of revoking or modifying a withdrawal or classification. In addition, protective withdrawals revoked or modified could adversely affect the protected resource by allowing conflicting use. Class I paleo areas and developed recreation sites would be classified/segregated from public land laws and mining laws.

TABLE 4-19
Impacts to Withdrawals and Classifications

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilzation - Alternative C	Preferred - Alternative D
Riparian areas	No positive/negative impact.	A total of 2,550 acres would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative B.
Wildlife habitat	No positive/negative impact.	A total of 17,499 acres would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative B.
Fishery habitat	No positive/negative impact.	A total of 11,108 acres would be withdrawn/segregrated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative B.
Special status plants ACEC designations	A total of 4,238 acres would be withdrawn from public land laws and mining laws.	A total of 112,081 acres would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative A.	A total of 78,556 acres would be withdrawn/segregated from public land laws and mining laws.
Historical reources Archaeological resources	No positive/negative impact.	Eight potential NRHP sites (11,760 acres) would be withdrawn/ segregated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative B.
Waterpower/reservoir resources	New areas would be withdrawn.	New areas would be withdrawn.	New areas would be withdrawn.	New areas would be withdrawn.
Wild and scenic river designations	No positive/negative impact.	A total of 21,931 acres would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative A.
Visual resources	No positive/negative impact.	Class II areas (206,436 acres) would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative A.	Same as Alternative A.
National recreation area designations	No positive/negative impact.	Same as Alternative A.	A total of 125,000 acres would be withdrawn/segregated from public land laws and mining laws.	Same as Alternative C.

Impact Conclusions: Withdrawals and classifications would not likely be adversely affected in Alternatives A and C; but, would be significantly adversely affected in Alternatives B and D because of limitations on large tracts of lands to be withdrawn. Riparian, wildlife, and fishery habitat, ACECs, historical and archaeological resources, and recreation would be the limiting factors and would be substantially less limiting in Alternative D than in Alternative B. None of these effects are irretrievable or irreversible.

Waterpower/Reservoir Resources

Waterpower/reservoir site withdrawals would continue to be made on sites that meet the qualifying criteria for waterpower/reservoirs.

Location and evaluation of new waterpower/reservoir sites would continue and would be added to the inventory. Land acquisitions of waterpower/reservoir sites meeting the criteria would be completed as needed, and subsequent withdrawals would be made where appropriate.

TABLE 4-20
Impacts to Waterpower/Reservoirs

Cause	Existing - Alternative A	Resource Utilization - Alternative B	Resource Conservation - Alternative C	Preferred - Alternative D
Riparian areas	Existing withdrawals on 2,550 acres would remain.	Existing withdrawals on 2,500 acres would be terminated.	Same as Alternative A.	Existing withdrawals on 1,275 acres would be terminated. Existing withdrawals on 1,275 acres would be retained.
Wildlife habitat	Existing withdrawals on 17,499 acres would remain.	Existing withdrawals on 17,499 acres would be terminated.	Same as Alternative A.	Same as Alternative A.
Recreation resources	Existing withdrawals (1,100 acres) would reduce lands suitable for waterpower/ reservoirs.	Termination of existing waterpower/ reservoir withdrawals and limitations on new withdrawals would reduce land available for waterpower/reservoirs.	Existing withdrawals (1,100 acres) would be revoked increasing lands suitable for waterpower/reservoirs.	Same as Alternative A.
Wild and scenic river designations	Wild and scenic river corridor would not be withdrawn (21,931 acres) from waterpower/ reservoir management.	Wild and scenic river corridor would be withdrawn (21,931 acres) from waterpower/reservoir management.	Same as Alternative A.	Same as Alternative A.
National recreation areas	Potential new withdrawals would not occur. Existing withdrawals (1,100 acres) would not be recommended for termination.	Same as Alternative A.	Potential new withdrawals would reduce lands suitable for waterpower/reservoir intensive management. Some existing withdrawals would be recommended for termination.	Same as Alternative C.

Impact Conclusions: Waterpower/reservoir resources would not likely be adversely affected in Alternatives A and C. Waterpower/reservoir resources would be significantly adversely affected because of the recommendations for termination of protective withdrawals for riparian areas, wildlife habitat, recreation resources, and wild and scenic river corridors in Alternative B. In Alternative D, waterpower/reservoir resources would likely only be moderately adversely affected because of the recommendation for termination of protective withdrawals for about half of the riparian areas. None of these effects are irretrievable or irreversible.

Areas of Critical Environmental Concern Designations

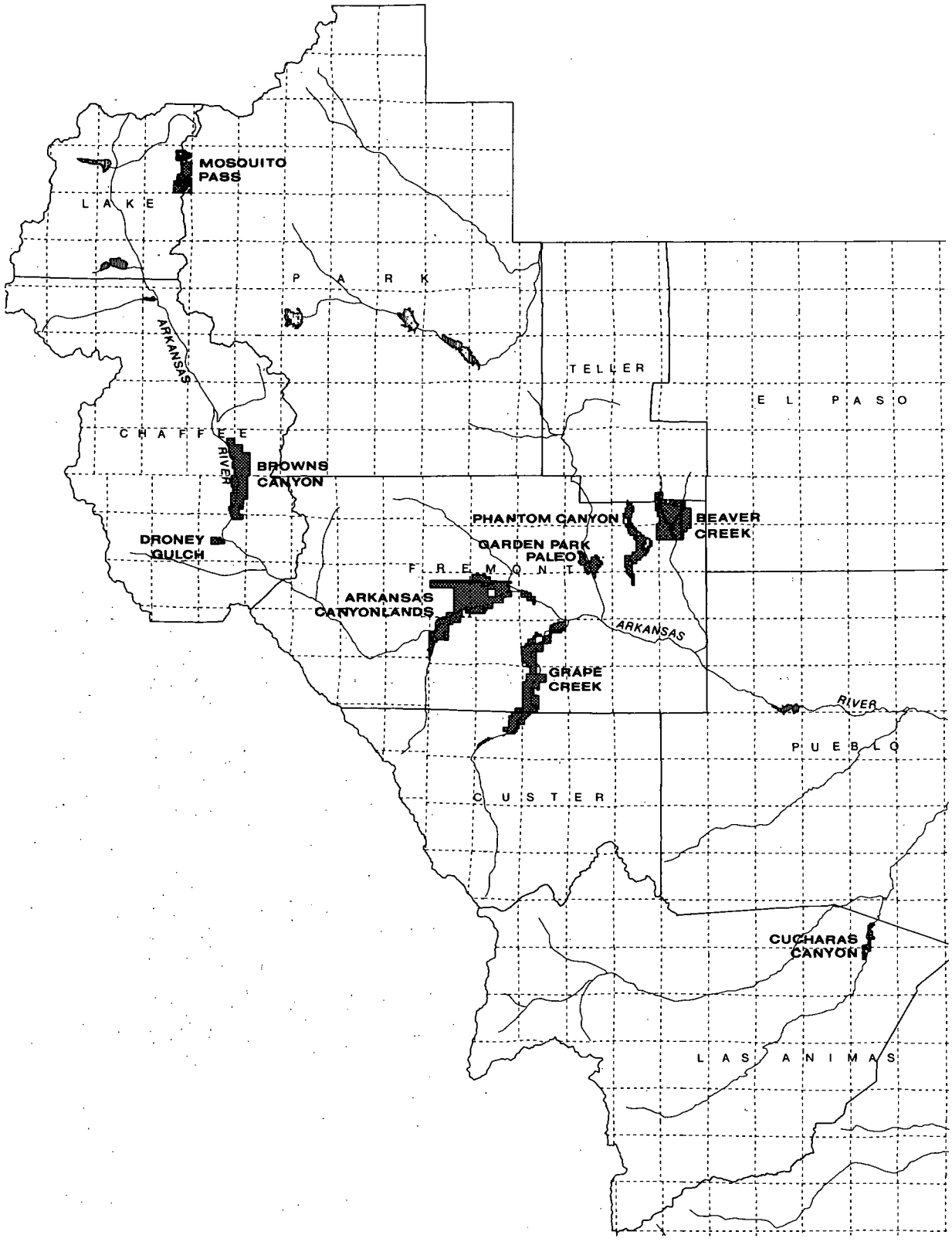
All areas considered for wilderness (e.g., initial study areas) and those now designated for wilderness study (e.g., wilderness study areas) have some special values and, therefore, were considered in the nomination process as potential areas of critical environmental concern (ACECs). In addition to the 5 areas considered for wilderness values, 28 other sites were nominated, evaluated, and screened for recommendation as ACECs in this plan. Fourteen of the 33 areas were determined to meet the Bureau ACEC screening criteria and are analyzed here in the draft RMP/draft EIS. Future areas may be nominated, screened, and recommended. An EA/plan amendment would be prepared for future designated areas.

TABLE 4-21
Impacts to Areas of Critical Environmental Concern Designations

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Fluid minerals *Locatable minerals* *Mineral materials*	Two ACECs (4,238 acres) would be protected from mineral development. Special values on 107,843 acres would not be protected from mineral development.	Fourteen ACECs (112,081 acres) would be protected from mineral development.	Same as Alternative A.	Nine ACECs (78,556 acres) would be protected from mineral development. Special values on 33,525 acres would not be protected from mineral development.
Rights-of-way	Two ACECs (4,238 acres) would be protected through avoidance. Special values on 107,843 acres could be lost to rights-of-way.	Five ACECs (34,847 acres) would be protected through avoidance. Nine ACECs (77,234 acres) would be protected through exclusion.	Same as Alternative A.	Two ACECs (3,433 acres) would be protected through avoidance. Seven ACECs (75,123 acres) would be protected through exclusion.
Land ownership adjustments	Two ACECs (4,238 acres) would be protected through retention. Special values on 107,843 acres could be lost through potential disposal.	Fourteen ACECs (112,081 acres) would be protected through retention.	Same as Alternative A.	One ACECs (2,728 acres) would be protected through retention. Special values on 75,828 acres could be lost through potential disposal.
Off-highway vehicle use *Visual resources* *Recreation resources*	Two ACECs (4,238 acres) would be protected. Special values on 107,843 acres could be lost to recreational activities.	Fourteen ACECs (112,081 acres) would be protected.	Same as Alternative A	Nine ACECs (78,556 acres) would be protected. Special values on (33,525 acres) could be lost to recreational activities.

[1/]See map 4-12

Impact Conclusions: Two of the 14 eligible and suitable ACECs would be designated to protect special features in Alternatives A and C. Fourteen eligible and suitable ACECs would be designated in Alternative B to protect special features. In Alternative D, 9 of the 14 eligible and suitable ACECs would be deisngated to protect special features. Potential irretrievable or irreversible impacts could occur to some of these special features in Alternatives A, C, and D. There would likely be an overall cumulative negative effect to these special features in Alternatives A, C, and D, and would likely be an overall positive effect to these special features in Alternative B. This cumulative adverse effect would not likely be as substantial in Alterrnative D as in Alternatives A and C.



Map 4-12 - AREAS OF CRITICAL ENVIRONMENTAL CONCERN
Preferred Alternative

Wild and Scenic River Designations

BLM believes an interim management prescription would give sufficient protection for the characteristics that determined eligibility for wild and scenic river designation within 146 miles of stream. It is also believed that interim management in all of the plan alternatives would continue for 3 years after the approved RMP/ROD is signed. Only 20 miles/2,880 acres of Beaver Creek and 126 miles/19,051 acres of the Arkansas River corridor would be affected by this analysis.

TABLE 4-22
Impacts to Wild and Scenic River Designations

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C[1/]	Preferred - Alternative D[1/]
Wildlife habitat *Special status animals*	Values adding to the overall wild and scenic experience on 146 miles/21,931 acres would not be protected by potential wild and scenic river designation.	Values adding to the overall wild and scenic experience on 21,931 acres would be protected.	Same as Alternative A.	Same as Alternative A.
Fluid minerals *Locatable minerals* *Mineral materials*	Various values related to the wild and scenic experiences on 146 miles/21,931 acres would not be protected by potential wild and scenic river designation.	Wild and scenic values on 146 miles/21,931 acres would be protected during interim management through no surface occupancy stipulations for fluids and closure to mineral entry and mineral materials disposal.	Same as Alternative A.	Same as Alternative A.
Rights-of-way	Lands with wild and scenic river-related values within 146 miles/ 21,931 acres would not be protected from new rights-of-way by a potential wild and scenic river designation.	Wild and scenic values on 146 miles/21,931 acres would be protected during interim management through limitation of location and placement.	Same as Alternative A.	Same as Alternative A.
Land ownership adjustments	Lands with wild and scenic river-related values within 146 miles/ 21,931 acres would not be protected through closure to land disposal by a potential wild and scenic river designation.	Wild and scenic values on 146 miles/21,931 acres would be protected during interim management through retention of land.	Same as Alternative A.	Same as Alternative A.
Withdrawals and classification	Lands with wild and scenic river-related values within 146 miles/ 21,931 acres would not be protected through waterpower/ reservoir and mineral development withdrawals by a potential wild and scenic river designation.	Wild and scenic values on 146 miles/21,931 acres would be protected during interim management through withdrawal from mineral entry and termination of existing waterpower/ reservoir withdrawals.	Same as Alternative A.	Same as Alternative A.

Table 4-22 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Off-highway vehicle use	Surface disturbance from off-highway vehicles in areas with wild and scenic river-related values on 146 miles/21,931 acres would not be protected by a potential wild and scenic river designation.	Wild and scenic values on 21,931 acres would be protected by closure or limitation of use.	Same as Alternative A.	Same as Alternative A.
Visual resources	Areas with VRM Class II related to the wild and scenic river corridors within the 146 miles/ 21,931 acres would not be managed to maintain the scenic standard without a potential wild and scenic river designation.	Wild and scenic values on 1,321 acres would be protected by maintaining VRM Class II standards.	Same as Alternative A.	Same as Alternative A.

[1/]Table 4-26 also addresses impacts related to some of these values.

Impact Conclusions: Wild and scenic river-related values within these corridors in Alternatives A, C, and D would not receive protection by a potential wild and scenic river designation, but would likely not be adversely affected, nor would there likely be any irretrieveable or irreversible impacts. The values within these river corridors related to a potential wild and scenic river designation would likely be protected and enhanced by the recommendation for potential designation as a national recreation area in Alternatives C and D, and by continuing the SRMA management in Alternative A. Please see other discussions in this chapter related to the potential NRA designation in Wilderness Study Areas, Withdrawals and Classifications, Waterpower/Reservoir Resources, Areas of Critical Environmental Concern Designations, Off-highway Vehicle Use, Recreation Management, and National Recreation Area Designations.

Off-highway Vehicle Use

Off-highway vehicle (OHV) use opportunities would be limited on areas with class I paleo resources (2,728 acres). WSAs (62,657 acres) would be closed to OHV use in all alternatives. Opportunities would be enhanced in all alternatives through new road construction from mineral development.

TABLE 4-23
Impacts to Off-Highway Vehicle Use

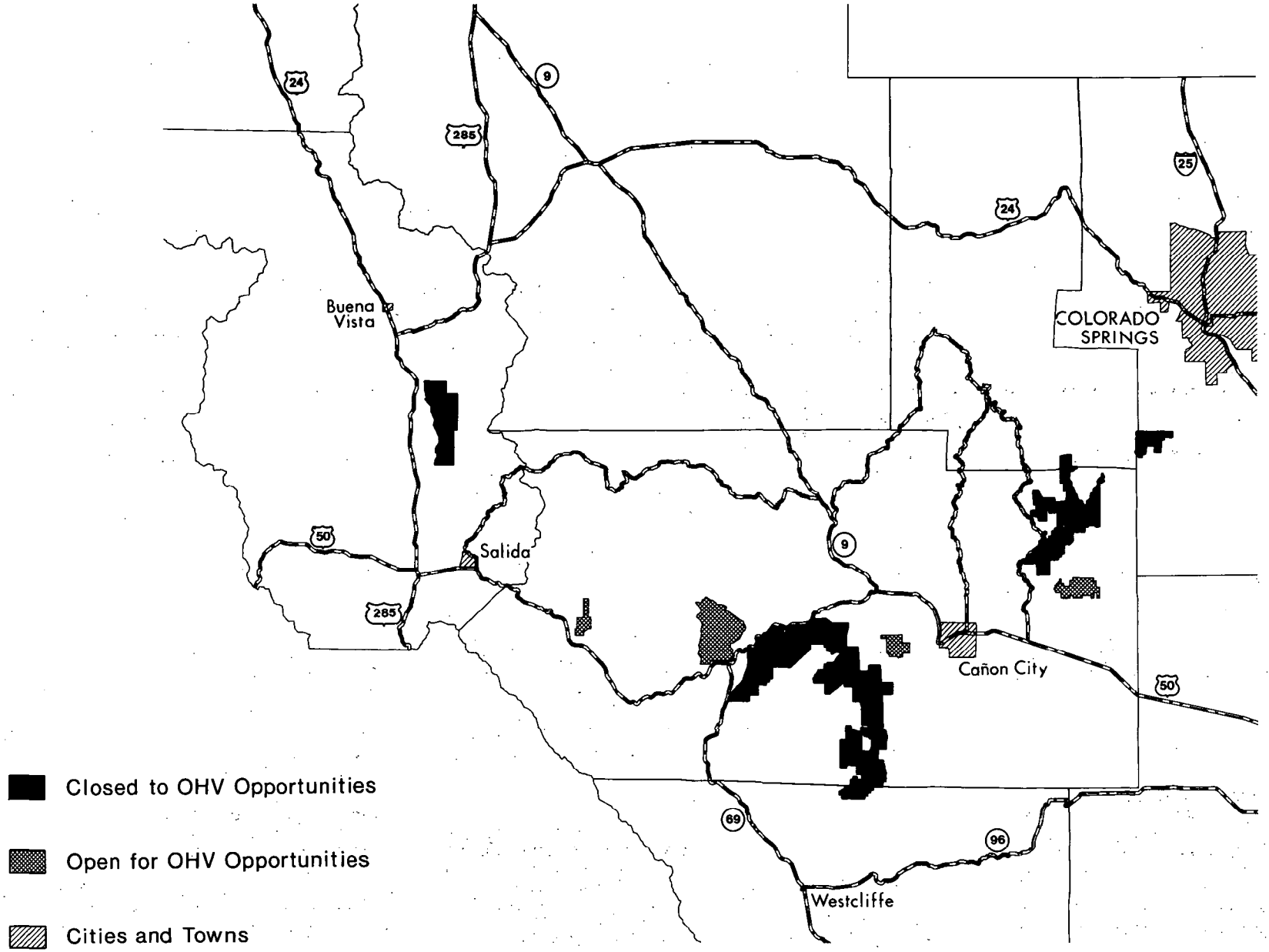
Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Riparian areas	OHV opportunities would be available on 2,550 acres.	OHV opportunities would be lost on 2,550 acres.	Same as Alternative A.	OHV opportunities would be limited to designated roads and trails on 2,550 acres.
Forest and woodlands	OHV opportunities would be enhanced on 92,854 acres through new road construction.	OHV opportunities would not be enhanced on 92,854 acres through new road construction.	Same as Alternative A.	Same as Alternative A.
Wildlife habitat	OHV opportunities would be available on big game birthing habitat (111,888 acres).	OHV opportunities would be diminished on 111,888 acres through seasonal limitations.	Same as Alternative A.	OHV opportunities would be diminished on 107,573 acres through seasonal limitations. OHV opportunities would be diminished on 17,267 acres through limiting use to designated roads and trails.
Fishery habitat	OHV opportunities would be available on 131 miles of stream fishery.	OHV opportunities would be limited to designated roads and trails on 2,550 acres.	Same as Alternative A.	Same as Alternative B.
Special status plants	OHV opportunities would be available on 4,741 acres.	OHV opportunities would not be available on 4,741 acres.	Same as Alternative A.	Same as Alternative B.
Special status animal	OHV opportunities would be available on 10,500 acres.	OHV opportunities would be diminished on 10,500 acres through seaonal limitations.	OHV opportunities would be diminished on 2,800 acres through seaonal limitations.	Same as Alternative B.
Historical resources Archeological resrouces	No positive/negative impacts.	OHV opportunities would be diminished on 11,760 acres through limiting use to designated roads and trails.	Same as Alternative A.	OHV opportunities would be diminished on 4,560 acres through limiting use to designated roads and trails.
Transportation and access	OHV opportunities would be enhanced on 10.5 miles through easement acquisition or new road construction.	OHV opportunities would be enhanced on 50 miles through easement acquisition or new road construction.	OHV opportunities would be enhanced on 6 miles through easement acquisition or new road construction.	OHV opportunities would be enhanced on 56 miles through easement acquisition or new road construction.
	OHV opportunities would be available on approximately one-third of the existing roads and trails.	OHV opportunities would be lost on approximately one-third of the existing roads and trails through limiting use to designated roads and trails or closure.	Same as Alternative B.	Same as Alternative B.
	OHV opportunities for 4-wheel drive vehicles would be lost on 0 miles of closed nonmaintained roads.	OHV opportunities for 4-wheel drive vehicles would be lost on 208 miles of closed nonmaintained roads.	Same as Alternative B.	Same as Alternative B.

Table 4-23 (Continued)

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
ACEC designations	OHV opportunities would be diminished on 4,238 acres through limiting use to designated roads and trails. OHV opportunities would be available without limitation on 107,843 acres.	OHV opportunities would be diminished on 112,081 acres through limiting use to designated roads and trails.	Same as Alternative A.	OHV opportunities would be diminished on 78,566 acres through limiting use to designated roads and trails. OHV opportunities would be available without limitation on 33,525 acres
Wild and scenic river designations	OHV opportunities would be available without limitation on 21,931 acres.	OHV opportunities would be diminished on 21,931 acres through limiting use to designated roads and trails.	Same as Alternative A.	Same as Alternative A.
Visual resources	OHV opportunities would be diminished on class II areas (2,407 acres).	OHV opportunities would be diminished on class II areas (206,436 acres) through limiting use to designated roads and trails.	Same as Alternative A.	OHV opportunities would be diminished on class II areas within ACECs (35,000 acres) through limiting use to designated roads and trails.
Recreation resources	OHV opportunities would be available on 61,187 acres	OHV opportunities would be diminished on approximately 61,187 acres of primitive and semi-primitive nonmotorized areas through limiting use to designated roads and trails.	Same as Alternative A.	Same as Alternative B.
National recreation areas	No positive/negative impacts.	Same as Alternative A.	OHV opportunities would be enhanced on approximately 109,000 acres through potential designation.	Same as Alternative C.

[1/]See map 4-13.

Impact Conclusions: An overall enhancement of off-highway vehicle use opportunities would occur in Alternatives A and C. These opportunites would be somewhat diminished in Alternatives B and D. Although these opportunities might be diminished in Alternative D, a more intensive access and easement acquisition effort would provide for more off-highway vehicle use opportunities than now exist. None of these adverse effects are irretrieveable or irreversible.



Map 4-13 - OFF-HIGHWAY VEHICLE USE

Visual Resource Management

Maintenance of high quality visual resources on the BLM-administered lands would be important to local economies in areas with sensitive scenic values. Range improvement and land treatment projects would be consistent with VRM class.

TABLE 4-24
Impacts to Visual Resource Management

Cause	Existing - Alternative A	Resourcel Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Fluid minerals *Locatable minerals* *Mineral materials*	Class II areas (206,436 acres) would not be protected from mineral development. Class III areas (43,090 acres) would not be managed as class II.	Class II areas (206,436 acres) would be protected from mineral development. Class III areas (43,090 acres) would be managed as class II.	Class II areas (206,436 acres) would be managed under class III guidelines.	Class II areas (206,436 acres) would be protected from leasing through CSU stipulations; mitigation measures would be provided on a case-by-case basis for mineral materials disposal areas.
Coal minerals	Class II areas (42 acres) would not be protected from coal leasing.	Class II areas (42 acres) would be protected from coal leasing.	Same as Alternative A.	Same as Alternative A.
Rights-of-ways	Class II areas (206,436 acres) would not be protected from major ROW/corridor development.	Class II areas (206,436 acres) would be avoided in locating major ROW/corridors.	Same as Alternative A.	Same as Alternative B.
Land ownership adjustments	Class II areas (206,436 acres) would be protected through retention.	Same as Alternative A.	Class II areas (2,407 acres) would be protected through retention. Class II areas on 204,209 acres could be lost through disposal.	Same a Alternative C.
Off-highway vehicle use	Class II areas (2,407 acres) would be protected through limiting use to designated roads and trails. Class II areas (204,029 acres) would not be protected.	Class II areas (206,436 acres) would be protected through limiting use to designated roads and trails.	Same as Alternative A.	Same as Alternative B.

Impact Conclusions: A potential substantial adverse effect on VRM Class II and III areas would occur in Alternatives A and C. These effects would be somewhat less in Alternatives B and D. There would likely be an overall cumulative adverse effect to visual resources in Alternative D; however, none of these adverse effects are irretrieveable or irreversible.

Recreation Management

Based on documentation in the Colorado Comprehensive Outdoor Recreation Plan (CORP), visitor use on BLM-administered lands is expected to significantly increase over present rates. New technology would result in growth of activities, which cannot be anticipated (e.g., rock climbing). Opportunities for interpretation of special plant and animal species and historical and archaeological resources would be enchanced in all alternatives to varying degrees. Developed sites would be excluded from livestock grazing, mineral entry, disposal of mineral materials, and major ROW/corridor development and leased for fluid minerals with NSO stipulations and retained in public ownership.

TABLE 4-25
Impacts to Recreation Management

Cause	Existing - Alternative A	Resource Conservation - Alternative B	Resource Utilization - Alternative C	Preferred - Alternative D
Gold Belt SRMA, Arkansas River SRMA, and Royal Gorge ERMA				
Riparian areas	Recreation development opportunities on 2,550 acres would continue.	Recreation development opportunities on 2,550 acres would be diminished.	Same as Alternative A.	Recreation development opportunities on 1,275 acres would be diminished.
Fishery habitat	Recreation opportunities on 11,108 acres would not be enhanced.	Recreation opportunities on 11,108 acres would be enhanced.	Same as Alternative A.	Recreation opportunities on 1,275 acres would be enhanced.
Transportation and access	Recreation access opportunities would be enhanced.	Recreation access opportunities would be diminished. Recreation opportunities for nonmotorized recreation activities would be enhanced.	Same as Alternative A except recreation opportunities for nonmotorized recreation activities would also be enhanced.	Same as Alternative B except recreation access opportunities would be enhanced.
Arkansas River SRMA				
Wild and scenic river designations	Additional funding for enhancement of river recreation 19,051 acres would not occur.	Additional funding for enhancement of river recreation on 19,051 acres would be received.	Same as Alternative A.	Same as Alternative A.
National recreation areas	Additional funding for enhancement of river recreation would not occur on approximately 125,000 acres.	Same as Alternative A.	Additional funding for enhancement of river recreation would occur on approximately 125,000 acres.	Same as Alternative C.
Gold Belt SRMA				
Fluid minerals *Locatable minirals* *Mineral materials* *Off-highway vehicle use*	Primitive and semiprimitive nonmotorized settings and opportunities on 11,505 acres could be adversely affected.	Primitive and semiprimitive nonmotorized settings and opportunities on 11,505 acres would be protected.	Same as Alternative A.	Same as Alternative B, except fluid minerals would be leased with standard stipulations only.
Paleontological resources	Recreation marketing/tourism opportunities on 2,728 acres would be enhanced.	Recreation marketing/tourism opportunities on 2,728 acres would be reduced.	Same as Alternative A, except recreation collecting opportunities on 2,728 acres would also be enhanced.	Same as Alternative C.

Impact Conclusions: There would not likely be an overall adverse effect to recreation resources in any of the alternatives. Recreation opportunities and experiences would be substantially enhanced in Alternatives C and D. None of the effects would be irretrievable or irreversible.

National Recreation Area Designations

It is assumed that whether or not management as a special recreation area (SRMA) would continue or management would be under a congressional designation of NRA, the area would for the most part be retained under BLM-administration and recreational values in the river corridor would continue to be enhanced for public use. It is also assumed that a potential NRA designation would include generally the same area as the Arkansas River SRMA, but would cover approximately 125,000 acres, and the same recreation values currently managed within the SRMA.

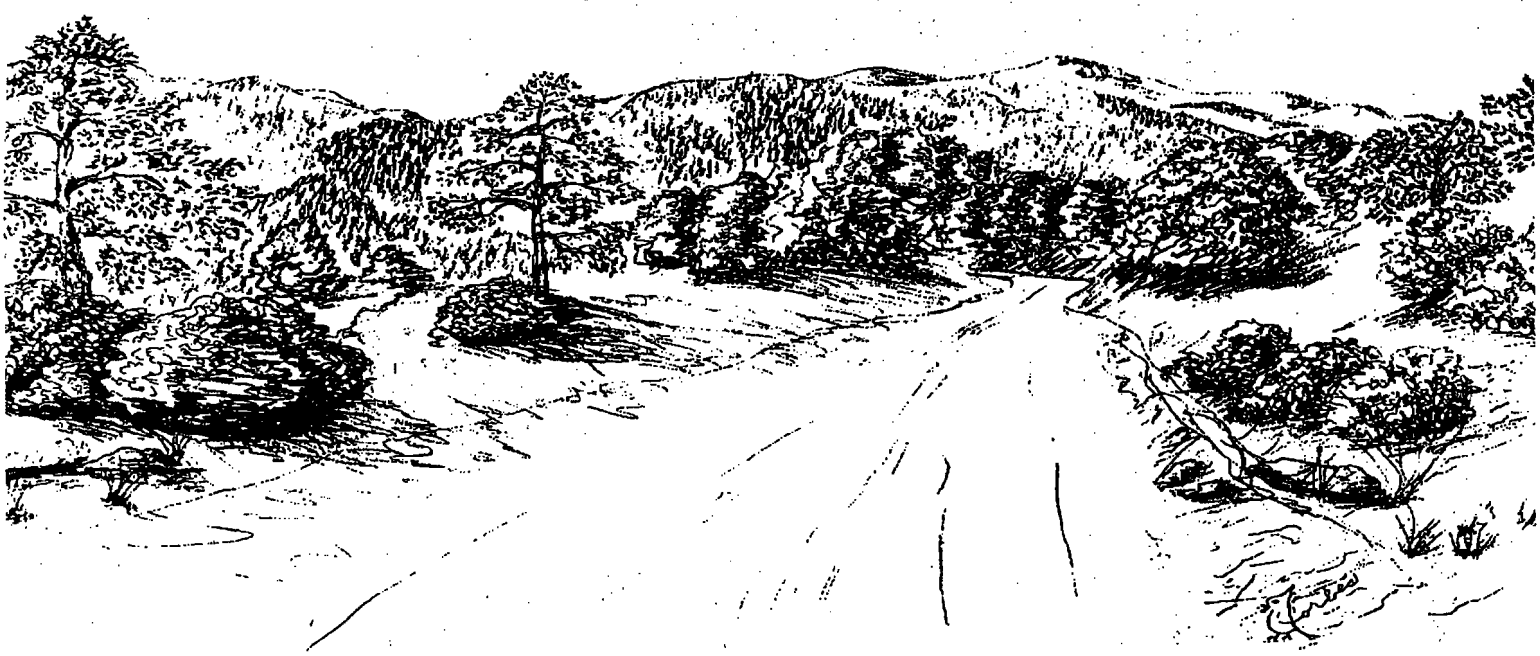
TABLE 4-26
Impacts on National Recreation Area Designations

Cause	Existing - Alternative A	Resource Conservation - Alternative B[1/]	Resource Utilization - Alternative C	Preferred - Alternative D[1/]
Land ownership adjustments	Additional funding for land acquisition and development on approximately 125,000 acres would not occur.	Same as Alternative A.	Additional funding for land acquisition and development on approximately 125,000 acres could occur.	Same as Alternative C.
Visual resources	Values on 125,000 acres would not be protected through legislation.	Same as Alternative A.	Values could be protected on 125,000 acres through language in legislation for NRA designation.	Same as Alternative C.
Recreation resources	River corridor recreational opportunities on 125,000 acres would not be developed and enhanced through NRA designation; i.e., long-term protection of existing values inherent to the overall experience, additional funding for more intense management.	Same as Alternative A.	River corridor recreational opportunities on 125,000 acres would be developed and enhanced through NRA designation; i.e., long-term protection of existing values inherent to the overall experience, additional funding for more intense management.	Same as Alternative C.

[1/]Table 4-22 also addresses impacts related to some of these values.

Impact Conclusions: National recreation area-related values within the Arkansas River corridor in Alternatives A and B would not receive protection by a potential NRA designation, but would likely not be adversely affected, nor would there likely be any irretrieveable or irreversible impacts. The values within this river corridor related to a potential NRA designation would likely be protected and enhanced by the recommendation for potential designation as a wild and scenic river in Alternative B and by continuing the SRMA management status in Alternative A. Please see other discussions in this chapter related to the potential wild and scenic designation in Special Status Animal Species Management, Locatable Minerals Management, Mineral Materials Management, Rights-of-Way Management, Withdrawals and Classifications, Waterpower/Reservoir Resources, Wild and Scenic River Designations, Off-highway Vehicle Use, and Recreation Management.

CHAPTER 5
PUBLIC INVOLVEMENT



CHAPTER 5

PUBLIC INVOLVEMENT

This chapter, consisting of four sections, describes the scoping process and public involvement prior to and during the preparation of this draft document. Consistency with resource management plans (RMPs) of other agencies; a summary of public involvement prior to publication of the draft plan; a list of Bureau people involved in preparation of this plan; and a list of groups, organizations, agencies, and individuals contacted for input are addressed.

Formal and informal efforts have been made to involve the public, other Federal agencies, and appropriate state and local governments. Several points of mandated public involvement have been completed and are discussed in this chapter.

PLAN CONSISTENCY WITH OTHER PLANS

The Bureau of Land Management (BLM) planning regulations require that RMPs be ". . . consistent with officially approved or adopted resource-related plans of other Federal agencies, State and local governments, and Indian tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public lands. . . ."

Throughout preparation of the draft resource management plan (RMP)/environmental impact statement (EIS), various methods, from telephone calls to public meetings, were used to ensure that consistency requirements were met. This segment of Chapter 5 summarizes and highlights these measures.

During preparation of the preplan, the management situation analysis, and this draft RMP/EIS, letters and response forms were sent to local, state, and Federal agencies, and interested individuals requesting information on land use plans or policies that would affect or be affected by the RMP. Community and county governments were contacted to determine whether BLM-administered lands would be needed for community expansion purposes during the life of the RMP. Letters were also sent to affected landowners in the Raton Coal Basin requesting input on coal leasing.

Reviews and a consistency analysis have been completed on any and all land use plans that could have some direct effect on management of BLM-administered land within the planning area. Some examples of these are: various county land use plans and zoning ordinances, Colorado Comprehensive Outdoor Recreation Plan, Colorado Wildlife Strategy Plan, Pike-San Isabel National Forest Land Use Plan, Arkansas River Recreation Area Management Plan, various economic development documents, etc.

Sixteen briefing meetings were held at different times and places during preparation of the draft RMP/EIS with many individuals, agencies, and numerous other groups to discuss BLM alternatives, local plans, and needs for further coordination. Meetings were held with most of the counties to discuss the relationship of their local planning with planning on BLM-administered lands. Also several county commissioner briefings were completed. In addition, letters were sent to numerous other agencies and interest groups offering to meet and discuss consistency issues.

These contacts promoted closer coordination with BLM, and affected agencies/interest groups and instrumental in the formulation of all plan alternatives, including the preferred. All these agencies, businesses, and organizations received copies of this draft and will receive copies of the final RMP/EIS. Some of these specific plans and documents referenced here are listed in Chapter 1 in Tables 1-3 and 1-4. In addition, the governor of Colorado has been asked to review the draft RMP during a 45-day period prior to approval for consistency with state and local plans.

At this point in our land use planning process, nothing within the Preferred Alternative appears to be substantially inconsistent with any of the local, regional, state, or Federal plans that have been reviewed or discussed.

PLANNING PROCESS INVOLVEMENT

The Draft Royal Gorge Resource Management Plan/ Environmental Impact Statement (RMP/EIS) was prepared by an interdisciplinary team of resource specialists from the Bureau of Land Management. This team consisted of specialists from the Royal Gorge Resource Area (RGRA), the Cañon City District (CCD), and the Colorado State Office (CSO).

Preparation of the document began in the winter of 1991; however, preceding this, a complex process of issue identification, data gathering, and other activities occurred. This included identification of issues to be addressed in the plan, development of resource and resource user information, public participation, interagency coordination and consultation, input of data into a geographic information system (GIS),

and the preparation of a management situation analysis (MSA). Records and files of this process, including the public involvement records, GIS data, and the MSA are available from the RMP Project Manager in the Royal Gorge Resource Area Office in Cañon City.

Consultation and coordination with agencies, organizations, and individuals occurred in a variety of ways throughout the planning process. Various news releases, newsletters, open houses, meetings, briefings, special mailings, user input groups, etc., were used. This section summarizes those formal and informal steps taken to consult and coordinate with the public-at-large, interested individuals, groups, and Federal, state, and local government entities during the preparation of this draft RMP. There has been full compliance on the mandated points of public involvement, and comments and responses will be included in the final RMP.

Table 5-1 is a summary of steps taken to complete consultation and coordination in this planning effort:

TABLE 5-1
Plan Process Involvement Summary

Time Period	Consultation Time	Description of Involvement
Fall 1989	Federal Register Notice	Public notice in Federal Register; news releases, and newslettersrs mailed
Winter 1990	Preliminary Issues/ Concerns and Planning Criteria	Public open houses, news releases, and newsletters
Summer 1990	Final Issues/Concerns and Criteria	News releases and news bulletins Federal, state, and local governmental briefings
Winter 1991	Final determination of areas of critical environmental concern	Public meetings, news releases, news bulletins, and user group workshops
Fall 1991	Alternative development	Public open houses, news releases, and news bulletins
Spring 1992	Impact analysis and wild and scenic river process finished	Advisory council briefing
Fall 1993	Draft RMP/EIS complete	Publish and distribute document, hold public hearings, mail news releases/bulletins, FR notice, and brief advisory council

LIST OF PREPARERS/REVIEWERS

The draft resource management plan for the Royal Gorge Resource Area was prepared and reviewed by personnel within the Royal Gorge Resource Area, Cañon City District, and the Colorado State Office. Names, assignments, education, and experience are listed in Table 5-2.

TABLE 5-2
List of RMP/EIS Preparers/Reviewers

Name	Assignment	Education	Years of Experience
L. Mac Berta	Area Manager	BS-Range Management	29.0
Dave Taliaferro	RMP Project Manager	BS-Recreation Administration MS-Outdoor Recreation Resource Planning	20.0
Dennis Zachman	Plan Coordinator for CSO Liaison	BS-Outdoor Recreation Management	19.0
Tom Grette	Technical Coordinator/Range Conservationist: Livestock grazing, riparian, vegetation, noxious weeds	BS-Range Management	15.0
Dan Grenard	Technical Coordinator/Geologist: Geology, topography, coal, paleontology	BS-Geology	12.0
Mike Gaylord	Technical Coordinator/Envrionmental Protection Specialist: Wild and scenic rivers, fire, hazard areas	BS-Resource Planning	15.0
Bev Neuben	Publications Coordinator/Editorial Assist.: Lead for format, editing, document layout, desktop publishing, and assembly	On-the-job training; formal training sessions on English, grammar, writing, editing, format, and desktop publishing	20.5
Scott F. Archer	Climate and air quality	BS-Environmental Science and Chemistry	15.0
Frederick Athearn	History and areas of environmental concern	Ph.D-History	17.0
John Riel	Review livestock grazing	BS-Range Management	27.0
Kevin Andersen	Geology, topography, fluid minerals	BS-Geology	12.5
Charles Fair	Locatable minerals, mineral materials	Ph.D-Geology	30.0
Jim Rhett	Review fluid minerals	BS-Geology	16.0
Roy Drew	Review mineral materials/locatables	BS-Geology	16.0
Bruce Fowler	Coal	BS-Geology	17.0
Carlton Lance	Review hazardous materials	BS-Geology	16.0
Erik Brekke	Wildlife, fisheries, special plant/animal species	BS-Wildlife Management	16.0
Clay Bridges	Review wildlife	BS-Wildlife Management	22.0
Lee Upham	Review wildlife	MS-Wildlife Management	25.0
Brenda Mitchell	Review fisheries	BS-Fisheris	8.0
Dave Gilbert	Review fisheries	BS-Fishery Biology MS-Wildlife Biology	11.3
Jim Cunio	Forest and woodland management	BS-Forest Management	14.0
Jimmie Pribble	Review forest and woodland management	BS-Forest Management	30.0
Dave Hallock	Realty/lands, land ownership adjustment, transportation and access, rights-of-way management, withdrawals	BS-Forest Management Professional Lands Resource Management	18.0

Table 5-2 (Continued)

Name	Assignment	Education	Years of Experience
Stuart Parker	Review lands and realty	BA-Economics	24.0
Andy Senti	Review lands and realty	BS-Range Management	42.0
Bob Schmidt	Review lands and realty	BS-Forest Management	28.0
Gene Lietzau	Waterpower/reservoirs	On-the-job training, formal training	10.0
John Nahomenuk	Recreation, visual, off-road vehicles, wilderness, NRA	BS-Natural Resources/Recreation Management	5.0
Bob Wick	Review recreation	BS-Forestry MS-Wildland Recreation Management	5.0
Don Bruns	Review recreation	BS-Outdoor Recreation Management	23.0
Barb Sharrow	Review visual	BA-Sociology	11.0
Eric Finstick	Review wilderness	BS-Geography MS-Geography	20.0
Carol Spurrier	Review vegetation/ecosytem	BS-Range/Wildlife Management MS-Botany	14.0
Jeanette Pranzo	Economic conditions and social concerns	MA-Economics	21.0
Monica Bargielski/ Weimer	Archaeology	BA-Anthropology MA-Anthropology	15.0
John Beardsley	Review archaeology	BA-Anthropology	14.5
Howard Wertsbaugh	Water rights/quality, sensitive soils	BS-Watershed Management	27.5
Scott Davis	Review soils/water	BS-Forestry MS-Soils and Hydrology	21.0
	Support Team		
Joan Larsen	Word processing	On-the-job training, formal training sessions	8.5
Lona Kossnar	Administrative	On-the-job training, formal support training session	22.5
Donn Bode	GIS Coordination/Cartography	On-the-job training, formal training	26.00
Sam Richards	GIS/MOSS data entry	On the-job training, formal training	2.0
Peggy Forbes-Crowl	Art work (cover)	Free-lance	7.0

CONTACT/DISTRIBUTION LIST

During preparation of this draft/EIS, various Federal agencies, state and local governments and agencies, interest groups, and individuals were contacted for information and data. The following is only a partial list of recipients of this draft document.

Federal Government

Advisory Council on Hist. Preservation
Library of Congress, Unit X
Documents Expediting Project
U.S. Department of Health and Human Services
U.S. Army Corps of Engineers
  San Francisco, CA
  Dallas, TX
U.S. Department of Energy
U.S. Department of Transportation
U.S. Environmental Protection Agency
  Denver, CO
  Washington, DC
U.S. Federal Highway Administration
U.S. National Park Service
U.S. Pentagon, Assistant Secretary of the Air Force
USAFRCE-CR-ROV
USDA, Forest Service
  Off. of Envir. Coord., Washington, DC
  Rocky Mountain Region, Lakewood, CO
  Pike San Isabel National Forest
  Commanche National Grasslands
    La Junta, CO
    Springfield, CO
  Leadville Ranger District, Leadville, CO
  Pikes Peak Ranger District, Colorado Springs, CO
  Salida Ranger District, Salida, CO
  San Carlos Ranger District, Cañon City, CO
  South Park Ranger District, Fairplay, CO
USDA, SCS
USDI, BLM
  Washington Office
  Off. of Sec., Denver, CO
  Colorado State Office
  BLM, Library D-533A
  All Colorado District and Area Offices
USDI, Bureau of Mines
  Branch of Min. Assess., Washington, DC
  Alaska Field Operations, Washington, DC
  Denver, CO - DSC Bldg 20
USDI, Bureau of Reclamation
  Division of Envir. Aff., Washington, DC
  Denver, CO
  Eastern Colo. Proj. Off., Salida, CO
  Pueblo, CO
  Southwest Reg. Off., Amarillo, TX
  Water Resource Manager, Twin Lakes, CO
USDI, Fish and Wildlife Service
  Chief, Div. of Envir. Coord., Washington, DC
  Regional Office, Denver, CO
  Colorado Field Office, Golden, CO
  Leadville National Fish Hatchery, Leadville, CO
USDI, Geological Survey
  Envir. Aff. Program, Reston, VA
  Geologic Division, Denver, CO
  Water Resources Division, Denver, CO
USDI, Minerals Management Service
  Offshore Envir. Assess. Div., Washington, DC
USDI, National Park Service
  Div. of Envir. Comp., Washington, DC
  Denver, CO
  Rocky Mountain Reg. Off., Denver, CO
  Bent's Old Fort National Historic Site, La Junta, CO
  Florissant Fossil Beds National Monument, Florissant, CO
USDI, Office of Env. Project Review
  Denver, CO
USDI, Office of Surface Mining
  Chief, Div. of Envir. and Econ. Analysis, Washington, DC
USDI, Office of the Secretary
USDI, Regional Solicitor
USDI, Water and Power Resources Service
All Colorado U.S. Congressional Delegates

State Government

Colorado Archaeological Society
Colorado Board of Land Commissioners
  Denver
Colorado State Clearing House
Colorado Department of Health
  Air Pollution Control Division
  Water Quality Control Division
Colorado Department of Highways
  Denver
  Pueblo
Colorado Department of Local Affairs
Colorado Department of Natural Resources
Colorado Division of Mines
Colorado Div. of Parks and and Outdoor Rec.
  Denver
  Colorado Springs
  Salida
  Walsenburg

Colorado Division of Water Resources
  Pueblo
  Denver
Colorado Division of Wildlife
  Denver
  Colorado Springs
  Regional Office, Colorado Springs
  Southwest Regional Office, Montrose
Colorado Environmental Coordinator
Colorado Forest Service
  Fort Collins
Colorado Geological Survey
Colorado Highway Department
Colorado Historical Society
Colorado Legislative Council
Colorado Natural Areas Program
Colorado Oil and Gas Conservation Commission
Colorado Plans Coordinator
Colorado State Engineer
  District 11 - Water Engineer
  District 12 - Water Engineer
Colorado State Legislative Delegates
Colorado State University
  Department of Recreational Resources
  Department of Fisheries and Wildlife Biology
  Experimental Learning Center
  Documents Librarian
Colorado Water Conservation Board
University of Colorado
University of Southern Colorado

Local Government

Board of Water Works of Pueblo
City of Buena Vista
City of Cañon City
City of Colorado Springs
  Water Division, Department of Utilities
City of Leadville
City of Pueblo
City of Salida
City of Trinidad
City of Walsenburg
County of Baca
County of Bent
County of Crowley
County of Chaffee
County of Custer
County of El Paso
County of Fremont
County of Huerfano
County of Kiowa
County of Lake
County of Las Animas
County of Otero
County of Park
County of Prowers
County of Pueblo
County of Teller
South Central Colorado Regional Tourism Board
Southeastern Colorado Water Conservancy
Town of Poncha Springs
Upper Arkansas Council of Governments
Upper Arkansas Water Conservancy

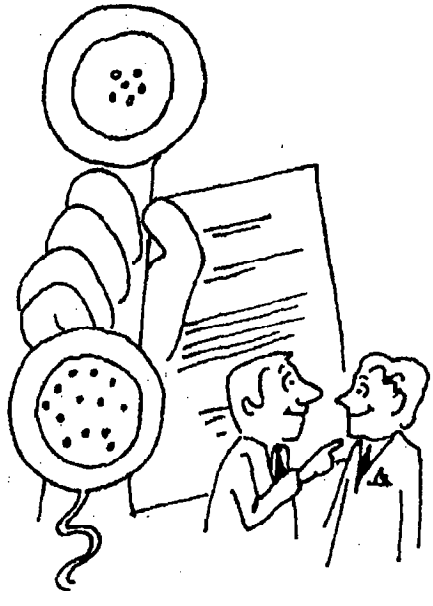
Groups/Organization

American Mountain Foundation
American Rivers
American Whitewater Affiliation
Anderson, Johnson, & Gianunzio
Arkansas River Outfitteres Association
Arkansas Valley Audubon Society
Boy Scouts of America
  Rocky Mountain Council
Cañon City Daily Record
Cañon City District Advisory Council (BLM)
Cañon City District Grazing Advisory Board
Cañon City Geology Club
Centennial Archaeology, Inc.
Center for Urban Affairs and Policy Research
Chaffee County Times Newspaper
Colorado Archaeological Society
  Pueblo Chapter
  Royal Gorge Chapter
Colorado Bowhunter Association
Colorado Environmental Coalition
Colorado Farm Bureau
  District 5
Colorado Metal Detectors Company
Colorado Off-Highway Vehicle Coalition
Colorado Outfitters Association
Colorado White Water Association
Colorado Wildlife Federation
CU Wilderness Study Group
Denver Museum of Natural History
Denver & Western Rio Grande Railroad
Energy Fuels
Fremont Cattleman's Association
Fremont/Custer Farm Bureau
Fremont and Custer Historical Society
Fremont Ecology
Friends of the Arkansas
Fuel Resources Development Company

Garden Park Paleontological Society
Gazette Telegraph
G.M.S., Inc.
Heart of the Rockies Audubon
Highby Huerfano River Ranches
Huerfano Farm Bureau
KVRH Radio
Minerals Exploration Coalition
Mountain Mail Newspaper
Native Cultural Services
Pass Creek Cattle Company
Patagonia Guide Line
Pheasants Forever
Pikes Peak Group, Sierra Club
Powers Elevation Company, Inc.
Rocky Mountain Oil and Gas Association
Stroh Ranches
Texaco, Inc.
Texas Creek Outfitters
Thompson Consulting Forester
Thorne Company
Trout Unlimited, Arkansas Valley Chapter
Wilderness Study Group, University of Colorado
Western River Guides Association
Western Historical Studies, Inc.
Wyoming Fuel Company
Zancudo Ranch

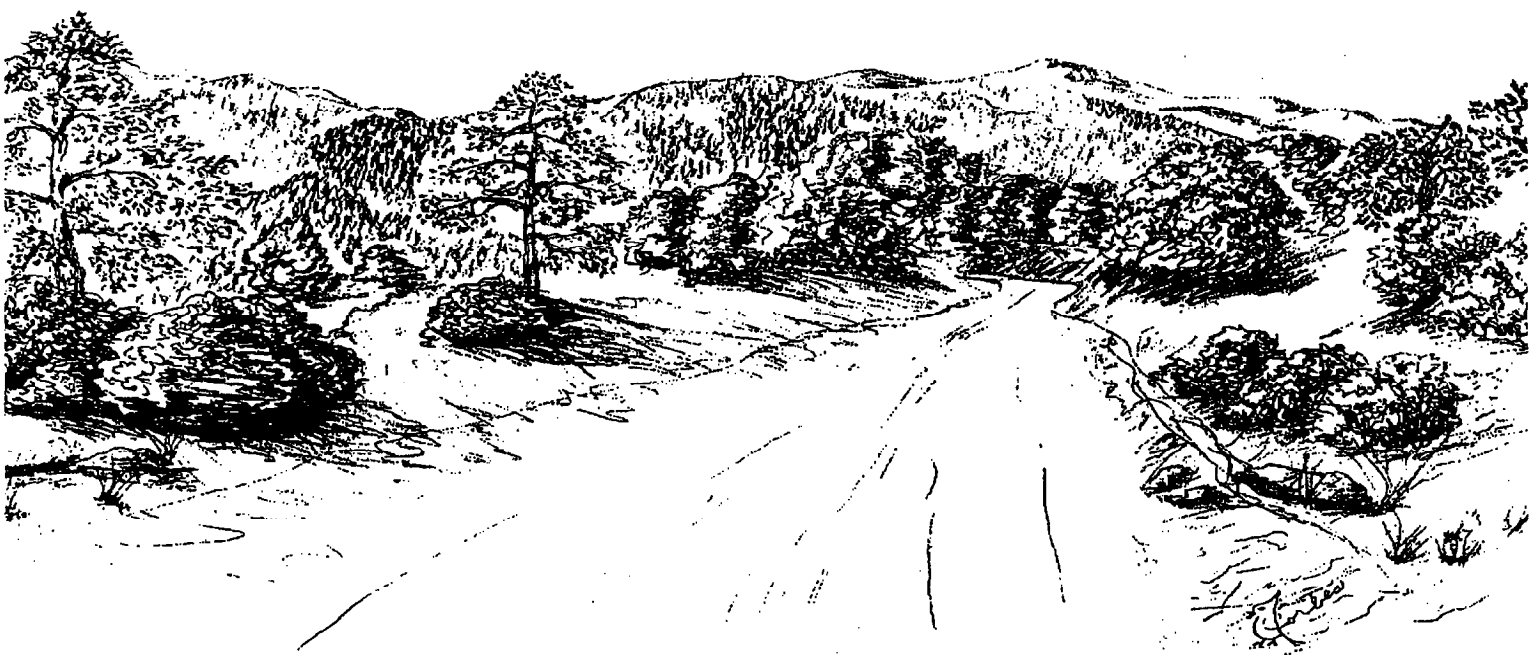
User Group Members

Adamic, Frank
Baker, James
Bergquist, Alfred and Susan
Buckles, William
Clifton, Chas
Covert, John
Dils, Reed
Emmer, Mark
Eve, Tom
Goodwin, Denzil
Javernick, Carl
Javernick, John
Johnson, David
Kerr, Dick
Makris, Pete
Mitchell, Kevin
Naslund, Dave and Laren
Nethaway, Kristinia
Pfeiffer, Bill
Rasmussen, Fred
Reinbrecht, Jennifer
Robinson, Michael
Sharp, Wendy
Stahlecker, Dale
Stringer, Gene
Tucker, Don and Jeanne
Van Epps, Charles
York, Ray
Young, Don
37 individual and corporate coal surface owners



APPENDIX A

ISSUES/CONCERNS WITH CRITERIA



APPENDIX A
ISSUES/CONCERNS WITH CRITERIA

INTRODUCTION

These issues/management concerns and corresponding planning criteria evolved from interdisciplinary team and public input and will be used for development of the RGRMP. They may be modified or "fine-tuned" by the management team during the planning process period. They are guideposts or parameters for the planning process and are not intended to inhibit analysis but to provide focus. This should allow the management team to bring to the attention of the core team/interdisciplinary team those items believed to be of significance in development of first, the management situation analysis (MSA), and second, the draft resource management plan (RMP) and draft environmental impact statement (EIS).

These issues/concerns cover only items that are not a normal matter of policy, law, etc. All these will be addressed as a matter of course during the planning process; therefore, please remember this information is in addition to current policy, law, etc.

This document is organized into three parts: 1) Significant Management Issues With Conflict, 2) Important Management Concerns, and 3) Topics Not Addressed In This Plan. These are further explained as follows:

1) *Significant* management issues *with conflict* - those *likely to change* in one or more of the plan *alternatives*. Significant, for our purposes, means management has determined that this item must be addressed. Conflict, for our purposes, means management determined that this item is in variance/contention with several resources or resource uses. It is also determined that very likely the item will be treated differently in the various plan alternatives.

2) *Important* management concerns - those that *may or may not have conflict* or *may or may not change* in one or more of the plan *alternatives*. Important, for our purposes, means management has determined (usually based on the planning *Supplemental Program Guidance* (SPG) information), that the item needs/requires attention during the planning process.

3) Items/topics/or subjects *not to be analyzed within this particular planning document* - items that may have been covered elsewhere or may not exist within this planning area. For example, portion(s) of the *Royal Gorge Grazing Environmental Impact Statement* may not need to be addressed again in this plan, the *Cañon City District Wilderness Environmental Impact Statement* may not need to be addressed again in this plan, etc. This resource area has no oil shale resources; therefore, there is no issue nor concern, and it will not be addressed in the planning document.

SIGNIFICANT MANAGEMENT ISSUES WITH CONFLICT

Lands and Realty Management

#1 - Land Tenure Adjustments

Issue:

Which lands should be considered for acquisition/disposal?

Planning Criteria:

1. Identify BLM-administered lands for conveyence out of Federal ownership. Criteria within Sec. 203 of FLPMA are:

a. Such tract because of its location or other characteristics is difficult and uneconomic to manage as part of the public lands, and is not suitable for management by another Federal department or agency; or

b. Such tract was acquired for a specific purpose, and the tract is no longer required for that or any other Federal purpose; or

c. Disposal of such tract will serve important public objectives, including but not limited to expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than public land and which outweigh other public objectives and values, including, but not limited to recreation and scenic values, which would be serviced by maintaining such tract in Federal ownership.

2. Identify BLM-administered lands for conveyence out of Federal ownership by exchange only. Section 206 of FLPMA allows:

"A tract of public land or interests therein may be disposed of by exchange. . . where. . . the public interest will be well served by making that exchange: *Provided*, That when considering public interest the Secretary concerned shall give full consideration to better Federal land management and the needs of State and local people."

#2 - BLM-Administered Land Access Acquisitions and Transportation Management

Issue:

What are the access needs within the Royal Gorge Resource Area?

Planning Criteria:

1. Identify BLM-administered lands that have sufficient access for the public and BLM administration.

2. Identify BLM-administered lands where public or administrative access should be acquired and establish priority for acquisition based on the following:

a. Resource values (quantity and quality)

b. Risk of closure to the public

c. Resource conflict mitigation

d. Public demand and BLM administrative need

e. Configuration (size, shape, and amount of public land)

f. Proximity to population centers

g. Proximity to major travel routes

3. Identify routes (trails and roads) to or through BLM-administered lands where new construction, closures, or periodic maintenance is necessary. Consider the need for the route, amount of use, likelihood of deterioration, and resource conflicts/needs.

4. Identify those areas where the public could be served better by signing, fencing, or marking BLM-administered lands.

Areas of Special Concern

#3 - ACEC Designations

Issue:

Which areas and/or resources should receive special management attention?

Planning Criteria:

1. Identify areas containing important historic, cultural, or scenic values; fish and wildlife habitat; or other natural systems or processes of greater than local significance to be considered for designation as areas of critical environmental concern (ACECs).

2. Identify areas so unique that it may be more important to manage them for a combination of specific uses rather than for full multiple use; may be considered for special management attention.

a. Develop a map showing the nominated areas for GIS digitizing work (ACE theme map).

b. Apply ACEC screening criteria process to all nominations. Develop a list of those areas to be analyzed within the MSA and plan. Develop a map showing the areas that met the screening criteria and turn in for GIS work (ACP theme map).

#4 - Wild and Scenic River Designation

Issue:

Which river/stream segments in the planning area meet the requirements as potential additions to the National Wild and Scenic Rivers System (NW&SR) and should be recommended to Congress as suitable for wild, scenic, and/or recreational designation?

Planning Criteria:

1. Identify those segments that appear to meet eligibility criteria for W&SR designation; i.e., Arkansas River, Badger Creek, Beaver Creek, Grape Creek, etc.

2. Study the potential for recommending various segments of area rivers/streams in the planning area, applying the W&SR eligibility criteria.

3. Determine and document segments to be recommended to Congress within the study report, and place the study report in the RMP as an appendix.

4. Determine and document the effects of various alternative W&SR recommendations within Chapters 3 and 4 of the RMP.

5. Consider a joint eligibility/suitability determination process where other agencies share jurisdiction of river segments (i.e., Badger Creek and the USFS).

6. Develop interim management strategies for those river/stream segments and/or corridors determined to be eligible/suitable for wilderness designation. These strategies will ensure nonimpairment of wild and scenic values until final determinations can be made regarding inclusion in the W&SRS.

#5 - National Conservation Area

Issue:

Which areas within the planning area may be eligible/suitable for recommendation to Congress as a national conservation area?

Planning Criteria:

1. Identify areas containing expansive and significant multiple resource values of major national significance to be considered for recommendation to Congress as a national conservation area.

2. Identify areas within the resource area with the capability to tremendously enhance the implementation of national BLM initiatives (e.g., *Wildlife 2000, Recreation 2000,* riparian proposals, etc.) to be considered for recommendation to Congress as a national conservation area.

Recreation Management

#6 - Off-Highway Vehicle (OHV) Use

Issue:

Which areas should be designated as open, open with limitations, or closed to OHV use?

Planning Criteria:

1. Identify those areas/sites in the planning area currently receiving public OHV use, and to the extent feasible, the current level of use.

2. Determine designations for planning area.

#7 BLM-Administered Lands and Regional Tourism

Issue:

How can BLM-administered lands be managed to enhance/compliment the regional tourism industry and other agency programs?

Planning Criteria:

1. Analyze the extent and significance of the interrelationship between opportunities available on BLM-administered lands and the tourism industry and other agencies.

2. Develop varying management scenarios that will present a range of effects on regional tourism/BLM-administered lands.

IMPORTANT MANAGEMENT CONCERNS

Suitability for Exploration/Development of Mineral Resources

#1 - Fluids Minerals Management (i.e., oil and gas and geothermal determinations)

Management Concern:

Which BLM-administered lands are suitable for development through leasing?

Planning Criteria:

1. Identify the fluid mineral resource potential in the planning area.

2. Determine the reasonable foreseeable development of oil and gas.

3. Determine where fluid minerals development should be subject to various levels of limitations for leasing; i.e., open to standard terms and conditions, open subject to seasonal constraints, open subject to no surface occupancy constraints, and closed.

#2 - Locatable Minerals Management (i.e., gold, silver, etc.)

Management Concern:

Which BLM-administered lands are suitable for operation under the mining laws?

Planning Criteria:

1. Identify the development potential in the planning area.

2. Identify which areas are or will be closed to operation under the mining laws.

3. Identify whether closures are discretionary or nondiscretionary.

#3 - Mineral Materials Management (e.g., sand/gravel, etc.)

Management Concern:

Which BLM-administered lands are suitable for sales of mineral resources?

Planning Criteria:

1. Identify the moderate and high mineral materials development potential in the planning area.

2. Identify which areas are or will be open and closed to mineral materials disposal.

3. Identify whether closures are discretionary or nondiscretionary.

#4 - Coal Minerals Management

Management Concern:

Which BLM-administered lands are suitable for leasing of coal mineral resources?

Planning Criteria:

1. Identify the coal mineral values in the planning area.

2. Identify areas that are acceptable, acceptable with stipulation, or unacceptable.

3. Apply the 20 unsuitability criteria to determine which potential coal tracts should be leased, except for presently leased tracts.

4. Determine what resource values need consideration in addition to the unsuitability criteria.

5. Consult qualified surface owners on potential leasing of Federal coal minerals under their surface estate.

6. Meet requirements for consultation with other agencies.

Recreation Management

#5 - Recreation Management

Management Concern:

1. What types of recreation facilities/use areas are needed and which ones should BLM provide on those areas to meet present and expected public demand on BLM-administered lands?

2. What levels of recreation use are appropriate on BLM-administered lands?

3. How will BLM Recreation Program Goals, as outlined in *Recreation 2000*, be achieved with the RMP?

4. How can this program be managed to include public user information and interpretation within the planning area?

Planning Criteria:

1. Determine the location and level of use of recreation sites/areas on BLM-administered lands.

2. Determine the significance of these sites/areas.

3. Analyze *Recreation 2000* goals as they relate to on-the-ground provision of resources, levels of use, facility developement, resource protection, etc.

Waterpower/Reservoir Resources

#6 - Waterpower/Reservoir Resources

Management Concern:

1. Where are the potential waterpower/reservoir sites?

2. Which existing sites/locations are withdrawn or need to be withdrawn to protect these resources?

3. Where do conflicts exist between waterpower/reservoir sites?

Planning Criteria:

1. Determine the three categories of waterpower/reservoir potential: a) lands suitable for intensive management of waterpower/reservoir reservoir sites, b) lands suitable for restricted management as waterpower/ reservoir sites, and c) lands unsuitable for management of waterpower/reservoir sites.

2. Assign currently withdrawn sites for waterpower/reservoir to one of the these categories: a) lands recommended for continuation of the withdrawal and b) lands not recommended for continuation of the withdrawal.

3. Prescribe management directions for waterpower/reservoir sites; e.g., restricted or excluded development techniques or activities, preferred or permitted activities, etc.

Soils and Watershed Resources

#7 - Water Rights Management

Management Concern:

1. Is the current level of water rights protection adequate for current and future needs?

2. Is there a need to maintain in-stream flows for biological perpetuation of riparian, aquatic, wildlife, recreation, and livestock needs?

Planning Criteria:

Establish a relationship between water availability and demand according to existing and projected water uses.

#8 - Water Quality Management

Management Concern:

1. Is the current management of surface water quality adequate for current and future water quality goals.

2. Is there an opportunity to manage BLM-administered lands in such a manner as to provide an overall improvement of surface water quality.

Planning Criteria:

1. Establish a relationship between surface water quality and existing management of BLM-administered lands.

2. Determine specific areas of opportunity to modify management of BLM-administered lands to improve surface water quality.

#9 - Sensitive Soils Management

Management Concern:

What activities will be permitted within designated sensitive soil areas? Are any of these areas suitable for ACEC status?

Planning Criteria:

Identify those areas vulnerable to degradation because of specific soil types related to Pikes Peak Granite.

Special Status Plant and Animal Species Management

#10 - T&E and Sensitive Plants/Communities

Management Concern:

1. What is the occurrence and distribution of T&E plant species on lands administered by BLM, and what is the significance of BLM-administered lands to the conservation of those species?

2. Which BLM-administered lands are essential habitat, and which are designated critical habitat of T&E plant species?

3. Which management prescriptions and management plans would provide for the conservation of these T&E plant species and habitats?

Planning Criteria:

1. Inventory and designate BLM-administered lands with critical habitat for plant species/communities.

2. Specify management that will ensure the long-term survival of these species/communities.

3. Determine if special management options are needed for management of these species/communities.

4. Consider cause and effect relationships between these plants/communities and other BLM resources/uses.

#11 - T&E and Sensitive Animals

Management Concern:

1. What is the occurrence and distribution of T&E wildlife species on BLM-administered lands, and what is the significance of their habitats?

2. What are the areas of critical T&E habitat, and what management methods and/or management plans are most appropriate for the conservation of these areas?

3. Which T&E critical habitat areas on BLM-administered lands should be designated as ACECs?

4. Where should species re-introduction to native habitats occur on BLM-administered lands?

Planning Criteria:

1. Inventory and designate those BLM-administered lands with these species.

2. Specify management that will ensure the long-term survival of these species.

3. Determine if special management options are needed for these species.

4. Consider cause and effect relationships between these species and other BLM resources/uses.

Cultural Resource Management

#12 - Historical Resources

Management Concern:

1. What areas/sites within the planning area have or potentially have significant historical resources present?

2. How can these historical sites be managed to provide for public values (including interpretation) and their integrity?

Planning Criteria:

1. Determine the location, density, and diversity of the historical areas/sites on BLM-administered lands within the planning area.

2. Determine the significance of the areas/sites in relation to eligibility for listing on the National Register of Historic Places (NRHP). Apply the criteria for eligibility for the NRHP system; e.g., the Phantom Canyon area, De Reemer Forts, Santa Fe Trail, various railroads, etc.

3. Determine the potential of the historical resources to provide, as considered appropriate, for public information, public use, and conservation.

4. Determine the management direction required for achieving the SPG specific cultural resources management objectives; i.e., establish conditions under which cultural resources may be managed for information potential; may be managed for preservation, may limit development of other resources, may need measures to protect the integrity of the cultural resource.

5. Determine which sites/areas should have special management.

#13 - Archaeological Resources

Management Concern:

1. What areas/sites within the planning area have or potentially have significant archaeological resources?

2. How can these archaeological sites be managed to protect the integrity and provide for public values (including interpretation)?

3. Which sites require active interpretation and a cultural resource management plan (CRMP)?

Planning Criteria:

1. Determine the location, density, and diversity of the areas/sites on BLM-administered lands within the planning area.

2. Evaluate the areas/sites for nomination to the National Register of Historic Places (e.g., Badger Creek, Cucharas Canyon, Browns Canyon, Johnson Village Overlook sites, dinosaur quarries, etc.).

3. Determine the potential of the archaeological resources to provide:

   a. Evaluation of information potential (low, medium, high).

   b. Evaluation of public values (appropriateness for interpretation).

   c. Evaluation for conservation (protection measures).

#14 - Paleontological Resources

Management Concern:

What areas/sites within the planning area have or potentially have significant paleontological resources and how should they be managed?

Planning Criteria:

1. Identify the location of the paleontological areas on BLM-administered lands within the planning area (i.e., which should be Class 1, 2, 3, or 4)?

2. Identify those Class 1 or 2 areas, such as the Garden Park Fossil Area, requiring special management.

3. Determine the direction required for achieving those paleontological resource management objectives; i.e., establish conditions under which paleontological resources may be managed for information potential, managed for preservation, limit development of other resources, and need measures to protect the integrity of the cultural resource.

Social/Economics

#15 - Social/Economics

Management Concern:

1. What is the relationship of various uses/management of BLM-administered lands and the economic/social benefits to the public both within and outside the planning area?

2. What are the respective costs and benefits of the various plan alternatives?

Planning Criteria:

1. Determine the specifics of the economic and social climate within the planning area, including general demographics data.

2. Determine the specific existing economics/social relationships to resources and resource uses on BLM-administered lands.

3. Analyze future public expectations for resources and resource uses on BLM-administered lands.

4. Determine costs of existing programs applied to BLM-administered lands and alternative programs potentially applied to these lands.

5. Analyze the cost/benefit relationships of BLM programs on these lands for the various alternative management options.

Air Quality

#16 - Air Quality

Management Concerns:

What air quality consequences will result from implementation of the various plan alternatives?

Planning Criteria:

1. Identify locations by class of known air quality conditions.

2. Determine how development and uses of other resources will affect the quality of the air.

Vegetation Resources Management

#17 - Vegetation Management

Management Concern:

Has vegetation improved since the grazing EIS was implemented?

Planning Criteria:

1. Analyze current range condition and trend study data to determine if any changes in plant communities have occurred.

2. Consider conducting an ecological site inventory to obtain baseline data on ecological status.

#18 - Noxious Weed Management

Management Concern:

To what extent are noxious weeds and poisonous plants becoming a problem in the planning area?

Planning Criteria:

1. Consider doing a noxious weed and poison plant inventory for the resource area.

2. Consider cause and effect relationships in the management of noxious weeds and poison plants.

3. Consider using integrated pest management to control noxious and poison plants.

#19 - Riparian Zone Management

Management Concern:

1. Where are the riparian zones in the planning area?

2. What are the conditions and trends of those zones?

3. How should these riparian zones be managed to provide enhancement of the resource value?

Planning Criteria:

1. Determine within the planning area the locations, conditions, trends, and the potential of each riparian zone to be enhanced.

2. Use an ecological site inventory method to inventory, maintain, and monitor riparian zones.

3. Describe a desired plant community for each riparian zone that will support the desired uses of the zone. Prescribe management to attain the desired plant community.

Livestock Grazing Management

#20 - Livestock Grazing Management

Management Concerns:

1. Are there concerns regarding trespass caused by subdivision of adjacent private lands and subsequent loss of fenced boundaries?

2. Are grazing capacity estimates accurate on allotments that have no monitoring data?

3. Should BLM allow base property to be subdivided, but kept as base property with a "graze until fenced clause"?

4. Should BLM grazing permits be issued or reissued on rangelands rated in poor condition in the 1980 *Royal Gorge Grazing Environmental Impact Statement*?

Planning Criteria:

1. Identify allotments adjacent to private land subdivisions and address those potential boundary problems.

2. Conduct monitoring studies (actual use utilization) on areas where current grazing capacity estimates are doubtful, and coordinate resource management planning with SCS on non-AMP allotments.

3. Clarify and develop a policy regarding subdivided base property.

4. Use vegetation management status instead of range condition, and consider cause and effect relationships when deciding whether or not to issue grazing permits on rangeland with unacceptable vegetation management status.

Fish and Wildlife Management

#21 - Fish and Wildlife Management

Management Concern:

1. What is the economic value of fish and wildlife species in the planning area in terms of benefits to the local economy and in the users' willingness to pay for access to or conservation of the resources?

2. What are the priority fish and wildlife species and habitats to be managed, and what habitat maintenance, improvement, and expansion opportunities are available?

3. What priority fish and wildlife habitat areas should be designated as ACECs?

4. What priority fish and wildlife habitat areas should receive special management through habitat management plans (HMPs)?

5. What consultation and coordination are needed with other agencies involved in fish and wildlife management and when are CMAs, MOUs, etc. required?

6. What is the potential for and what is the suitable level of participation within the planning area for volunteer and special interest groups to assist BLM fish and wildlife management?

Planning Criteria:

1. Consider the specific goals and objectives outlined for the CCDO within the BLM *Fish and Wildlife 2000* plan during the planning process.

2. Consider public and special interest group input and requests for fish and wildlife management on BLM-administered lands.

3. Manage fish and wildlife habitat to maximize production where appropriate and in conformance with the DOW strategic plan.

Forest and Woodland Management

#22 - Forest and Woodland Management

Management Concern:

1. Which lands administered by the BLM should be managed as productive forest land and woodland?

2. What level of harvest can be sustained on commercial forest lands and woodlands?

Planning Criteria:

1. Identify all BLM-administered lands with a timber or woodlands cover type.

2. Identify all BLM-administered lands available and suitable for sustained production of timber, firewood, or other forest products based on supply/demand, management needs, stand location (access, topography, etc.), site potential, stand conditions, and other resource values.

3. Identify and evaluate cutting practices based on stand conditions, silviculture treatment options, and the environmental conditions present within the constraints of multiple use.

4. Identify the harvest level that can be environmentally, technically, and economically sustained within the constraints of multiple use.

Wilderness Management

#23 - Wilderness Management

Management Concerns:

How will the wilderness study areas (WSAs) not recommended for wilderness designation be managed if they are released from further consideration by Congress?

Planning Criteria:

Develop land use decisions within the RMP for WSAs not recommended for designation assuming that Congress concurs with BLM recommendations and does not designate those WSAs as wilderness.

Visual Resource Management

#24 - Visual Resource Management

Management Concern:

Are visual resource management (VRM) guidelines being followed in land use decisions?

Planning Criteria:

1. Identify the visual resources by class, using the standard I through IV Bureau VRM planning classes, and the locations of those classes within the planning area.

2. Develop a range of protection/enhancement prescriptions within the various plan alternatives that meet the VRM objectives to varying degrees.

3. Determine those areas of outstanding scenic values that need special management or protection measures to maintain the integrity of that visual resource. (See issue #3 - ACEC Designations.)

Fire Management

#25 - Fire Management

Management Concern:

1. Are wildfires being managed efficiently under the current District Fire Management Plan?

2. How and where can prescribed fire be used to enhance resource values within RGRA? Will prescribed fire be utilized outside designated fire management areas?

3. Is least-cost suppression (including a "monitor only" option) realistic within the RGRA?

Planning Criteria:

1. Identify and analyze fire management areas for full suppression, least-cost suppression, and prescribed fire applications.

2. Identify any necessary fire management restrictions to fire suppression practices.

Hazards Management

#26 - Hazards Management

Management Concern:

1. Are there specific manmade hazards to public safety on BLM-administered lands in the planning area? These hazards would include mining shafts, unauthorized dumps, authorized landfills, and high walls from past mineral operations, etc.

2. Are there appropriate mitigation measures for these identified hazards?

Planning Criteria:

1. Identify and map these manmade hazards on BLM-administered lands.

2. Determine the needed mitigation measures with corresponding monitoring steps for these public hazards.

3. Work cooperatively with Colorado Mined Land Reclamation Hazard Abatement Project on sites on BLM-administered lands.

4. Consider disposal of parcels containing manmade hazard areas.

Lands and Realty Management

#27 - Rights-of-Way Management

Management Concern:

1. What BLM-administered lands in the planning area should be designated as utility corridors to minimize negative environmental consequences from right-of-way (ROW) development and maximize multiple placements?

2. What land use restrictions should be placed on BLM-administered lands within and outside the identified corridors?

Planning Criteria:

1. Consider public lands, in which there are now multiple compatible ROWs, for corridor designation.

2. Use the 1986 Western Regional Corridor Study (WRCS) to consider designated corridors throughout the planning area.

3. Identify utility corridors to optimize economic efficiency of ROW management as balanced by environmental and social concerns. Identify areas to avoid or exclude from right-or-way issuance, and establish mitigation necessary if unavoidable.

4. Consider technical, public safety, and national security concerns in designating corridors.

#28 - Withdrawals

Management Concern:

1. Are statutory objectives of all withdrawals (i.e., powersite) and all classifications (i.e., R&PP) currently being met?

2. Are these withdrawals and classifications still needed (should they be continued)?

3. Are additional withdrawals needed?

Planning Criteria:

1. Identify and map within GIS all withdrawals and classifications (Sec. 204 of FLPMA).

2. Determine for what purpose lands were withdrawn and if the original purpose is still being served.

3. Determine what lands will be withdrawn and for what purpose.

4. Determine if the lands are suitable for return to multiple purpose resource management.

TOPICS NOT ADDRESSED IN THIS PLAN

Presently there are no topics specifically excluded from being considered within this planning effort. Portions of wilderness and livestock grazing management have been discussed to date.

Wilderness recommendations sent to Congress recommended two areas (Browns Canyon and Beaver Creek WSAs) as additions to the National Wilderness Preservation System. They will be considered as potential ACECs in one or more alternatives within the plan; therefore, if Congress does not designate them, an alternative has been analyzed, and a plan amendment will not be needed at a later date.

The *Royal Gorge Livestock Grazing Final Environmental Impact Statement* (EIS) was completed in 1980. This document identified objectives and overall management of the grazing lands in the resource area. These decisions, as updated in the 1981, 1983, and 1987 Range Program Summaries, will be incorporated into the RMP. Only those areas with new conflicts, areas of concern, etc., will be reviewed during the RMP process. Impacts of the RMP alternatives on the range program decisions (in the existing 1987 RPS) will be analyzed.

APPENDIX B
CLIMATE/AIR QUALITY

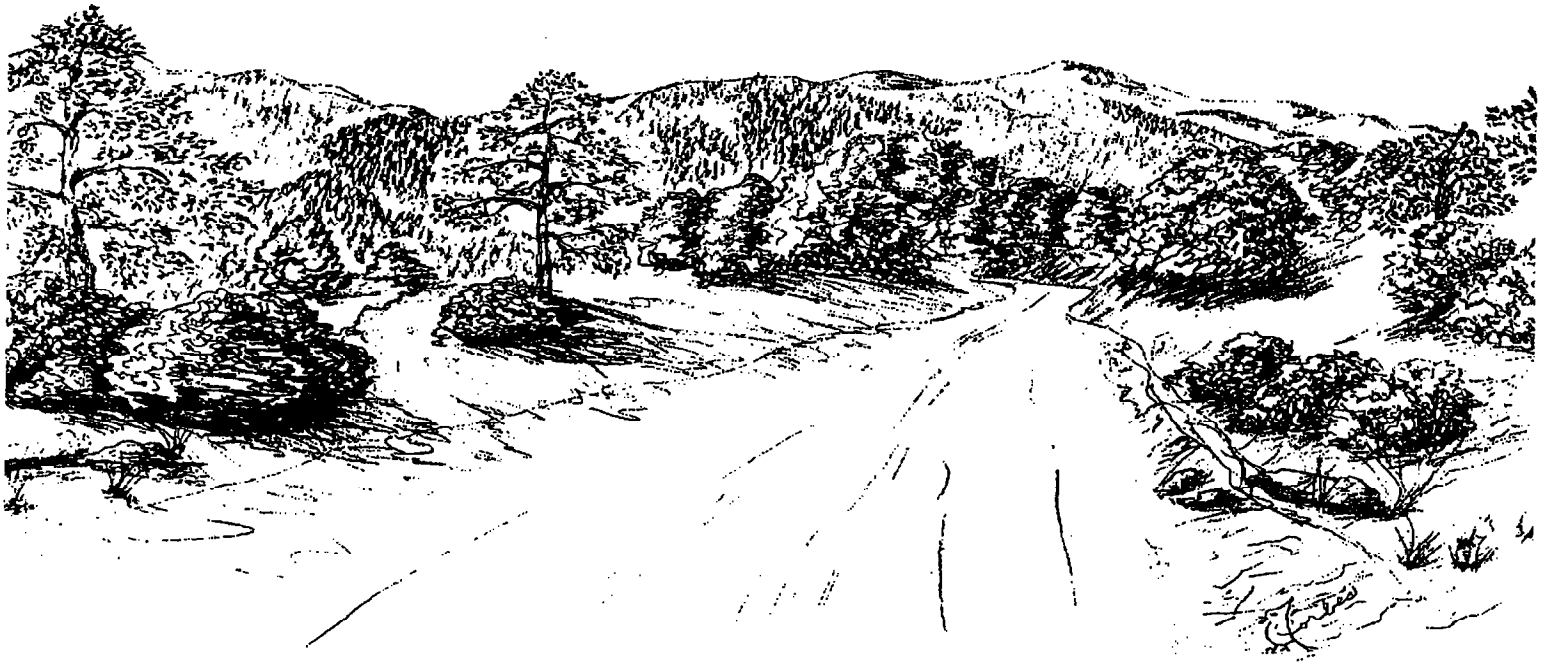


TABLE B-1
Climatic Data

Station	Elevation (ft; Mean Sea Level)	Temperature (degrees F)						Precipitation (inches)			Frost-free Period		
		Extreme Minimum	Mean Minimum	Annual Mean	Mean Maximum	Extreme Maximum	Annual Mean	Monthly Maximum	Monthly Minium	Mean Snowfall	Days	Begin Date	End Date
Antero Reservoir	8,920	-27	--	37*	--	87*	11.6*	2.7*	0.1*	--	41*	6/23*	8/03*
Buena Vista	7,931	-32	28	44	60	95	10.9	2.2	0.4	78	100	6/06	9/14
Canon City	5,330	-23	41	55	69	107	12.6	2.0	0.3	38	167	4/30	10/14
Colorado Springs AP	6,090	-27	35	49	62	100	15.2	3.0	0.3	40	154	5/07	10/08
Eads	4,217	-25	37	53	69	110	13.9	2.4	0.3	23	154	5/06	10/07
Guffey	8,201	--	--	--	--	--	15.6	3.0	0.4	65	--	--	--
Holly	3,390	-22	38	54	70	110	14.6	3.0	0.3	18	164	4/28	10/09
Las Animas	3,890	-25	37	54	72	109	12.3	2.4	0.3	21	161	4/30	10/08
Leadville	9,938	-34	22	35	48	86	16.4	2.0	0.9	118	85	6/14	9/07
Pueblo AP	4,684	-31	37	53	68	105	11.2	1.9	0.3	30	165	4/28	10/10*
Red Wing	7,900	-20*	--	--	--	99*	21.1*	5.2*	0.3*	--	112*	6/16*	10/06
Rocky Ford	4,170	-28	36	53	71	107	11.3	2.0	0.2	23	158	4/30	10/05
Rye	6,848	-26	32	47	62	97	23.3	3.3	0.9	103	135	5/22	10/04
Salida	7,160	-33	29	46	63	95	11.0	1.7	0.3	53	104	5/31	9/12
Trinidad AP	5,746	-32	36	52	67	102	11.9	1.9	0.3	39	159	5/05	10/11
Walsenburg	6,150	-36	37	52	66	100	15.1	2.1	0.6	80	152	5/10	10/09
Westcliffe	7,858	-45	25	42	60	94	15.9	2.7	0.5	92	84	6/09	9/01

Source: PEDCO Environmental, Inc. (1981)

*U.S. Department of Commerce (1990)

TABLE B-2
Selected Atmospheric Dispersion Data
Stability Frequency (percent)

	Winter	Spring	Summer	Fall	Annual
Colorado Springs					
Unstable	11	17	30	18	19
Neutral	49	57	38	46	47
Stable	40	26	32	36	34
Fort Carson					
Unstable	29	36	52	36	39
Neutral	35	51	35	39	40
Stable	31	13	13	25	21
La Junta					
Unstable	16	23	34	22	24
Neutral	40	47	35	36	39
Stable	44	30	31	42	36
Pueblo					
Unstable	15	23	33	23	24
Neutral	41	50	35	37	41
Stable	44	27	32	40	35
Trinidad					
Unstable	18	21	33	24	24
Neutral	39	53	35	35	40
Stable	43	26	32	41	36

Source: PEDCO Environmental, Inc. (1981).

TABLE B-3
State and Federal Air Quality Standards
(micrograms per cubic meter)
February 1991

Pollutant	Averaging[a] Time	Ambient[b] Federal Primary	Ambient[b] Federal Secondary	Ambient[b] Colorado Primary	Ambient[b] Colorado Secondary	Increment[c] Federal Class I	Increment[c] Federal Class II	Increment[c] Federal Class III	Increment[c] Colorado Category I	Increment[c] Colorado Category II	Increment[c] Colorado Category III
Carbon Monoxide	8 hours	10,000	10,000	10,000	---	---	---	---	---	---	---
	1 hour	40,000	40,000	40,000	---	---	---	---	---	---	---
Lead	Quarterly	1.5	1.5	---	---	---	---	---	---	---	---
Nitrogen Dioxide	Annual (Arith)	100	100	100	---	2.5	25	50	---	---	---
Oxidants (Ozone)	1 hour	235	235	160	---	---	---	---	---	---	---
Sulfur Dioxide	Annual (Arith)	80	---	---	---	2	20	40	2	10	15
	24 hours	365	---	---	---	5	91	182	5	50	100
	3 hours		1,300	700	---	25	512	700	25	300	700
Total Suspended Particulates	Annual (Geom)	75[d]	60[d]	75	60[e]	5	19	37	---	---	---
	24 hours	260[d]	150[d]	260	150	10	37	75	---	---	---
Inhalable Particulates (PM_{10})	Annual (Arith)	50	5	[f]	[f]	---	---	---	---	---	---
	24-hours	150	150	---	---	---	---	---	---	---	---

Sources: National Primary and Secondary Ambient Air Quality Standards (40 CFR 50 et seq, as revised July 1, 1990).

Requirements for Preparation, Adoption and Submittal of Implementation Plans (40 CFR 51.166, as revised July 1, 1989).

Approval and Promulgation of Implementation Plans (40 CFR 52.21, as revised July 1, 1989).

Code of Colorado Regulations (Volume 5, Part 14, as amended May 27, 1980).

[a] Short-term standards (those other than annual and quarterly) are not to be exceeded more than once each year, except the Federal ozone and PM_{10} standards. Under Federal regulations, the "expected number of days" with ozone or PM_{10} levels above the standard is not to be exceeded more than once per calendar year.

[b] Ambient standards are the absolute maximum level allowed to protect either public health (primary) or welfare (secondary).

[c] Incremental (Prevention of Significant Deterioration) standards are the maximum incremental amounts of pollutants allowed above the baseline in regions of clean air.

[d] Federal TSP standards were superseded by the Federal PM_{10} standards, effective July 31, 1987.

[e] The Colorado annual secondary TSP standard was established as a guide in assessing implementation plans to achieve the 24-hour standard.

[f] Colorado is developing PM_{10} standards at least as stringent as the Federal standards.

TABLE B-4
Selected Particulate Concentration Data
(micrograms per cubic meter)

Year	TSP # Obs	TSP Ann Geo Mean	TSP 2nd 24-hr Max	PM-10 # Obs	PM-10 Ann Arit Mean	PM-10 1st 24-hr Max	PM-10 2nd 24-hr Max	Sulfates # Obs	Sulfates Ann Arit Mean	Sulfates 2nd 24-hr Max	Nitrates # Obs	Nitrates Ann Arit Mean	Nitrates 2nd 24-hr Max	Lead Quart Mean
Colorado Springs/Urban (Foote 4-D)														
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1988	60	58	105	-	-	-	-	-	4.23	8.6	-	2.82	6.9	0.02
1987	54	49	100	-	-	-	-	-	3.73	6.1	-	3.19	6.5	0.00
1986	51	46	97	-	-	-	-	-	2.10	4.2	-	3.20	4.9	0.10
1985	68	54	101	-	-	-	-	-	3.40	6.5	-	2.70	6.8	0.20
Colorado Springs/Urban (Meadowland 4-E)														
1990	15	(46)	125	325	25	89	-	-	-	-	-	-	-	-
1989	60	55	154	287	28	177	-	-	-	-	-	-	-	-
1988	57	65	195	286	28	160	-	-	-	-	-	-	-	-
1987	60	70	296	260	31	-	142	-	-	-	-	-	-	-
1986	56	58	185	-	-	-	-	-	-	-	-	-	-	-
1985	74	68	216	-	-	-	-	-	-	-	-	-	-	-
Colorado Springs/Urban (Cascade 4-F)														
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1988	61	56	116	-	-	-	-	-	-	-	-	-	-	-
1987	53	60	132	-	-	-	-	-	-	-	-	-	-	-
1986	57	59	136	-	-	-	-	-	-	-	-	-	-	-
1985	65	71	136	-	-	-	-	-	-	-	-	-	-	-
Colorado Springs/Urban (RBD 4-G)														
1990	45	(50)	138	61	27	79	-	-	-	-	-	-	-	0.05
1989	-	-	-	58	34	118	-	-	-	-	-	-	-	-
1988	-	-	-	56	34	73	-	-	-	-	-	-	-	-
1987	-	-	-	41	32	-	53	-	-	-	-	-	-	-

Table B-4 (Continued)

Year	TSP # Obs	TSP Ann Geo Mean	TSP 2nd 24-hr Max	PM-10 # Obs	PM-10 Ann Arit Mean	PM-10 1st 24-hr Max	PM-10 2nd 24-hr Max	Sulfates # Obs	Sulfates Ann Arit Mean	Sulfates 2nd 24-hr Max	Nitrates # Obs	Nitrates Ann Arit Mean	Nitrates 2nd 24-hr Max	Lead Quart Mean
Colorado Springs/Urban (Service Center 4-H)														
1990	-	-	-	61	21	60	-	-	-	-	-	-	-	-
1989	-	-	-	61	26	64	-	-	-	-	-	-	-	-
1988	-	-	-	48	(26)	60	-	-	-	-	-	-	-	-
1987	-	-	-	41	28	-	71	-	-	-	-	-	-	-
Lamar/Surban (Muni Complex 6-C)														
990	-	-	-	57	20	46	-	-	-	-	-	-	-	-
1989	-	-	-	49	(28)	77	-	-	-	-	-	-	-	-
1988	-	-	-	121	25	101	-	-	-	-	-	-	-	-
1987	20	47	102	106	26	-	53	-	-	-	-	-	-	-
1986	52	64	407	60	(27)	-	50	-	-	-	-	-	-	-
1985	5	(44)	(65)	-	-	-	-	-	-	-	-	-	-	-
Pueblo/Urban (Health 7-A)														
1990	-	-	-	50	26	75	-	-	-	-	-	-	-	-
1989	-	-	-	58	33	84	-	-	-	-	-	-	-	-
1988	54	68	139	54	35	71	-	-	-	-	-	-	-	-
1987	60	56	116	5	(29)	-	34	-	-	-	-	-	-	0.0
1986	59	59	131	-	-	-	-	-	-	-	-	-	-	0.1
1985	62	67	166	-	-	-	-	-	-	-	-	-	-	0.1
Pueblo/Urban (Watts Station 7-C)														
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	55	(20)	70	-	-	-	-	-	-	-	-
1988	56	34	70	56	19	65	-	-	-	-	-	-	-	-
1987	58	31	62	5	(18)	-	20	-	-	-	-	-	-	-
1986	55	29	87	-	-	-	-	-	-	-	-	-	-	-
1985	59	33	90	-	-	-	-	-	-	-	-	-	-	-

Table B-4 (Continued)

Year	TSP # Obs	TSP Ann Geo Mean	TSP 2nd 24-hr Max	PM-10 # Obs	PM-10 Ann Arit Mean	PM-10 1st 24-hr Max	PM-10 2nd 24-hr Max	Sulfates # Obs	Sulfates Ann Arit Mean	Sulfates 2nd 24-hr Max	Nitrates # Obs	Nitrates Ann Arit Mean	Nitrates 2nd 24-hr Max	Lead Quart Mean
Pueblo/Urban (Airport 7-E)														
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	43	(21)	43	-	-	-	-	-	-	-	-
1988	56	25	84	42	(16)	32	-	-	-	-	-	-	-	-
1987	60	26	69	-	-	-	-	-	-	-	-	-	-	-
1986	55	28	77	-	-	-	-	-	-	-	-	-	-	-
1985	67	31	104	-	-	-	-	-	-	-	-	-	-	-
Cañon City/Suburban (13-A)														
1990	-	-	-	330	19	49	-	-	-	-	-	-	-	-
1989	-	-	-	344	23	129	-	-	-	-	-	-	-	-
1988	-	-	-	335	23	172	-	-	-	-	-	-	-	-
1987	87	53	175	2	(19)	-	18	-	4.60	8.4	-	2.22	4.0	-
1986	58	51	272	-	-	-	-	-	1.1	4.3	-	3.7	7.2	-
1985	74	54	253	-	-	-	-	-	4.0	9.9	-	2.3	7.8	-
Leadville/Surban (13-C)														
1990	56	37	118	-	-	-	-	-	-	-	-	-	-	0.12
1989	57	39	88	-	-	-	-	-	-	-	-	-	-	0.05
1988	54	41	123	-	-	-	-	-	-	-	-	-	-	0.10
1987	49	41	134	-	-	-	-	-	-	-	-	-	-	0.30
1986	49	44	117	-	-	-	-	-	-	-	-	-	-	0.30
1985	67	61	148	-	-	-	-	-	-	-	-	-	-	0.40

Source: Colorado Department of Health, n.d.

NOTE: *Underlined values indicate violation of Ambient Air Quality Standards.*
Parentheses indicate insufficient data.

TABLE B-5
Selected Gaseous Pollutant Concentration Data
(micrograms per cubic meter)

Stat/ Year	Carbon Monoxide						Ozone			Nitrogen Dioxide		Nitrogen Oxide	
	# Obs	1st 1-hr Max	2nd 1-hr Max	# Obs	1st 8-hr Max	2nd 8-hr Max	# Obs	1st 1-hr Max	2nd 1-hr Max	# Obs	Ann Arit Mean	# Obs	Ann Arit Mean
Colorado Springs/Urban (Tejon 4-A)													
1990	360	16.1	15.6	360	6.8	6.7	335	0.075	0.073	-	-	-	-
1989	362	17.5	16.8	362	10.1	7.3	292	0,081	0.079	-	-	-	-
1988	344	20.3	19.2	344	12.8	11.2	335	0.090	0.090	-	-	-	-
1987	347	17.4	16.7	347	10.7	7.5	344	0.081	0.080	-	-	-	-
1986	320	24.2	17.8	320	8.8	8.1	362	0.078	0.077	-	-	-	-
1985	352	23.0	19.0	352	9.0	7.0	303	0.070	0.070	178	0.020	339	0.04
Colorado Springs/Urban (I25 4-B)													
1990	237	16.4	15.6	237	7.2	2.9	-	-	-	-	-	-	-
1989	345	25.0	22.5	345	13.3	8.1	-	-	-	-	-	-	-
1988	360	18.5	18.5	360	12.9	11.8	-	-	-	-	-	-	-
1987	361	18.5	17.5	361	9.5	9.1	-	-	-	-	-	-	-
1986	354	25.0	23.5	354	9.9	9.5	-	-	-	-	-	-	-
1985	345	25	25.0	345	12.0	8.0	-	-	-	-	-	-	-
Colorado Springs/Urban (Chestnut 4-I)													
1990	-	-	-	-	-	-	360	0.103	0.093	-	-	-	-
1989	-	-	-	-	-	-	362	0.091	0.085	-	-	-	-
1988	-	-	-	-	-	-	149	(0.08)	(0.08)	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-	-

Table B-5 (Continued)

Stat/ Year	Carbon Monoxide # Obs	Carbon Monoxide 1st 1-hr Max	Carbon Monoxide 2nd 1-hr Max	Carbon Monoxide # Obs	Carbon Monoxide 1st 8-hr Max	Carbon Monoxide 2nd 8-hr Max	Ozone # Obs	Ozone 1st 1-hr Max	Ozone 2nd 1-hr Max	Nitrogen Dioxide # Obs	Nitrogen Dioxide Ann Arit Mean	Nitrogen Oxide # Obs	Nitrogen Oxide Ann Arit Mean
Security/Suburban (4-C)													
1990	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	140	(0.10)	(0.07)	-	-	-	-
1987	-	-	-	-	-	-	336	0.110	0.100	-	-	-	-
1986	-	-	-	-	-	-	341	0.085	0.075	-	-	-	-
1985	-	-	-	-	-	-	320	0.070	0.070	-	-	-	-
Pueblo/Urban (7-A)													
1985	310	10.0	10.0	310	6.0	4.0	-	-	-	-	-	-	-
1984	347	16.0	16.0	347	6.0	6.0	-	-	-	-	-	-	-
1983	339	11.0	11.0	337	7.0	6.0	-	-	-	-	-	-	-
1982	345	12.0	12.0	345	5.9	4.4	-	-	-	-	-	-	-
1981	344	9.5	8.5	344	4.3	3.9	-	-	-	-	-	-	-
1980	326	17.0	16.5	326	6.2	6.2	-	-	-	-	-	-	-

Source: Colorado Department of Health, n.d.

NOTE: Underlined values indicate violation of Ambient Air Quality Standards.

Parentheses indicate insufficient data.

TABLE B-6
Selected Standard Visual Range Data (Km)

Station/ Year	Winter Percentile			Spring Percentile			Summer Percentile			Fall Percentile		
	10th	50th	90th	10th	50th	90th	10th	50th	90th	10th	50th	90th
Denver/Stapleton (annual averages)												
1990	84	169	282									
1989	79	172	280									
1988	74	156	261									
1987	89	171	267									
1986	89	179	311									
Denver/Thornton (annual averages)												
1990	34	98	259									
1989	27	79	200									
1988	24	71	177									
1987	31	72	192									
Great Sand Dunes National Monument												
1991	107	207	298	-	-	-	-	-	-	-	-	-
1990	-	-	-	101	152	225	95	167	225	106	179	278
1989	132	254	348	104	170	315	107	175	278	139	229	334
1988	128	218	372	95	148	229	72	122	182	65	132	226
1987	-	-	-	-	-	-	106	143	177	108	188	278

Source: Air Resource Specialists, Inc., n.d.

TABLE B-7
Selected Acid Deposition Data (pH)

Station/ Year	Winter		Spring		Summer		Fall		Annual	
	Valid Obs	pH	Valid Obs	pH	Valid Obs	pH	Valid Obs	pH	Valid Obs	pH
Alamosa (CO00)										
1990	5	5.66	7	6.01	8	5.42	9	5.31	28	5.50
1989	6	6.32	5	6.64	7	5.81	4	5.22	22	5.59
1988	5	5.48	4	5.75	9	5.42	8	5.45	27	5.49
1987	6	5.80	8	5.86	8	5.16	8	5.26	30	5.42
1986	4	5.00	9	5.97	10	5.32	11	5.03	34	5.28
1985	5	5.91	7	5.45	10	5.21	8	5.33	28	5.29
1984	3	6.02	3	6.73	9	5.36	8	5.48	26	5.51
1983	8	5.81	6	5.93	10	5.50	8	5.51	28	5.58
1982	8	5.31	7	6.13	1	5.68	7	5.64	25	5.66
1981	3	6.24	7	5.10	10	5.35	9	5.11	31	5.24
1980	-	-	4	6.01	5	5.31	3	5.53	12	5.68
Las Animas Fish Hatchery (CO01)										
1990	3	5.79	8	5.55	11	5.87	8	5.69	30	5.70
1989	7	6.52	6	5.85	9	5.76	6	5.24	28	5.69
1988	8	5.21	8	5.61	9	5.42	5	5.79	29	5.56
1987	8	6.09	8	5.90	9	5.75	7	5.52	33	5.71
1986	6	4.89	11	6.08	9	5.74	11	5.58	37	5.66
1985	5	5.80	9	5.64	6	6.30	8	5.32	29	5.55
1984	4	5.92	5	5.82	5	5.73	3	5.93	16	5.80
1983	-	-	-	-	-	-	3	6.04	5	5.75

Table B-7 (Continued)

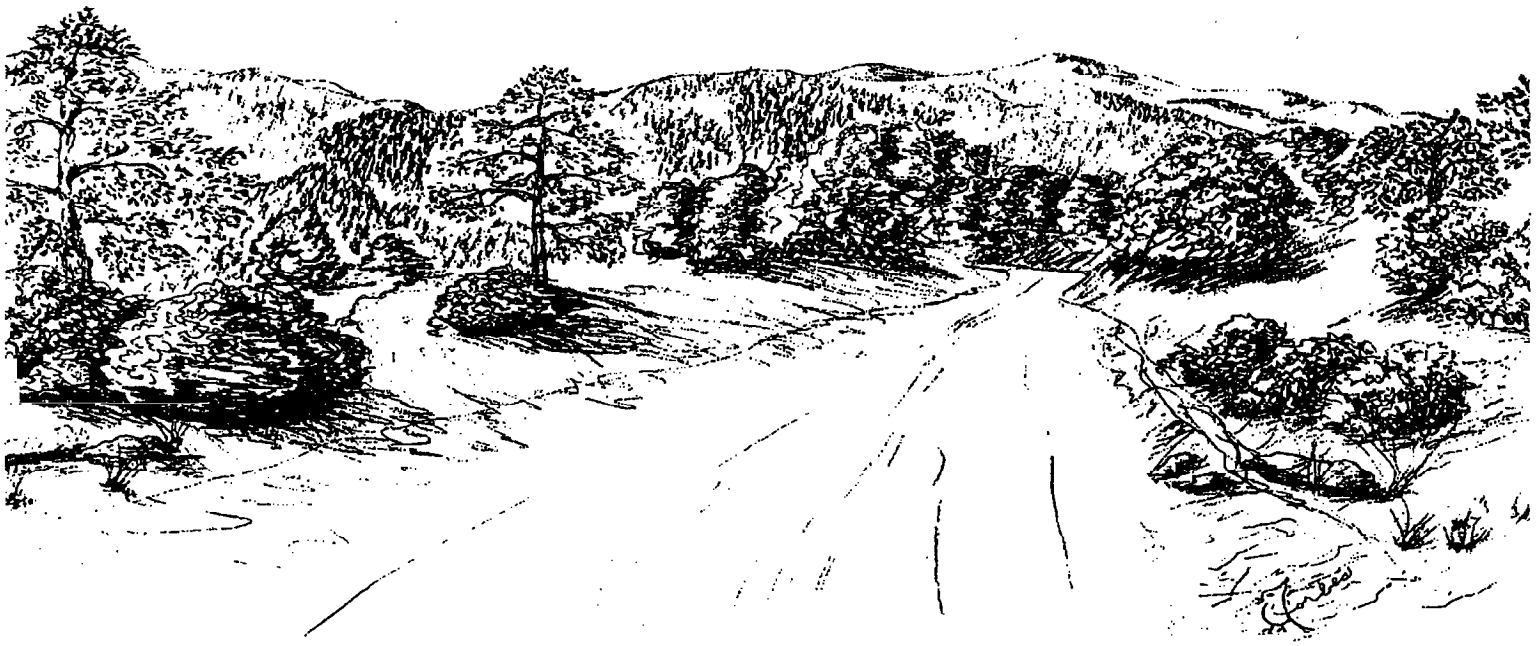
Station/ Year	Winter		Spring		Summer		Fall		Annual	
	Valid Obs	pH	# Obs	pH	# Obs	pH	# Obs	pH	# Obs	pH
					Manitou (C021)					
1990	5	5.41	11	5.14	12	4.81	8	4.95	37	4.94
1989	8	5.77	7	5.29	9	5.01	6	5.05	29	5.09
1988	6	4.98	10	4.95	13	4.80	7	5.01	38	4.85
1987	8	4.92	11	4.83	10	4.77	-	-	29	4.82
1986	6	4.84	12	5.14	10	4.70	11	4.87	38	4.82
1985	5	5.13	9	5.01	9	4.78	7	4.97	31	4.86
1984	8	5.20	11	5.51	12	4.77	8	4.92	36	4.90
1983	6	5.39	10	5.03	10	4.86	9	5.40	37	4.97
1982	4	5.27	12	5.02	8	4.76	9	4.92	33	4.91
1981	4	5.88	12	4.83	8	4.82	8	4.64	34	4.81
1980	2	5.15	6	5.11	5	4.89	3	5.11	16	5.06
1979	5	4.92	8	5.20	6	4.95	4	5.05	21	5.03
1978	-	-	-	-	-	-	4	5.71	6	5.32

Source: Natural Resources Ecology Laboratory

NOTE: Precipitation weighted averages. The natural pH of precipitation is approximately 5.6

APPENDIX C

ECONOMIC CONDITIONS AND SOCIAL ENVIRONMENT



APPENDIX C
ECONOMIC CONDITIONS AND SOCIAL ENVIRONMENT

This appendix provides details on various county employment and income levels in a table format.

TABLE C-1
Employment and Income for Baca County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	14	14		1	1	0
Construction	87	99	74	5	7	5
Manufacturing	25	12		2	1	0
Transportation	83	68	76	5	4	5
Wholesale Trade	139	92	89	8	6	6
Retail Trade	389	323	258	24	21	18
Finance/Insur/R.Estate	113	112	108	7	7	7
Services	258	246	226	16	16	16
Government	507	514	558	31	34	38
Misc. Agricultural Svcs.	39	35	44	2	2	3
Not Classified Elsewhere			18	0	0	1
Total Nonfarming	1,654	1,515	1,451	100	100	100
Farming	996	908	925			
Total Employment by Place of Work	2,650	2,423	2,376			
Unemployment Rate	3.130	4.110	3.720			
Total Personal Income (M$)	39.546	66.285	82.115			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of conficential information.

TABLE C-2
Employment and Income for Bent County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining				0	0	0
Construction	48	99	73	2	5	4
Manufacturing	86	86	62	4	4	3
Transportation	71	81	78	3	4	4
Wholesale Trade	11	17	17	1	1	1
Retail Trade	281	220	236	14	11	12
Finance/Insur./R.Estate	62	63	67	3	3	3
Services	237	276	274	12	13	14
Government	1,207	1,170	1,094	59	57	5
Misc. Agricultural Svcs.	36	37	46	2	2	2
Not Classified Elsewhere	2	2	2	0	0	0
Total Nonfarming	2,041	2,051	1,949	100	100	100
Farming	528	502	516			
Total Employment by Place of Work	2,569	2,553	2,465			
Unemployment Rate	3.660	4.350	6.360			
Total Personal Income (M$)	38.549	52.66	61.53			

Source: Colorado Division of Local Government County Profile. Blanks Indicate Suppressed Data to Avoid Disclosure of Confidential Information

TABLE C-3
Employment and Income for Chaffee County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	79	38	23	2	1	0
Construction	562	607	420	11	12	7
Manufacturing	157	135	207	3	3	4
Transportation	194	194	185	4	4	3
Wholesale Trade	107	147	167	2	3	3
Retail Trade	1,238	1,238	1,313	25	24	23
Finance/Insur./R.Estate	298	340	372	6	6	6
Services	1,117	1,452	1,727	23	28	30
Government	1,126	1,090	1,342	23	21	23
Misc. Agricultural Svcs.	19	18	27	0	0	0
Not Classified Elsewhere				0	0	0
Total Nonfarming	4,897	5,259	5,783	100	100	100
Farming	216	208	213			
Total Employment by Place of Work	5,113	5,467	5,996			
Unemployment Rate	8.100	10.390	8.830			
Total Personal Income (M$)	120.109	144.995	162.965			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-4
Employment and Income for Crowley County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	0	0	0	0	0	0
Construction	62	82	77	12	15	9
Manufacturing		0	0	0	0	0
Transportation		34	29	0	6	3
Wholesale Trade				0	0	0
Retail Trade	103	118	108	20	21	13
Finance/Insur./R.Estate	26		26	5	0	3
Services	106	109	133	20	20	15
Government	169	182	482	32	33	56
Misc. Agricultural Svcs.				0	0	0
Not Classified Elsewhere	57	31	6	11	6	1
Total Nonfarming	523	556	861	100	100	100
Farming	488	462	493			
Total Employment by Place of Work	1,011	1,018	1,354			
Unemployment Rate	4.970	5.900	6.120			
Total Personal Income (M$)	30.011	26.123	38.802			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-5
Employment and Income for Custer County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	0	0	0	0	0	0
Construction	48	63	68	11	11	11
Manufacturing	39	15	11	9	3	2
Transportation		30	32	0	5	5
Wholesale Trade				0	0	0
Retail Trace	58	97	94	14	17	15
Finance/Insur./R.Estate	45	70	76	11	12	12
Services	82	182	184	20	31	30
Government	110	114	130	26	20	21
Misc. Agricultural Svcs.				0	0	0
Not Classified Elsewhere	38	10	25	9	2	4
Total Nonfarming	420	581	620	100	100	100
Farming	177	188	189			
Total Employment by Place of Work	597	769	809			
Unemployment Rate	3.170	7.940	7.610			
Total Personal Income (M$)	16.283	20.463	25.366			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-6
Employment and Income for El Paso County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	290	495	397	0	0	0
Construction	8,909	14,422	11,266	6	7	5
Manufacturing	16,308	24,117	25,085	10	12	11
Transportation	5,009	6,024	6,722	3	3	3
Wholesale Trace	3,789	3,902	5,585	2	2	2
Retail Trade	25,441	32,308	35,478	16	16	16
Finance/Insur./R.Estate	12,880	17,870	20,967	8	9	9
Services	34,240	44,058	56,711	21	22	25
Government	54,019	57,441	64,274	33	28	28
Misc. Agricultural Svcs.	696	1,317	1,670	0	1	1
Not Classified Elsewhere				0	0	0
Total Nonfarming	161,581	201,954	228,155	100	100	100
Farming	1,098	1,091	1,112			
Total Employment by Place of Work	162,679	203,045	229,267			
Unemployment Rate	6.780	5.380	7.430			
Total Personal Income (M$)	2,861.450	4,579.330	6,090.990			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-7
Employment and Income for Fremont County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	340	194	156	4	2	1
Construction	533	658	621	6	6	5
Manufacturing	1,157	1,194	1,192	12	11	10
Transportation	421	404	408	4	4	4
Wholesale Trade	130	164	111	1	2	1
Retail Trade	1,693	1,927	2,096	18	18	18
Finance/Insur./R.Estate	645	669	690	7	6	6
Services	2,512	3,164	3,228	26	29	28
Government	2,194	2,405	2,948	23	22	26
Misc. Agricultural Svcs.	23	28	49	0	0	0
Not Classified Elsewhere				0	0	0
Total Nonfarming	9,648	10,807	11,499	100	100	100
Farming	521	560	575			
Total Employment by Place of Work	10,169	11,367	12,074			
Unemployment Rate	8.800	9.340	9.110			
Total Personal Income (M$)	224.136	315.509	378.756			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-8
Employment and Income for Huerfano County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining			0	0	0	0
Construction	107	271	162	6	12	8
Manufacturing	61	54	70	3	2	3
Transportation	77	77	81	4	3	4
Wholesale Trade	42	36	38	2	2	2
Retail Trade	496	536	459	27	24	23
Finance/Insur./R.Estate	114	158	132	6	7	6
Services	475	631	583	25	28	29
Government	474	447	492	25	20	24
Misc. Agricultural Svcs.	12	14	17	1	1	1
Not Classified Elsewhere	7	7		0	0	0
Total Nonfarming	1,865	2,231	2,034	100	100	100
Farming	339	356	353			
Total Employment by Place of Work	2,204	2,587	2,387			
Unemployment Rate	10.270	9.720	11.550			
Total Personal Income (M$)	45.492	61.892	69.435			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-9
Employment and Income for Kiowa County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining		13		0	2	0
Construction	45	71	55	8	11	9
Manufacturing	18	13		3	2	0
Transportation	35	20	30	6	3	5
Wholesale Trade	30	26	37	5	4	6
Retail Trade	101	125	92	17	19	15
Finance/Insur./R.Estate	32	35	19	5	5	3
Services	80	100	84	14	15	14
Government	216	229	250	37	35	41
Misc. Agricultural Svcs		21	31	0	3	5
Not Classified Elsewhere	31		19	5	0	3
Total Nonfarming	588	653	617	100	100	100
Farming	514	465	470			
Total Employment by Place of Work	1,102	1,118	1,087			
Unemployment Rate	1.640	1.650	3.650			
Total Personal Income (M$)	28.319	42.665	44.074			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-10
Employment and Income for Lake County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	3,672		217	62	0	10
Construction	109	84	100	2	3	5
Manufacturing	31	23		1	1	0
Transportation				0	0	0
Wholesale Trade	30	27		1	1	0
Retail Trade	561	458	414	10	15	20
Finance/Insur./R.Estate	161	153	122	3	5	6
Services		462	476	0	15	22
Government	567	558	585	10	19	28
Misc. Agricultural Svcs.	15	20	15	0	1	1
Not Classified Elsewhere	751	1,204	192	13	40	9
Total Nonfarming	5,897	2,989	2,121	100	100	100
Farming	0	0	0			
Total Employment by Place of Work	5,897	2,989	2,121			
Unemployment Rate	9.060	16.700	15.850			
Total Personal Income (M$)	97.551	67.899	53.541			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-11
Employment and Income for Las Animas County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	684	174	205	12	4	4
Construction	276	215	178	5	5	4
Manufacturing	148	100	78	3	2	2
Transportation	363	303	309	7	7	7
Wholesale Trade	141	141	155	3	3	3
Retail Trade	1,024	819	1,051	19	18	22
Finance/Insur./R.Estate	240	238	230	4	5	5
Services	1,344	1,273	1,074	24	27	23
Government	1,276	1,340	1,405	23	29	30
Misc. Agricultural Svcs.	33	33	39	1	1	1
Not Classified Elsewhere				0	0	0
Total Nonfarming	5,529	4,636	4,724	100	100	100
Farming	623	636	637			
Total Employment by Place of Work	6,152	5,272	5,361			
Unemployment Rate	7.110	11.730	8.990			
Total Personal Income (M$)	117.804	130.805	155.506			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-12
Employment and Income for Otero County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining			15	0	0	0
Construction	387	353	302	4	4	3
Manufacturing	1,155	1,062	843	13	12	10
Transportation	930	751	698	10	8	8
Wholesale Trade	427	489	483	5	6	6
Retail Trade	1,635	1,540	1,630	18	17	19
Finance/Insur./R.Estate	455	4584	57	5	5	5
Services	2,218	2,315	2,339	24	26	27
Government	1,717	1,748	1,790	19	20	20
Misc. Agricultural Svcs.	167	144	187	2	2	2
Not Classified Elsewhere	7	7		0	0	0
Total Nonfarming	9,098	8,867	8,744	100	100	100
Farming	1,038	998	1,042			
Total Employment by Place of Work	10,136	9,865	9,786			
Unemployment Rate	8.020	7.830	8.680			
Total Personal Income (M$)	182.035	228.087	255.184			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-13
Employment and Income for Park County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	52	70		4	4	0
Construction	195	256		14	14	0
Manufacturing	37	105	70	3	6	4
Transportation	46	65	71	3	4	4
Wholesale Trade	10	18	25	1	1	1
Retail Trade	220	301	285	16	16	14
Finance/Insur./R.Estate	119	103	128	9	6	6
Services	272	467	499	20	25	25
Government	424	447	548	30	24	28
Misc. Agricultural Svcs.	19	14	19	1	1	1
Not Classified Elsewhere			336	0	0	17
Total Nonfarming	1,394	1,846	1,981	100	100	100
Farming	154	185	184			
Total Employment by Place of Work	1,548	2,031	2,165			
Unemployment Rate	6.980	6.100	6.920			
Total Personal Income (M$)	52.352	75.793	96.865			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-14
Employment and Income for Prowers County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	146	266	183	3	4	3
Construction	293	309	311	5	5	5
Manufacturing	511	986	692	9	15	11
Transportation	261	239	338	5	4	5
Wholesale Trade	420	402	479	8	6	7
Retail Trade	1,335	1,409	1,263	24	22	20
Finance/Insur./R.Estate	356	391	431	6	6	7
Services	1,004	1,202	1,278	18	18	20
Government	1,103	1,134	1,286	20	17	20
Misc. Agricultural Svcs.	153	170	212	3	3	3
Not Classified Elsewhere				0	0	0
Total Nonfarming	5,582	6,508	6,473	100	100	100
Farming	1,033	925	961			
Total Employment by Place of Work	6,615	7,433	7,434			
Unemployment Rate	5.390	6.160	8.460			
Total Personal Income (M$)	101.852	159.736	177.486			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-15
Employment and Income for Pueblo County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	132	124	105	0	0	0
Construction	2,395	2,505	2,580	5	5	5
Manufacturing	8,349	4,396	4,823	16	9	10
Transportation	3,143	2,761	2,239	6	6	4
Wholesale Trade	1,432	1,394	1,184	3	3	2
Retail Trade	9,821	9,779	10,556	19	21	21
Finance/Insur./R.Estate	3,126	2,972	2,923	6	6	6
Services	12,121	12,352	14,407	24	26	29
Government	10,357	10,091	10,717	20	22	21
Misc. Agricultural Svcs.	255	301	360	0	1	1
Not Classified Elsewhere				0	0	0
Total Nonfarming	51,131	46,675	49,894	100	100	100
Farming	1,097	1,013	1,039			
Total Employment by Place of Work	52,228	47,688	50,933			
Unemployment Rate	10.340	10.560	8.930			
Total Personal Income (M$)	1,091.67	1,297.65	1,550.18			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-16
Employment and Income for Teller County

				Percent of Total		
	1980	1984	1988	1980	1984	1988
Mining	67	110	24	3	3	1
Construction	312	457	424	12	13	11
Manufacturing	82	71	96	3	2	2
Transportation	73	97	94	3	3	2
Wholesale Trade	17	33	47	1	1	1
Retail Trade	544	685	865	21	20	22
Finance/Insur./R.Estate	403	494	611	15	14	16
Services	661	871	1,045	25	26	27
Government	455	554	662	17	16	17
Misc. Agricultural Svcs.	31	36	33	1	1	1
Not Classified Elsewhere				0	0	0
Total Nonfarming	2,645	3,408	3,901	100	100	100
Farming	81	85	85			
Total Employment by Place of Work	2,726	3,493	3,986			
Unemployment Rate	5.820	6.690	8.720			
Total Personal Income (M$)	73.278	123.576	171.667			

Source: Colorado Division of Local Government County Profile. Blanks indicate suppressed data to avoid disclosure of confidential information

TABLE C-17
Contribution of Recreational Activities Employment and Income to the ESA

	Alternatives			
	Existing	Resource Conservation	Resource Utilization	Preferred
Expenditure	38,192,600	38,195,100	39,150,200	73,368,500
Output	80,815,542	80,820,832	82,841,823	91,767,746
Earnings	26,276,509	26,278,229	26,935,338	63,035,610
Employment[1/]	2,091	2,091	2,143	2,374

[1/]Less than 1 percent change would occur in any alternative

TABLE C-18
Expenditures by Activity

Activity	Expenditure	Base	Existing	Alternatives		
				Resource Conservation	Resource Utilization	Preferred
OHV	16	816,000	816,000	584,000	1,032,000	1,072,000
Other motor	16	13,364,800	13,364,800	13,364,800	13,364,800	15,318,400
Nonmotor	16	873,600	873,600	976,000	1,120,000	1,184,000
Camping	12	921,600	921,600	954,000	1,104,000	1,344,000
Hunting	18	1,522,800	1,522,800	1,080,000	1,368,000	1,368,000
Land based	16	1,704,000	1,704,000	1,659,200	1,952,000	2,096,000
Fishing	17	999,600	999,600	1,572,500	867,000	1,065,900
Boating	74	16,576,000	16,576,000	16,576,000	16,576,000	17,982,000
Other water	16	97,600	97,600	112,000	177,600	339,200
Winter sports	86	1,212,600	1,212,600	1,212,600	1,444,800	1,453,400
Snowmobiling	16	104,000	104,000	104,000	144,000	143,600
Total		38,192,600	38,192,600	38,195,100	39,150,200	43,368,500

TABLE C-19
National Dollar Unit Per Resource Unit

Resource	Unit	Dollar Value
Livestock	AUM	9.19[a/]
Deer hunting	AUs	54.61
Elk hunting	AUs	156.60
Antelope hunting	AUs	21.63
Other big game hunting	HDs	26.44
Waterfowl hunting	HDs	7.74
Warm water angling	ADs	4.29
Cold water angling	ADs	4.74
Dispersed recreation use	RDs	4.06
Nongame use (nature study)	RDs	9.79

[a/] The charge to lessee is $1.92/AUM

Source: Colorado BLM SAGERAM 1991 Price file

TABLE C-20
Estimated Recreation National Dollar Values By 2010

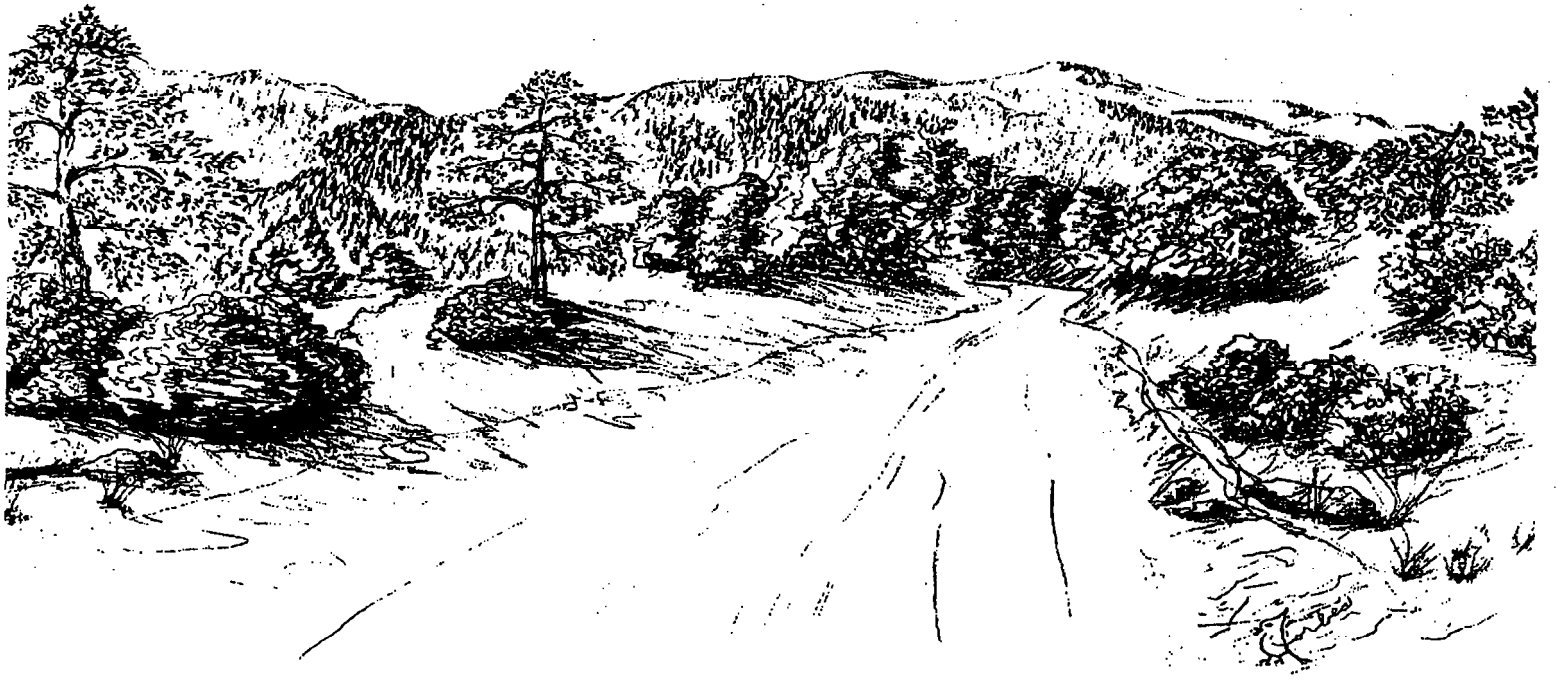
Activity	Value	Base	Existing	Resource Conservation	Resource Utilization	Preferred
OHV	10	510,0005	510,000	365,000	645,000	670,000
Other motor	10	8,353,000	8,353,000	8,353,000	8,353,000	9,574,000
Nonmotor	12	655,200	655,200	732,00	840,00	888,000
Camping	7	537,600	537,600	556,500	644,000	784,000
Hunting	48	4,060,800	4,060,800	2,880,000	3,648,000	3,648,000
Land based	10	1,065,000	1,065,000	1,037,000	1,220,000	1,310,000
Fishing	5	294,000	294,000	462,500	255,000	313,500
Boating	16	3,584,000	3,584,000	3,584,000	3,584,000	3,888,000
Other water	10	61,000	61,000	70,000	111,000	212,000
Winter sports	22	310,200	310,200	310,200	396,600	371,000
Snowmobiling	10	65,000	65,000	65,000	90,000	91,000
Total		19,495,800	19,495,800	18,415,200	19,759,600	21,750,300
Change from Existing				-1,081	263,800	2,254,500
Percent change from Existing				-5.5	1.4	11.6

TABLE C-21
Estimated National Annual Dollar Values By 2010

			Alternatives			
Resource	Value	Base	Existing	Resource Conservation	Resource Utilization	Preferred
Recreation[1/]			19,495,800	18,415,200	19,759,600	21,750,300
AUMs	8	239,848	239,848	239,848	239,848	239,848
Sawtimber Mbf	30	4,200	4,200	0	39,000	39,000
Cords of wood	10	9,500	9,500	8,000	0	9,500
Miscellaneous wood permits		1,800	1,800	2,000	2,000	1,800
Total		255,348	19,751,148	18,665,048	20,040,448	22,040,448
Percent change from Existing				-5.5	1.5	11.6

[1/]See Table C-20

APPENDIX D
GEOGRAPHIC REFERENCE AREAS



APPENDIX D
GEOGRAPHIC REFERENCE AREAS

Decisions in the final RMP/EIS will be made by geographic reference area (GRA). Each geographic area is somewhat similar in land, vegetation, and management goals and may have particular issues or management concerns in common. In the final document, the resource condition objective, land use allocation, and the management action decisions will be described on the basis of these geographic areas (Map D-1).

The following 10 geographic reference areas have been identified:

1 - Other Lands
2 - Arkansas River
3 - Collegiate/Sangre
4 - Badger Creek
5 - South Park
6 - Gold Belt
7 - Waugh Mountain/Tallahassee Creek
8 - Grape Creek
9 - Huerfano
10 - Cucharas Canyon

A general area description, listing of possible issues/concerns, and general land management objectives related to the Preferred Alternative are shown for each GRA.

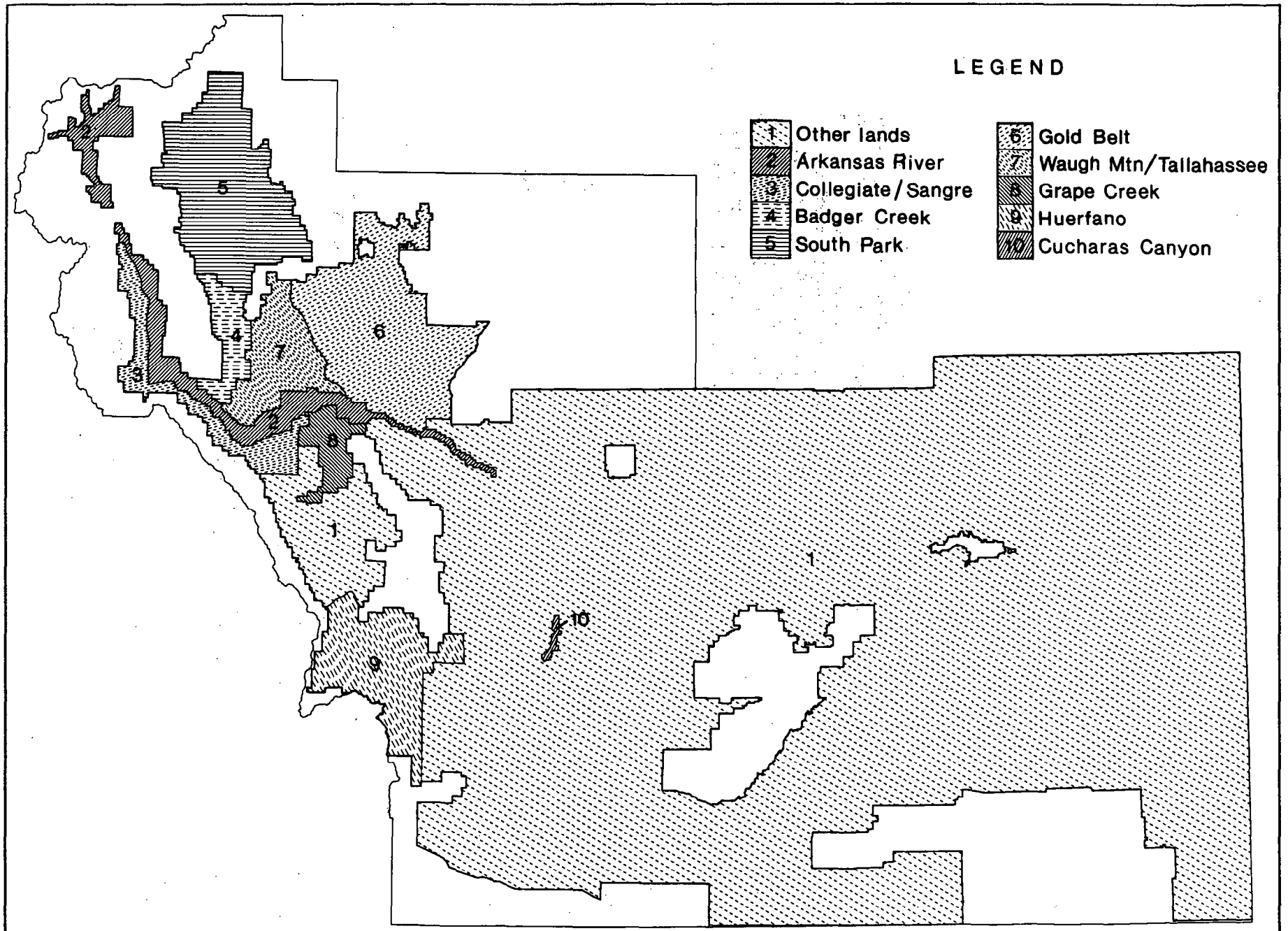
Area 1 (OtherLands):

61,597 acres BLM
1,263,305 acres private
846,974 acres state

The area extends from Custer County on the west to Kansas on the east. Oklahoma and New Mexico form the southern boundary and the southern county lines of El Paso, Lincoln, and Cheyenne Counties form the northern border of the unit. Custer County area is represented by rolling grasslands of the typical Rocky Mountain high mountain park. The grassland is broken by an occasional stand of ponderosa pine or piñon/juniper; normally on the foothills or draws that dissect the park. The remainder comprises a large area of southeastern Colorado made up of the western most portion of the American Great Plains. Blue grama and buffalo grasses are the most common vegetation of these plains. Other vegetation include sand sage, woody riparian vegetation around reservoirs and along rivers and streams, a large variety of annual forbs, and perennial flowers and shrubs. The area is generally flat to gently rolling with few gullies and little topographic relief.

Management Issues and Concerns

Land ownership adjustments, fluid minerals management, mineral materials management, coal minerals management, wildlife habitat management, livestock grazing management, and special status animal species management are of concern within this area.



Map D-1 - GEOGRAPHIC REFERENCE AREAS

General Management Objectives

Provide for:

- emphasis on land disposal
- limited off-highway vehicle use
- custodial grazing management
- limited fishery/wildlife habitat management
- enhanced opportunities for minerals management

Area 2 (Arkansas River):

124,876 acres BLM

7,534 acres private

8,703 acres state

Area 2 includes private, state, and BLM-administered lands around Leadville, Colorado, and down the Arkansas River corridor to the upper end of Pueblo Reservoir. The corridor consists of those lands directly affected by the river and river associated uses. Riparian vegetation is highly variable depending on the elevation, topography, and amount of human change that has occurred over the past two or more centuries. At the upper elevations, mountain meadow grasses, willows and sedge/rush are the dominant riparian vegetation normal for these high, cold elevations. Along the middle and lower stretches of the river corridor, the riparian vegetation is dominated by grass species associated with warmer climates, a variety of shrubs (several nonnative) and cottonwood trees. On the uplands bordering the riparian vegetation, piñon/juniper woodlands, oak, and other mountain shrub species occur with aspen, fir, spruce, and ponderosa pine trees at the upper elevations. U.S. Highways 50 and 285 as well as the railroad have been a major influence within this area. Most of the corridor to Cañon City, Colorado, is dominated by steep-walled canyons with a few wide scattered floodplains; the topography then opens into the Great Plains.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, areas of critical environmental concern, national recreation area designation, off-highway vehicle use, regional tourism, fluid mineral/locatable mineral management, recreation management, waterpower/reservoir management, special status plant/animal species management, historical resources, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawals and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- very limited disposal of lands and some acquisitions
- extensive access acquisition and some transportation enhancement
- three ACECs (Mosquito Pass, Browns Canyon, and Arkansas Canyonlands)
- recommendation for congressional designation of area as a national recreation area
- some closure to and some limited off-highway vehicle use
- enhancement of regional tourism
- opportunities for mineral development in corridor with limitations
- enhancement of recreation management
- very limited opportunities for waterpower/reservoir management
- enhancement of special status plant/animal species
- enhancement of historical resources
- enhancement of riparian area management
- limited livestock grazing management
- enhanced fishery and wildlife habitat management
- enhancement of the opportunities to maintain the visual resources
- limited rights-of-way management
- extensive increases in protective withdrawals and land classifications
- limited forest and woodland management

Area 3 (Collegiate/Sangre):

56,376 acres BLM

20,612 acres private

13,155 acres state

Topography of this GRA is represented by valley floor and foothills at the base of the Collegiate Mountains in the northwestern portion and rugged, rocky hills in the eastern part. Vegetation is predominantly piñon/juniper woodlands intermixed with oak, other mountain shrubs, and widely scattered grassy openings in the woodlands of the eastern portion. The northwestern part is again mostly piñon/juniper with a larger portion of the northwest made up of grasses, forbs,and low growing shrubs.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, areas of critical environmental concern, off-highway vehicle use, fluid minerals/locatable minerals/mineral materials management, recreation management, special status plant/animal species management, vegetation management, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawal and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- limited disposal of lands and some acquisitions
- some access acquisition and some transportation enhancement
- one ACEC (Droney Gulch)
- some closure to and some limited off-highway vehicle use
- opportunities for mineral development with limitations
- enhancement of recreation management
- enhanced opportunities for vegetation management
- enhancement of special status plant/animal species
- enhancement of riparian area management
- intensive livestock grazing management
- intensive wildlife habitat management
- enhancement of the opportunities to maintain the visual resources
- limited rights-of-way management
- limited forest and woodland management

Area 4 (Badger Creek):

34,594 acres BLM

18,742 acres private

36,810 acres state

This is an important watershed within the Arkansas River drainage. Piñon/juniper and scattered mountain shrub species make up the normal vegetation of the lower (southern) portion of this watershed with the intermountain grasslands of the southern part of South Park dominating the upper watershed. Topography of the upper area is rolling hills with the lower portion consisting of steep canyon walls and rocky hills. No major highways cross the unit, and only scattered rural homes are in the area, with no towns nor shopping areas.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, off-highway vehicle use, fluid minerals/locatable minerals/mineral materials management, recreation management, special status plant/animal species management, vegetation management, riparian area management, livestock grazing management, fishery and wildlife habitat management, archaeological resource management, rights-of-way management, and forest and woodlands management.

General Management Objectives

Provide for:

- limited disposal of lands and some acquisitions
- some access acquisition and some transportation enhancement
- some closure to and some limited off-highway vehicle use
- opportunities for mineral development with limitations
- enhancement of overall vegetation management
- enhancement of archaeological resource management
- enhancement of special status plant/animal species
- enhancement of riparian area management
- intensive livestock grazing management
- intensive wildlife habitat management
- limited rights-of-way management
- limited forest and woodland management

Area 5 (South Park):

57,794 acres BLM

179,255 acres private

77,534 acres state

High mountain grasses and rolling hills are the predominant features of this large intermountain park. A few ridges with ponderosa pine and a variety of mountain shrubs are scattered around the valley floor. U.S. Highways 24 and 285, and Colorado State Highway 9 cross the park allowing good access to most of the area. The park is surrounded by high mountains with dense stands of mixed conifer and aspen trees; these mountains are topped with treeless alpine tundra. Three large reservoirs are within the unit (Antero, Spinney Mountain, and Elevenmile Reservoirs). Associated with these reservoirs are several hundred acres of wet meadows and marshes that provide a diverse high elevation ecosystem. The South Platte River connects these three reservoirs and then exits South Park from the southeastern corner to flow eastward through the mountains onto the Great Plains.

Management Issues and Concerns

Land ownership adjustments, off-highway vehicle use, fluid minerals/locatable minerals/mineral materials management, recreation management, special status plant/animal species management, riparian area management, livestock grazing management, fishery and wildlife habitat management, rights-of-way management, and forest and woodlands management.

General Management Objectives

Provide for:

- disposal of some lands and some acquisitions
- some closure to and some limited off-highway vehicle use
- opportunities for mineral development with limitations
- limited opportunities for waterpower/reservoir management
- intensive livestock grazing management
- intensive wildlife habitat management
- limited rights-of-way management
- limited forest and woodland management

Area 6 (Gold Belt):

132,402 acres BLM

93,759 acres private

26,026 acres state

This large area extends from the Florissant Fossil Beds National Monument on the north to the Arkansas River corridor on the south and from Colorado State Highway 9 on the west to Fort Carson on the east. Topography varies from the high mountains around Cripple Creek, Colorado, to the gentle rolling hills around the national monument. In the eastern portion of the GRA are steep, rocky mountains and the spectacular Beaver Creek Canyon. To the west of this canyon, to Colorado State Highway 9, is an almost unbroken series of rugged mountains and hills with few roads, houses, or towns. Vegetation consists of mountain grasses, aspen, and ponderosa pine in the northern and central portions; piñon/juniper, blue grama grass, and oak are in the southern and eastern portions of the area. BLM-administered land encompasses most of the southern half with private control of almost all of the land in the northern half.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, areas of critical environmental concern, off-highway vehicle use, regional tourism, fluid minerals/locatable minerals/mineral materials management, waterpower/reservoir management, recreation management, special status plant/animal species management, historical and paleontological resource management, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawal and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- very limited disposal of lands and some acquisitions
- extensive access acquisition and some transportation enhancement
- three ACECs (Garden Park, Phantom Canyon, and Beaver Creek)
- some closure to and some limited off-highway vehicle use
- enhancement of regional tourism
- limited opportunities for mineral development
- limited opportunities for waterpower/reservoir management
- enhancement of recreation management
- enhancement of special status plant/animal species
- enhancement of historical and paleontological resources
- enhancement of riparian area management
- enhancement of opportunities to maintain the visual resources
- extensive increases in protective withdrawals and land classifications
- intensive livestock grazing management
- intensive fishery and wildlife habitat management
- limited opportunities for rights-of-way management
- limited forest and woodland management

Area7 (Waugh Mountain/Tallahassee Creek):

70,146 acres BLM

60,551 acres private

12,257 acres state

This area is remote, and sparsely populated, with no towns nor major highways. A few high mountains are present; however, the majority of the area has rugged piñon/juniper and oak-dominated hills. A significant part of the west-central portion consists of a series of gentle grassy hills. The higher mountains have ponderosa pine, other mixed conifers, mountain meadows, and aspen stands. There are no major bodies of water in this area and only a few small streams. Remoteness is the most significant feature. Real estate subdivision is taking place in the southeastern portion of the GRA, but the impact on the total area is not yet significant. The area is bounded on the west by the approximate boundary of the Badger Creek watershed, on the east by Colorado State Highway 9, on the north by the Pike/San Isabel National Forest, and on the south by the Arkansas River corridor.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, off-highway vehicle use, fluid minerals/locatable minerals/mineral materials management, waterpower/reservoir management, recreation management, special status plant/animal species management, vegetation management, riparian area management, livestock grazing management,

fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawal and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- disposal of some lands and some acquisitions
- some access acquisition and some transportation enhancement
- some closure to and some limited off-highway vehicle use
- opportunities for mineral development with limitations
- opportunities for waterpower/reservoir management
- some enhancement of recreation management
- enhancement of special status plant/animal species
- enhancement of vegetation management
- enhancement of riparian area management
- intensive livestock grazing management
- intensive fishery and wildlife habitat management
- some limitations for rights-of-way management
- limited forest and woodland management

Area 8 (Grape Creek):

48,205 acres BLM

19,397 acres private

4,149 acres state

The area extends downstream from DeWeese Reservoir to the confluence of Grape Creek with the Arkansas River. Also included in this area are portions of McIntyre Hills and Copper Gulch in the northwestern portion. The gravel road, known as Copper Gulch Road, is the only major, county-maintained road in the GRA. Most of the vegetation is piñon/juniper woodland, with smaller amounts of grassland, mountain shrub, oak, and small stands of aspen and mixed conifers. Some real estate subdivision has taken place in the northwestern part of the area, but the rest is very remote, with much of the BLM-administered lands within a wilderness study area. Grape Creek is a significant tributary to the Arkansas River; however, water rights are held by irrigation companies, so flows are not natural nor dependable.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, areas of critical environmental concern, off-highway vehicle use, regional tourism, fluid minerals/locatable minerals/mineral materials management, waterpower/reservoir management, recreation management, special status plant/animal species management, historical resource management, vegetation management, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawal and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- very limited disposal of lands and some acquisitions
- extensive access acquisition and some transportation enhancement
- one ACEC (Grape Creek)
- some closure to and some limited off-highway vehicle use
- enhancement of regional tourism
- limited opportunities for mineral development
- limited opportunities for waterpower/reservoir management
- enhancement of recreation management
- enhancement of special status plant/animal species
- enhancement of historical resources
- enhancement of vegetation management
- enhancement of riparian area management

- enhancement of the opportunities to maintain the visual resources
- extensive increases in protective withdrawals and land classifications
- intensive livestock grazing management
- intensive fishery and wildlife habitat management
- limited opportunities for rights-of-way management
- limited forest and woodland management

Area 9 (Huerfano):

62,703 acres BLM

74,301 acres private

14,211 acres state

This GRA covers approximately the western half of Huerfano County, in south-central Colorado. BLM-administered lands are in scattered tracts spread uniformly throughout the area. U.S. Highway 160 crosses the southern portion of the area from west to east, and Colorado State Highway 69 runs northwest to southeast across the northern third of the unit. The rest of the unit is isolated and remote, with few stores or houses. Vegetation is generally divided into dry grasslands and piñon/juniper woodlands and fir, pine, and spruce in the scattered mountainous areas. The relatively flat terrain of the northern and eastern part are contrasted by the high and steep-sided mountains of the southwestern portion of the GRA. Several of the mountains have associated sharp-backed dikes or spines of rock ledges radiating out from them.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, off-highway vehicle use, regional tourism, fluid minerals/locatable minerals/mineral materials management, recreation management, special status plant/animal species management, vegetation management, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, withdrawal and classifications, and forest and woodlands management.

General Management Objectives

Provide for:

- disposal of some lands and some acquisitions
- some access acquisition and some transportation enhancement
- some closure to and some limited off-highway vehicle use
- enhancement of regional tourism
- opportunities for mineral development with some limitations
- enhancement of some recreation management
- enhancement of special status plant/animal species
- enhancement of vegetation management
- enhancement of riparian area management
- enhancement of opportunities to maintain the visual resources
- some increases in protective withdrawals and land classifications
- intensive livestock grazing management
- intensive wildlife habitat management
- some opportunities for rights-of-way management
- limited forest and woodland management

Area 10 (Cucharas Canyon):

1,865 acres BLM

2,894 acres private

1,291 acres state

This GRA is a unique and spectacular canyon setting extending along the Cucharas River from the Cucharas Reservoir, downstream (to the north) to a point where the canyon opens up, just before flowing into the Huerfano River. This area is a steep-sided,deep canyon surrounded by the relatively flat eastern plains of Colorado. The vegetation is varied and unique,

from the conifers and broadleaf deciduous trees along the narrow river bottom to the mountain shrubs growing along the steep canyon walls. No roads, other than primitive ranch roads, are in the area.

Management Issues and Concerns

Land ownership adjustments, land access acquisition/transportation, areas of critical environmental concern, off-highway vehicle use, fluid minerals/locatable minerals/mineral material management, historical and archaeological resource management, riparian area management, livestock grazing management, fishery and wildlife habitat management, visual resource management, rights-of-way management, and withdrawals and classifications.

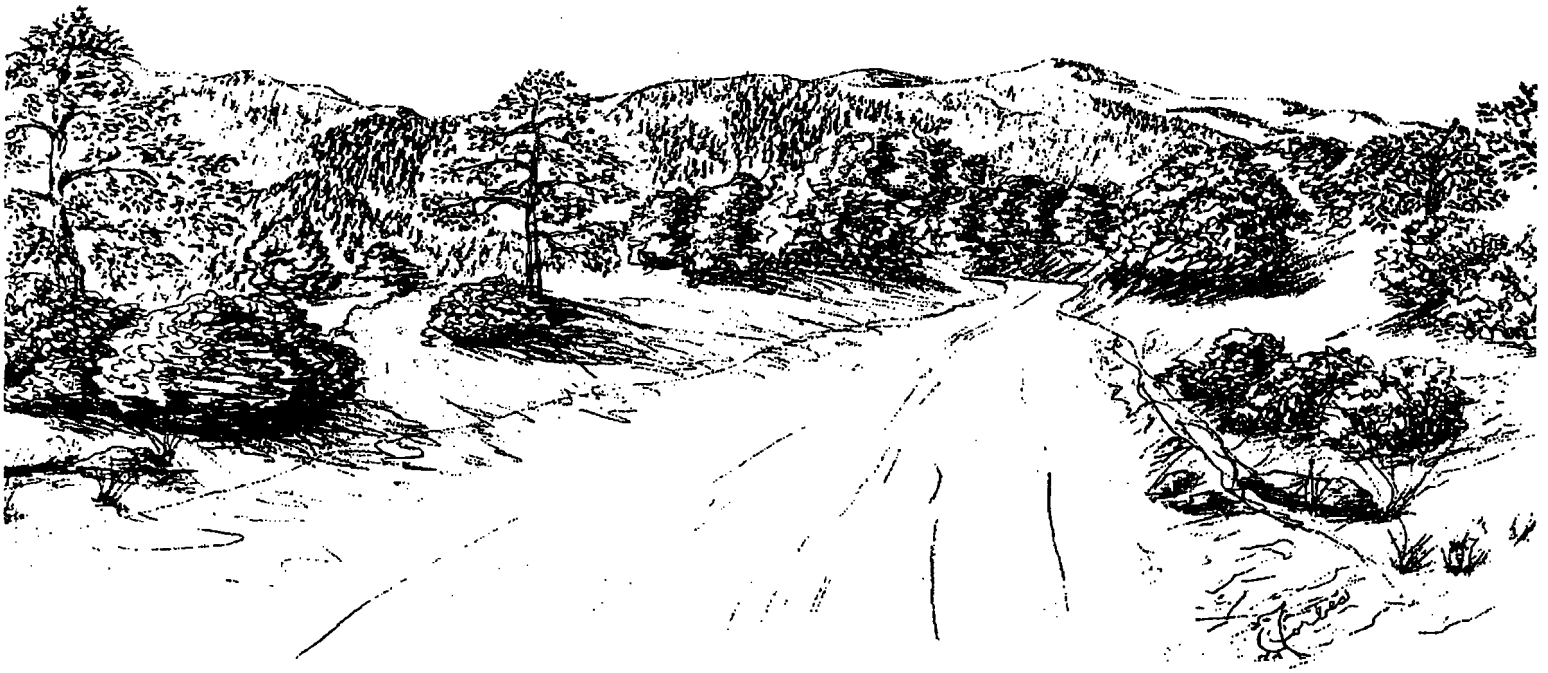
General Management Objectives

Provide for:

- no disposal of lands and some acquisitions
- access acquisition and some transportation enhancement
- one ACEC (Cucharas Canyon)
- closure to off-highway vehicle use
- very limited opportunities for mineral development
- enhancement of historical and archaeological resources
- enhancement of riparian area management
- enhancement of the opportunities to maintain the visual resources
- extensive increases in protective withdrawals and land classifications
- very limited livestock grazing management
- enhancement of fishery and wildlife habitat management
- very limited opportunities for rights-of-way management

APPENDIX E

LIVESTOCK GRAZING MANAGEMENT



APPENDIX E
LIVESTOCK GRAZING MANAGEMENT

Boundaries for Improve and Custodial allotments are shown on Map E-1. The following decisions will be carried forward from the Royal Gorge Grazing EIS and made a part of the Royal Gorge RMP:

Range improvement projects (i.e., fences, spring developments, water catchments, reservoirs, water pipelines, water troughs, cattleguards, wells, water storage tanks, and livestock trails) would continue to be constructed on an as-needed basis. Specifications for these projects would be as directed by BLM manuals. NEPA documentation would be completed on each project as needed. Required environmental document would be tiered to the RMP, which analyzes impacts from range improvement projects.

Land treatments such as burning, thinning, and plowing vegetation as a management practice would continue. NEPA documentation would be completed on each project as needed, and the required environmental document would be tiered to the RMP, which analyzes impacts from land treatment projects.

Rangeland monitoring studies such as actual use, utilization, and trend would continue on Improve category allotments.

Evaluation of each allotment with a grazing management plan would continue according to the existing schedule in each plan.

The following changes from existing decisions in the grazing EIS would be made in the Preferred Alternative :

Allocation of additional forage resulting from improved management or vegetation manipulation would be to livestock or wildlife or a combination of both on an case-by-case basis after consulting with state and Federal agencies and private groups (i.e., the Colorado Habitat Partnership Program) and the affected grazing permittee.

Adjustments in grazing use would be made by allotment on a case-by-case basis. Changes in number of livestock, season-of-use, duration-of-use, and class of livestock could be made based on monitoring studies and inventory data.

The grazing treatment on Improve and Maintain category allotments would require a rest standard to allow a time period for forage species to recover from the last grazing period before the plants are regrazed. This rest standard would allow plants to regrow, regain vigor, and produce seeds and seedlings and change in species composition would result. Also plant litter would accumulate and protect the soil surface from erosion. Examples of treatments that provide a rest standard are rest rotation grazing, deferred rotation grazing, deferred grazing, dormant season grazing, short duration grazing, and time controlled grazing. Complete protection from grazing would also provide an adequate rest standard.

Maximum allowable utilization on allotments with rotational grazing or dormant season grazing would be 80 percent of annual production on grass species and 60 percent of annual production on shrub species. These percentages may have to be reduced on specific allotments because of conflicts with wildlife, watershed conditions, or riparian habitat.

On single pasture allotments with season-long spring/summer grazing, utilization would be held to the 40 to 60 percent range on forage species in lieu of a rest standard. This requirement would be on high elevation allotments where deferment or dormant season use is impractical because of deep snow, and fencing the allotment into smaller units is uneconomical. On these allotments, utilization estimates would be made on a key species to prevent over utilization of desirable species.

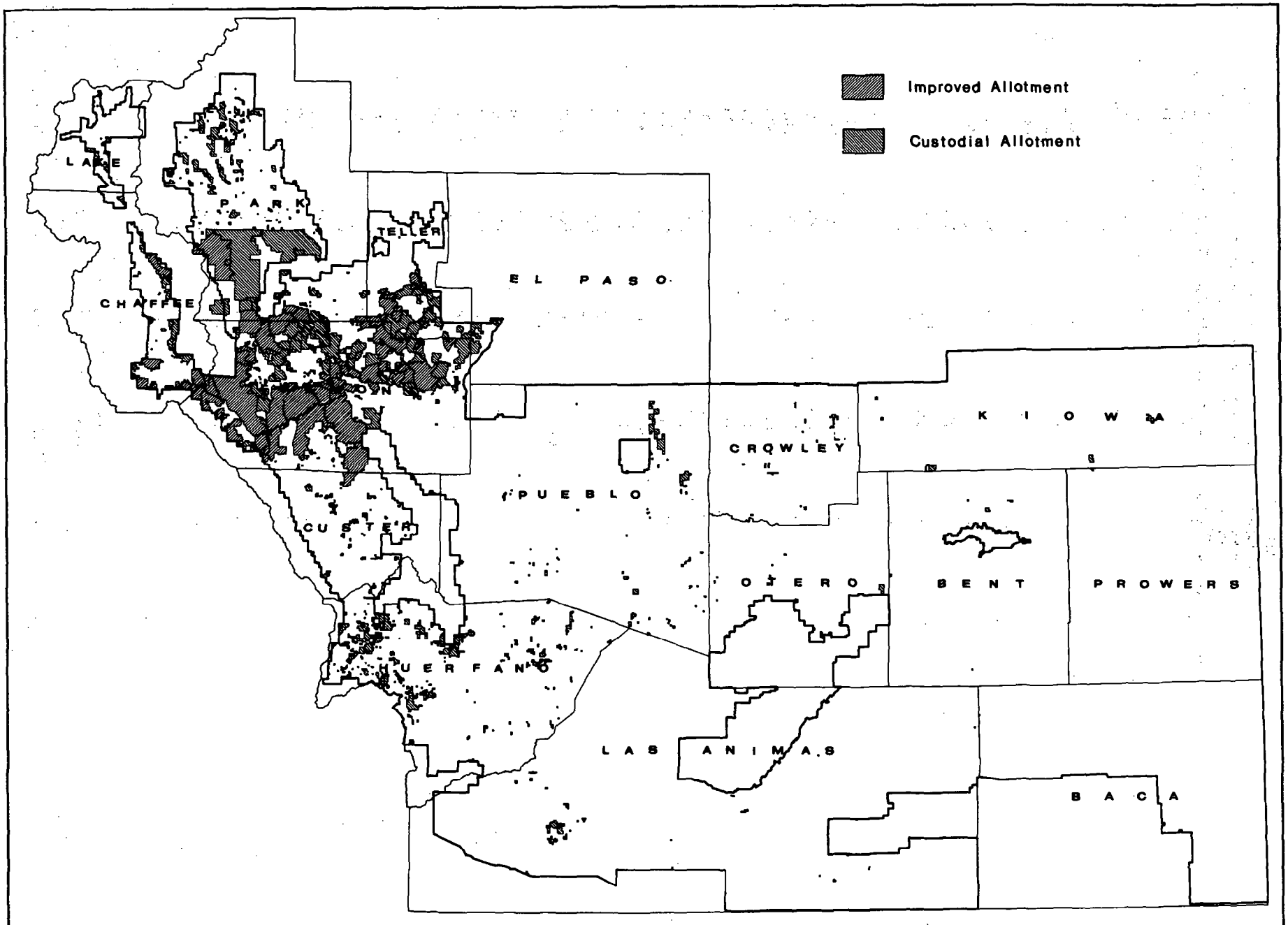
Table E-1 provides an allotment-specific summary of the livestock management program. Following is an explanation of the data presented in this table:

Priority # of an allotment refers to the ranking of the Improve and Maintain category allotments for investment of public funds for range improvement projects.

Management category is the general management objective for each allotment. I = most intensive, with the objective of improving existing resource conditions; M = less intensive, with the objective of maintaining existing resource conditions; and C = least intensive, or custodial, management.

Active use in AUMs is that portion of the total grazing AUM preference available to be licensed for use during any one grazing year.

Date On and Date Off Allotment is when livestock are authorized to graze on BLM-administered land.



Map E-1 - GRAZING ALLOTMENT MANAGEMENT BOUNDARIES

TABLE E-1
Summary of Livestock Management Program by Allotment

Allotment No.	Allotment Name	Priority #1/	Management Category	Acres of Public Land	Active Use in AUMs	Date On Allotment	Date Off Allotment
5005	Wellsville	68	I	4,471	91	4/10	5/31
5006	Kerr Gulch Common	7	I	5,754	135	5/01	9/30
5009	Beddows Mountain		C	80	8	3/01	2/28
5019	South Beaver School		C	438	48	3/01	2/28
5021	Hoosier Pass		C	26	2	6/16 9/16	6/30 9/30
5035	Currant Creek		C	1.240	24	3/01	2/28
5047	Delilah Peak		C	931	7	3/01	32/28
5042	Agate Beds	9	I	1,666	269	6/01	9/01
5047	Underhill	63	I	3,516	118 154	3/01 11/01	5/31 2/28
5048	Bull Hill		C	36	3	3/01	2/28
5054	Brown Park		C	230	13	3/01	2/28
5055	Temple Canyon	8	I	6,794	150 89	4/16 10/16	6/30 12/31
5056	Fresh Water Creek		C	173	8	3/01	2/28
5057	Bumback Spring		C	51	1	3/01	2/28
5059	Wagon Tongue		C	3,032	132	3/01	2/28
5060	31 Mile Creek		C	240	9	3/01	2/28
5061	One Creek/Cat Gulch	41	I	1,625	110	6/01	9/30
5062	Lower Beaver Park		C	271	11	3/01	2/28
5063	Indian Gulch Common	26	M	616	86	5/01	6/15
5064	Burno Mountain		C	163	6	3/01	2/28
5065	Cobb Creek		C	290	4	3/01	2/28
5066	South Garden Park		C	120	1	3/01	2/28
5067	Mt. Pisgah Ind.		C	143	18	6/01	8/31
5068	Deer Peak		C	160	36	3/01	2/28
5069	Grouse Mountain		C	5,099	196	6/01	10/31
5071	East Garden Park		C	280	2	3/01	2/28
5072	Phantom Canyon	43	I	8,976	147 126	11/01	2/28
5073	Grape Creek Common	3	I	15,233	156 273 414	3/01 7/01	2/28 11/15
5074	Bull Domingo		C		72	3/01	2/28
5075	South Jack Hall		C	303	24	7/01	8/01
5076	Rock House		C	861	67	8/15	10/15
5077	Pole Gulch		C	2,177	100	5/16	10/15
5078	Geology Camp	46	M	640	50 42	12/01 3/01	2/28 5/15
5079	Eldred		C	350	4	3/01	2/28
5080	Trout Creek South		C	880	70	3/01	2/28
5081	Burnt Ridge	71	I	2,857	97	7/16	9/15
5082	Worley Country	64	I	1,232	42	6/10	10/09
5083	Oil Well Flats	40	I	2,590	62 48	11/16 3/01	2/28 5/20
5084	Upper Boneyard		C	30	1	3/01	2/28
5085	East Cactus		C	110	2	3/01	2/29
5086	Mill Creek Common		C	1,141	64	6/01	10/01
5087	Two Creek	13	I	2,420	261	6/01	10/15
5088	Trout Creek North		C	540	41	3/01	2/28
5089	Rock Creek Ranch		C	3,570	140	3/01	2/28
5090	Felch Creek	21	I	1,108	48 10	10/01 3/01	2/28 3/31
5091	Maverick Gulch	37	I	3,910	147	5/01	11/15
5092	Gravel Pit		C	300	10	3/01	2/28
5093	Pony Gulch	72	I	1,260	114	4/01	5/30
5094	Beckwith		C	240	12	3/01	2/28
5095	Bond	22	M	2,793	110	6/16	10/16

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority[1/]	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5096	Cottonwood Creek	23	I	5223	56 322 111 55	11/01 12/01 3/01 4/01	11/30 2/28 3/31 4/30
5097	Kelly Creek		C	300	10	3/01	2/28
5098	Oil Creek Common	54	I	1,812	35 36	6/16 6/15	9/30
5099	Barnard Creek		C	283	24	3/01	2/28
5100	Barnard Creek East		C	76	12 2	3/01 6/16	2/28 8/31
5101	Trachyte Knob		C	233	12	3/01	2/28
5102	Tenderfoot		C	46	4	3/01	2/28
5103	Oil Creek North		C	658	24	3/01	2/28
5104	Lookout Point	47	I	427	37	8/02	9/30
5105	Gillette		C	40	12	3/01	2/28
5106	North Beckwith		C	65	5	3/01	2/28
5108	Badito West		C	80	8	3/01	2/28
5109	Badger Creek	1	I	36,852	1,203	4/16	10/15
5110	Straub Mountain		C	1,810	70	3/01	2/28
5111	Big Bull Mountain		C	271	15	3/01	2/28
5112	Victor Pass		C	58	6	3/01	2/28
5113	Long Hollow		C	170	31	3/01	2/28
5114	High Park	19	I	3,519	183	6/21	11/12
5115	Antelope Gulch		C	123	12	3/01	2/28
5116	Green Mountain North		C	360	16 8	5/15	11/15
5117	Badito		C	580	4	3/01	2/28
5118	Douglas Gulch-South		C	120	7	3/01	2/28
5120	Holbert Pasture		C	1,693	90 37	6/01	11/30
5124	Guffey Pasture		C	80	6	3/01	2/28
5125	31 Mile Mountain	11	I	2,656	273	6/01	9/30
5127	Cactus Mountain	73	I	5,692	50 142 42	12/06 11/01 12/01	1/28 2/20 2/28
5129	Sommerville Table	61	I	1,386	140	8/01	11/30
5131	Wright Reservoir		C	125	1	3/01	2/28
5132	Beaver Creek		C	6,676	69 208	5/16	10/15
5133	Patton Canyon		C	601	16	3/01	2/28
5134	Asher Gulch		C	1,597	264	6/01	1/31
5135	West Pasture		C	1,194	72	6/01	2/28
5137	Blue Ridge		C	711	56	3/01	2/28
5138	Shaws Park		C	772	95	3/01	2/28
5139	Carlin Gulch	49	I	1,624	55 47 24 31	11/15 3/01 9/01 11/01	2/28 5/31 10/30 12/15
5141	Elevenmile Canyon		C	7,825	16 170 5 17 2 2 2 20 10 17 6 12 5 15 83 25	3/01 6/01 3/01 6/01 3/01 3/01 3/01 6/01 3/01 6/01 3/01 3/01 3/01 3/01 6/01 3/01	2/28 8/15 2/28 8/15 2/28 2/28 2/28 8/15 2/28 8/15 2/28 2/28 2/28 2/28 8/15 2/28
5142	Big Bear		C	600	4	3/01	2/28
5144	East Box Canyon	52	M	1,435	202	9/27	3/31

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5147	Cedar Springs Mountain		C	510	19	3/01	2/28
5148	Iron Mountain		C	1,220	12	3/01	2/28
5151	Twelvemile Park		C	227	20	10/01	2/28
5152	Herring Creek		C	880	49	3/01	2/28
5153	East Guffey		C	206	12	3/01	2/28
5154	Monument Creek		C	331	9	3/01	2/28
5155	Rye Slough North	24	M	1,080	111	8/01	10/31
5156	U Long Gulch		C	200	24	3/01	2/28
5157	Dicks Creek		C	42	1	3/01	2/28
5158	Green Mountain Gulch		C	980	60	3/01	2/28
5159	Wilbur	67	I	2,198	132	6/01	9/30
5162	Soapy Hill2/	75	M	680	48	8/01	10/30
5163	Park Mountain		C	780	8	3/01	2/28
5164	Micanite	16	I	1,945	92 321	3/01 8/01	4/30 2/28
5169	Pruden Creek		C	400	42 9	8/01	10/31
5173	Long Hollow West		C	913	96	3/01	2/28
5175	Dry Lake School		C	90	2	3/01	2/28
5176	Skyline		C	40	4	3/01	2/28
5177	Stout Creek		C	120	12	3/01	2/28
5178	Cow Mountain		C	125	8	3/01	2/28
5179	West Box Canyon	66	I	5,395	217	5/15	10/15
5180	Salt Works Pasture		C	160	11	3/01	2/28
5181	Wall Mountain		C	120	2	3/01	2/28
5183	Brush Hollow		C	240	12 8	3/01 1/01	5/31 2/28
5184	West Patton Gulch		C	521	3	3/01	2/28
5186	Crown Point	70	I	2,276	51	7/16	9/15
5188	Red Gulch	32	I	3,430	246	9/01	12/31
5189	Booger Red Hill	31	I	640	114	6/16	9/15
5190	Tallahassee Road		C	640	17	3/01	2/28
5191	East Eldred		C	360	1	5/01	12/31
5192	Mud Gulch	79	M	1,165	99	10/01	12/31
5193	Jack Hall	27	I	864	127	7/01	10/15
5194	Reinke Ridge		C	55	9	3/01	2/28
5195	Palmer Gulch		C	120	6	6/01	8/31
5199	Waugh Mtn.	12	I	973	41	7/01	8/31
5200	Miners Gulch	35	I	3,132	25 40 9 39 30 4	11/09 12/16 3/01 11/09 10/02 12/15	12/15 2/29 3/18 10/01 2/28 10/01
5201	Dry Gulch		C	157	12	3/01	2/28
5202	Tallahassee Creek	58	I	2,883	283	6/15	2/28
5204	39 Mile Mountain		C	160	9	6/01	9/30
5205	Cottonwood Ridge	74	I	650	60	9/01	2/28
5206	Cooper Mountain		C	355	19	3/01	2/28
5207	Glass Place		C	1,588	71	3/01	2/28
5208	Skagway S. Pasture		C	400	80	3/01	2/28
5209	E. Fork Milsap Creek	33	M	2,515	52 13 4 1	11/01 3/01 11/01 3/01	2/28 3/31 2/28 3/31
5211	Miller Place		C	420	20	3/01	2/28
5212	Lower Shaws Park		C	987	19	3/01	2/28
5214	Heck Gulch Allotment		C	280	2	3/01	2/28
5216	South Red Hill		C	190	1	3/01	2/28
5217	North Red Hill		C	60	2	3/01	2/28

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5218	Burris Mountain		C	3,759	114	3/01	2/28
5219	Schoolhouse Gulch		C	533	40	3/01	2/28
5220	Gardener Table		C	240	8	3/01	2/28
5221	Meadow Gulch		C	598	6	3/01	2/28
5222	Long Gulch Pasture		C	40	3	3/01	2/28
5223	Six Mile Park		C	999	11 43	3/01 11/01	3/31 2/28
5224	Eight Mile Park		C	1,080	13	3/01	2/28
5225	Gillett Ind		C	132	11	3/01	2/28
5226	Salt Canyon		C	160	1	3/01	2/28
5228	Antero Reservoir		C	826	54	3/01	2/28
5230	Dry Lake		C	80	12	3/01	2/28
5232	Home Place		C	409	16	3/01	2/28
5233	Deer Haven Ranch		C	507	9	3/01	2/28
5234	Webster Gulch		C	1,183	69	6/01	10/31
5236	Bull Mountain Ind		C	40	4	6/01	9/30
5237	Nipple Mountain Ind	36	I	340	37	7/01	9/01
5238	Race Path	15	I	7,762	378	10/01	2/28
5239	High Creek		C	120	12	3/01	2/28
5240	Hammond Peak		C	50	9	7/01	9/30
5242	Currant Creek Pass		C	160	7	3/01	2/28
5243	Box Canyon	52	I	939	108	3/01	2/28
5244	Rhyolite Mountain		C	319	14	3/01	2/28
5251	Trail Canyon	14	I	3,058	225 174 4 9 40 162 75	11/01 3/01 5/15 10/01 6/01 8/16 6/01	2.28 6/01 5/15 12/31 8/15 10/30 10/30
5300	Wilson Creek	20	I	5,809	462 291	11/01 3/01	2/28 5/15
5301	Twin Mountain	62	I	2,502	268 55	10/10 3/01	2/28 3/31
5302	Espanoza Gulch	53	I	3,786	347	11/01	2/28
5303	Dutch Henry		C	595	44	3/01	2/28
5304	Kaufman Ridge		C	4,003	180	3/01	2/28
5306	North Beaver School		C	2,917	120	3/01	2/28
5307	Boneyard Gulch		C	40	2	3/01	2/28
5701	Ruby Mountian	59	M	5,220	35	10/10	11/30
5702	Red Top		C	958	192	3/01	2/28
5703	Garo		C	1,950	153	3/01	2/28
5704	Diamond A East		C	158	17	3/01	2/28
5706	St. Charles		C	240	48	3/01	2/28
5707	Link Ditch		C	426	32	3/01	2/28
5708	Del Agua		C	80	2	3/01	2/28
5709	Bradford Canal		C	1,685	155	3/01	2/28
5710	Vigil Canyon		C	510	24	3/01	2/28
5711	Lake Merideth-South		C	80	18	3/01	2/28
5712	Badger Basin		C	4,692	300	3/01	2/28
5713	West Pass Creek		C	1,207	6	3/01	2/28
5714	West Horse Creek		C	160	27	3/01	2/28
5715	Nero Hill		C	458	92	3/01	2/28
5716	Trujillo Canyon		C	160	12	3/01	2/28
5717	Ideal Canyon-West		C	80	8	3/01	2/28
5718	Yellowstone Creek		C	40	2	3/01	2/28
5719	Schoolfield		C	320	18	3/01	2/28
5720	Mulligan Lakes		C	370	31	3/01	2/28

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5721	Silver Mountain West		C	200	17	3/01	2/28
5722	Silver Mountain North		C	40	4	3/01	2/28
5723	South Abeyta		C	80	6	3/01	2/28
5724	Walsen Arroyo		C	80	4	3/01	2/28
5725	Reveille Canyon		C	1,194	57	3/01	2/28
5726	Rock Creek		C	130	1	3/01	2/28
5727	South Martin		C	40	1	3/01	2/28
5729	Warm Springs		C	1,720	129	3/01	2/28
5731	Green Mountain		C	520	1	3/01	2/28
5732	Mauricio		C	179	12	3/01	2/28
5733	Bradford Canal South		C	1,120	8	3/01	2/28
5734	Sand Arroyo North		C	80	5	3/01	2/28
5735	Trout Creek		C	2,440	192	3/01	2/28
5736	Chacuaco Creek		C	40	7	3/01	2/28
5737	Teeple		C	54	7	3/01	2/28
5738	Tingley Canyon		C	358	28	6/15	11/15
5739	High Creek		C	1,200	108	3/01	2/28
5740	Hunt Canyon		C	308	33	3/01	2/28
5742	Rito Oso Creek		C	40	4	3/01	2/28
5743	Tombstone Hill		C	285	48	3/01	2/28
5745	Adobe Creek East		C	1,120	60	3/01	2/28
5746	Red Wing		C	240	26	3/01	2/28
5745	Derry Ditch		C	3,298	125	3/01	2/28
5748	Antelope Creek		C	80	5	3.01	2/28
5749	Hayden Butte		C	80	8	3/01	2/28
5740	Kramer Creek		C	2,040	123	3/01	2/28
5751	Sugarloaf Mountain		C	2,717	3 14	3/01 10/01	3/31 2/28
5753	Ute Lake		C	40	3	3/01	2/28
5755	Powell Arroyo		C	2,185	16	3/01	2/28
5756	Crooked Creek		C	720	45	3/01	2/28
5757	West Fairplay		C	80	30	5/01	9/30
5758	Two Buttes Creek		C	74	7	3/01	2/28
5759	Crowley County		C	120	12	3/01	2/28
5760	Little Turkey Creek		C	3,004	41	3/01	2/28
5761	Kiowa County		C	880	142	3/01	2/28
5762	Diamond A West		C	661	64	3/01	2/28
5763	White Hills		C	675	38	3/01	2/28
5764	Park Ditch		C	2,494	24	3/01	2/28
5765	Silver Mountain		C	561	3	3/01	2/28
5766	Seven L Butte		C	80	3	3/01	2/28
5767	Mineral Creek		C	273	2	3/01	2/28
5768	Hecla Junction East		C	2,785	3 14	3/01 10/01	3/31 2/28
5769	Little Sheep		C	1,104	10	3/01	2/28
5770	Red Hill Pass		C	1,227	66	3/01	2/28
5771	Turkey Ridge		C	880	196	3/01	2/28
5772	Greemwood		C	360	19	3/01	2/28
5773	Hecla Junction West	48	M	1680	4 10	3/01 10/01	3/31 2/28
5774	Siloam Road		C	80	4	3/01	2/28
5776	Rito Oso		C	200	6	3/01	2/28
5777	Boone Hill		C	480	48	3/01	2/28
5778	King Center		C	80	16	3/01	2/28
5779	Manzanola		C	7	1	3/01	2/28
5780	Little Cochetopa		C	338	4	3/01	2/28
5781	Spring Branch East		C	240	15	3/01	2/28

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5782	Indian Gulch		C	120	9	3/01	2/28
5783	Merideth Island		C	120	32	3/01	2/28
5784	Muddy Creek		C	9,183	154	3/01	2/28
5785	Poison Creek		C	3,130	328	3/01	2/28
5786	Chitwood Gulch		C	200	17	3/01	2/28
5787	Threemile Creek		C	1,120	1 10	3/01 10/01	3/31 2/28
5788	Vanbromer Arroyo		C	120	24	3/01	2/28
5789	Harlin Ditch		C	675	38	3/01	2/28
5790	Pond Creek		C	160	27	3/01	2/28
5791	Picketwire		C	151	9	3/01	2/28
5792	Malice Ditch		C	625	53	3/01	2/28
5793	Raspberry Gulch		C	406	12	3/01	2/28
5794	Fourmile Ranch		C	520	37	3/01	2/28
5795	Logan Hill		C	680	36	5/01	9/30
5795	La Veta Pass-North		C	40	4	3/01	2/28
5797	Ordway-NW		C	88	18	3/01	2/28
5798	Spinney Mountain		C	1,220	70	3/01	2/28
5799	Como		C	440	29	3/01	2/28
5800	Park Gulch		C	3,022	190	3/01	2/28
5801	Como Park East		C	4,350	192 40	3/01 5/18	2/28 10/18
5802	McFadden Creek		C	40	5	3/01	2/28
5803	South Spring Branch		C	720	61	3/01	2/28
5804	North Spring Btranch		C	80	4	3/91	2/28
5805	Como Park		C	840	38	3/01	2/28
5806	Red Top Road		C	640	120	3/01	2/28
5807	Wellsville2/	69	M	2,440	89	4/10	5/31
5808	Black Draw		C	862	173	3/01	2/28
5809	Airport		C	120	2 16	3/01 7/01	3/31 2/28
5810	Mustang Creek		C	320	64	3/01	2/28
5811	Apishapa Bridge		C	120	15	3/01	2/28
5812	Promontory Divide		C	40	1	3/01	2/28
5813	Browns Canyon		C	1,159	1 2 8	6/15 4/01 8/06	6/20 11/01 9/03
5814	Upper Ditch		C	40	3	3/01	2/28
5815	Cedar Crest		C	124	16	3/01	2/28
5816	Whiterock		C	119	16	3/01	2/28
5817	Saunders Arroyo		C	79	18	3/01	2/28
5818	Crystal Falls		C	520	12	3/01	2/28
5819	Browns Canyon School		C	40	2	3/01	2/28
5820	Gardner Road		C	40	12	3/01	2/28
5821	Santana Canyon		C	251	5	3/01	2/28
5822	Bear Creek North		C	240	24	3/01	2/28
5823	Thompson Arroyo		C	1,114	149	3/01	2/28
5824	Gotera Canyon		C	160	36	3/01	2/28
5825	Hezron Gulch		C	125	21	3/01	2/28
5826	Levee Road		C	54	5	3/01	2/28
5827	Mosca-Mulligan		C	5,365	140	3/01	2/28
5828	Park Gulch East		C	320	15	3/01	2/28
5829	North Rattlesnake Butte		C	160	20	3/01	2/28
5830	Hamilton Canyon		C	120	11	3/01	2/28
5831	Burlingame Ditch		C	440	33	3/01	2/28
5832	Maes Creel		C	440	66	3/01	2/28
5833	Sand Arroyo		C	40	6	3/01	2/28
5848	Soda Creek		C	364	31	3/01	2/28

Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5849	Frijole Creek		C	38	7	3/01	2/28
5851	Twelvemile Club		C	1,919	140	3/01	2/28
5852	Hooker Hills		C	325	73	3/01	2/28
5853	Silverheel		C	160	13	3/01	2/28
5854	Mud Hill		C	120	12	3/01	2/28
5855	Wixon Mountain		C	596	9	3/91	2/28
5856	Gageby Creek		C	80	18	3/01	2/28
5857	Turkey Creek		C	1,157	25	3/01	2/28
5858	North Badito		C	920	10	3/01	2/28
5859	East Pond Creek		C	199	40	3/03	2/28
5860	San Isidro		C	40	6	3/01	2/28
5863	Iowa Gulch		C	1.177	22	3/01	2/28
5864	Breece Creek		C	153	1	3/01	2/28
5865	Hardscrabble Mountain		C	81	1	3/01	2/28
5866	Brush Hollow Creek		C	80	6	3/01	2/28
5867	Bradford Reservoir		C	1,936	100	3/01	2/28
5868	Palo Duro Creek		C	722	14	3/01	2/28
5870	Silver Prince Creek		C	160	5	3/01	2/28
5871	Midland Hill	28	I	6,415	206	4/01	6/30
5872	Ute Log		C	200	2	3/01	2/28
5873	Bear Canyon		C	1,762	59	3/01	2/28
5874	May Creek		C	320	33	3/01	2/28
5875	Mount Mestas		C	600	2	3/01	2/28
5876	Madden Canyon		C	360	72	3/01	2/28
5877	Cucharas West		C	320	18	3/01	2/28
5878	Wilmer Gulch		C	79	5	3/01	2/28
5880	Graneros Flats		C	160	29	3/01	2/28
5881	Cucharas Canyon		C	970	54	3/01	2/28
5882	Boone-East		C	301	55	3/01	2/28
5883	Cleveland Mountain		C	742	5	3/01	2/28
5884	Junkins Park		C	200	1	3/01	2/28
5885	Sanford Hills		C	271	54	3/01	2/28
5886	Dike		C	87	12	3/01	2/28
5887	Haynes Creek		C	4,413	442	3/01	2/28
5888	Mt. Tyndall		C	40	11	9/01	10/15
58898	Mt. Herring		C	465	10	3/01	2/28
5890	Sugar City		C	80	20	3/01	2/28
5891	Tree Top		C	617	138	3/01	2/28
5892	Browns Creek		C	325	10	3/01	2/28
5893	Dutch Flat		C	19	2	3/01	2/28
5894	Mansanares Creek		C	160	1	3/01	2/28
5895	Chama-West		C	35	2	3/01	2/28
5896	Americus		C	340	28 6	8/15 3/01	2/28 4/15
5897	St. Jude		C	1,523	21	3/01	2/28
5898	Methodist Mountain	76	I	3,164	193	7/15	9/30
5899	Antelope		C	120	7	3/01	2/28
5900	Baldy		C	520	38	3/01	2/28
5901	Lapin Creek		C	230	20 24	3/01	2/28
5902	Walsenburg North		C	401	45	3/01	2/28
5903	Michigan Campground		C	1,256	74	3/01	2/28
5904	Antero Reservoir		C	400	30	3/01	2/28
5905	Daisy Canyon		C	176	12	3/01	2/28
5906	Fishermens Bridge		C	40	5	3/01	2/28
5907	East Palo Duro		C	40	1	3/01	2/28
5908	Stanley Creek		C	603	9	3/01	2/28

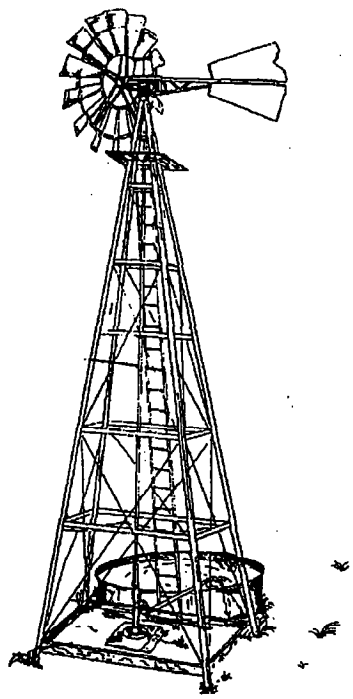
Table E-1 (Continued)

Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use in AUMS	Date On Allotment	Date Off Allotment
5909	Apache City		C	79	4	3/01	2/28
5910	Fourmile Creek		C	1,641	133	3/01	2/28
5911	West Cordova		C	160	13	3/01	2/28
5912	Long Canyon		C	152	11	3/01	2/28
5913	Steel Gulch		C	431	43	3/01	2/28
5914	North Boone		C	2,244	187	3/01	2/28
5915	Chalk Creek		C	160	7	3/01	2/28
5916	Hardesty Draw		C	640	107	3/01	2/28
5917	Rough Mountain		C	3,622	5	3/01	2/28
5918	Mt. Shavano	25	I	5,367	241	6/01	9/30
5919	Patterson Hollow		C	322	64	3/01	2/28
5920	Buffalo Creek		C	80	6	3/01	2/28
5921	Iron Hill		C	406	3	3/01	2/28
5922	Democrat Ridge		C	30	11	3/01	2/28
5923	Iron Mountain South		C	1,536	58	3/01	2/28
5924	Adobe Canyon		C	120	8	3/01	2/28
5925	Malachite		C	200	8	3/01	2/28
5927	Phelps Canyon		C	158	9	3/01	2/28
5928	Crowley-North		C	80	8	3/01	2/28
5929	Buffalo Peaks		C	40	12	3/01	2/28
5930	Middle Creek North		C	232	3	3/01	2/28
5932	Middle Creek South		C	516	6	3/01	2/28
5933	South Chama		C	60	5	3/01	2/28
5934	Martin Ridge		C	560	87	3/01	2/28
5936	East Chama		C	20	1	3/01	2/28
5937	Little Porcupine		C	153	10	3/01	2/28
5939	Playa Lakes	78	I	1,640	208	7/15	10/30
5490	Sharpsdale		C	110	1	3/01	2/28
5941	Pass Creek	44	I	3,287	248	6/01	7/15
5942	Cemetary		C	20	12	3/01	2/28
5943	Santa Clara Creek		C	80	3	3/01	2/28
5986	Farisita		C	646	27	3/01	2/28
5999	Badito Cone		C	1,300	12	3/01	2/28
15001	Table Mountain	6	I	15,248	673 227	9/01 3/01	2/28 4/30
15002	Big Hole	5	I	18,890	48 10 242 49 547 111	10/01 3/01 10/01 3/0 10/011 3/01	2/28 3/31 2/28 3/31 2/28 3/31
15003	Little Hole Common	18	I	6,612	307 49	7/01	10/31
15004	Bear Creek	50	I	2,885	123	7/15	9/30
15007	Sand Gulch Common	56	I	3,741	165 166 180 181	12/01 3/01 12/01 3/01	2/28 5/31 2/28 5/31
15008	Howard Creek	34	M	880	69	3/01	5/31
15009	Little High		C	40	12	3/01	2/28
15010	Lower East 8 Mile	45	M	920	42	7/01	10/31
15011	Sixmile		C	2,130	23 22 9 9	3/01 12/01 3/01 12/01	5/31 2/28 5/31 2/28
15012	Balfour Noth		C	400	21	3/01	2/28
15013	Spring Ck-North		C	129	4	3/01	2/28
15014	Rattlesnake	42	I	3,795	445	6/19	10/30

Table E-1 (Continued)

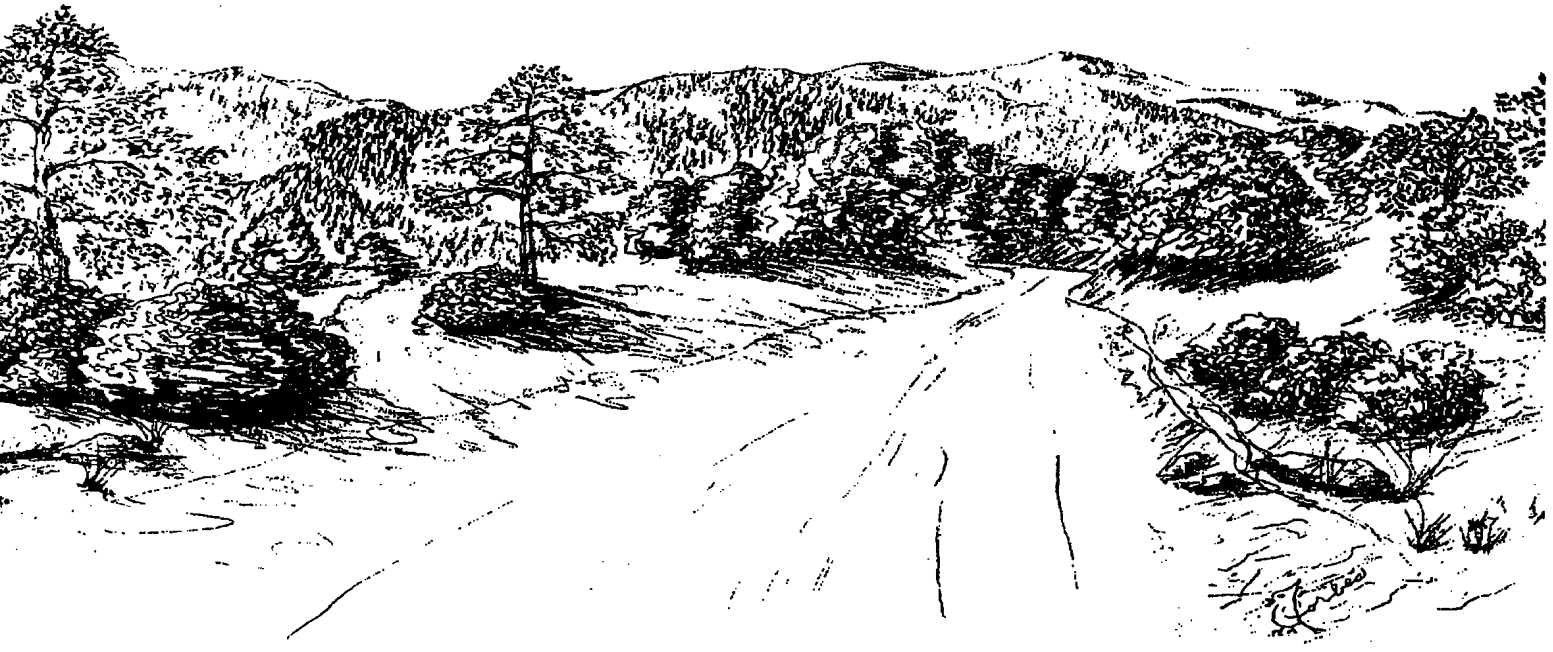
Allotment No.	Allotment Name	Priority#1/	Management Category	Acres of Public Land	Active Use In AUMS	Date On Allotment	Date Off Allotment
15015	Upper Meadow Gulch		C	558	14	3/01	2/28
15016	South Tallahassee		C	120	1	3/01	2/28
15017	Mullock Gulch	29	I	265	12	7/15	8/15
15018	Stony Face Common		C	473	42 26	6/01 6/16	10/31 10/31
15019	Ruby Gulch		C	80	12	3/01	2/28
15020	Cow Mountain West		C	389	22	3/01	2/28
15022	Alta Vista Ind		C	99	12	3/01	2/28
15023	West Beaver Creek	65	I	1,431	159	7/16	9/30
15024	Penstock		C	103	14	3/01	2/28
15028	Oak Creek	39	M	884	60	6/01	9/30
15029	Price Park		C	80	4	3/01	2/28
15032	Soda Mountain	57	M	1,759	158 53	10/15 3/01	2/28 4/15
15036	Copper Gulch Common	2	I	30,080	105 207 73 633	7/01 7/03 7/01 7/01	10/15 10/15 10/01 10/15
15038	Poncha Park	10	I	4,935	1,082	5/15	9/15
15039	Antelope Pasture		C	436	60	3/01	2/28
15040	Owens Creek		C	1,651	36	3/01	2/28
15041	DeWeese		C	60	12	3/01	2/28
15043	Texas Creek Common	4	I	20,932	1,108	6/16	10/15
15044	West Fourmile Creek		C	20	2	3/01	2/28
15045	Mitre Peak North		C	488	25	3/01	2/28
15049	McCoy Gulch	17	M	195	35	3/01	4/30
15040	Fern Creek		C	1,146	132	7/01	9/15
15052	Mill Gulch West		C	200 1,320	12 5	3/01	2/28

1/Category C allotments are not prioritized.
2/Change since the last RPS update.



APPENDIX F

RIPARIAN AREA MANAGEMENT



APPENDIX F
RIPARIAN AREA MANAGEMENT

TABLE F-1
Royal Gorge Riparian Areas

Name	Type[1/]	Length in Miles	Area in Acres	Riparian Condition[2/]	Riparian Trend[3/]
Abeyta Creek	P	3/8	3	U	U
Antelope Gulch	P	5/8	5	U	U
Antero Reservoir	R	-	1	U	U
Apache Creek	P	1/4	1	U	U
Arkansas Gulch	I	1-1/4	8	U	U
Arkansas River	P	40-5/8	599	F-G	S
Badger Creek	P	6-5/8	28	P-F	Variable
Balm of Gilead Creek	P	3/4	3	U	U
Barnard Creek	P	3-1/8	17	EX	S
Bear Creek	P	1/4	2	U	U
Bear Gulch	I	3/4	5	U	U
Beaver Creek	P	1-1/4	13	U	U
Bernard Creek	P	1/4	5	U	U
Birdseye Gulch	P	2	13	U	U
Bison Creek	P	1/4	3	U	U
Big Cottonwood Creek	P	1/4	3	U	U
Bills Creek	P	2	12	U	U
Bradford Reservoir	R	-	22	U	U
Buffalo Creek	I	1/2	3	U	U
Bumback Gulch	I	1	8	U	U
Butter Creek	I	1	5	U	U
Catamount Reservoir	R	-	-	U	U
Cedar Springs Gulch	I	3	18	U	U
Chitwood Creek	I	1/4	2	U	U
Clear Creek	P	1/2	4	U	U
Clear Creek Reservoir	R	-	32	U	U
Coal Creek	P	1/4	1	U	U
Cochetopa Creek	P	1/4	2	U	U
Colorado Canyon	I	1/8	2	U	U
Colorado Gulch	P	1/2	5	U	U
Copper Gulch	I	4	17	U	U
Cottonwood Canyon	I	1/4	2	U	U
Cottonwood Creek	P	1/4	1	U	U
Cottonwood Creek	I	2-1/8	11	U	U
Cottonwood Creek	P	6-1/4	45	G	I
Cottonwood Gulch	I	1-1/8	7	U	U
Cripple Creek	P	1	8	U	U
Crooked Creek	P	1-1/4	6	P	S
Cross Creek	P	1/4	1	U	U
Crystal Falls Creek	P	3/4	3	U	U
Cucharas Reservoir	R	-	-	U	U
Cucharas River	P	2-3/4	12	F	I
Currant Creek	P	4-1/4	53	G-EX	I
Dead Horse Gulch	I	1-1/4	12	U	U

Table F-1 (Continued)

Name	Type[1/]	Length in Miles	Area in Acres	Riparian Condition[2/]	Riparian Trend[3/]
Deer Creek	I	1/8	1	U	U
Devils Gulch	I	1-1/4	3	U	U
DeWeese Reservoir	R	-	1	U	U
Dry Gulch	I	3/8	3	U	U
Dry Union Gulch	I	1/2	2	U	U
Dyer Gulch	P	1/4	8	U	U
East Badger Creek	P	1/2	4	U	U
East Beaver Creek	P	1-1/8	4	U	U
East Eight Mile Creek	I	3	24	U	U
East Fork Arkansas River	P	4-7/8	51	EX	S
East Fork West Beaver Creek	P	1-1/8	7	EX	S
East Gulch	P	6	39	EX	S
East Three Mile Creek	P	7/8	6	EX	S
Eight Mile Creek	P	7	47	G	I
Elevenmile Reservoir	R	-	30	U	U
Espinosa Gulch	I	3-1/4	29	U	U
Fairplay Pond	R	-	-	U	U
Falls Gulch	I	1	7	U	U
Falls Gulch	I	2-1/2	12	U	U
Fear Creek	P	1/2	7	U	U
Felch Creek	I	1-3/4	12	U	U
Fern Leaf Gulch	P	4-1/2	22	U	U
Five Points Gulch	I	6-1/2	24	U	U
Fourmile Creek	P	1/2	2	U	U
Fourmile Creek	P	1	8	G	I
Fourmile Creek	P	6	39	P	P
Froze Creek	P	1/4	1	U	U
Grape Creek	P	22-1/8	221	P-F	Variable
Grease Wood Arroyo	I	1-1/4	6	U	U
Green Creek	P	1/2	3	U	U
Green Mtn. Gulch	I	1	7	U	U
Halfmoon Creek	P	3/4	0	U	U
Hamilton Creek	P	2-1/2	11	EX	S
Hayden Gulch	P	1-1/8	7	U	U
Heck Gulch	I	2-3/4	13	U	U
Henthorn Gulch	I	1-1/2	9	U	U
High Creek	P	1	28	U	U
Hop Gulch	P	1	7	U	U
Huerfano River	P	1/8	1	U	U
Indian Gulch	P	1-1/41	0	U	U
Indiana Gulch	P	3-1/2	21	U	U
Iowa Gulch	P	4-1/8	18	U	U
JM Reservoir	R	-	0	U	U
Kerr Gulch	I	3-1/2	18	U	U
Lapin Creek	I	1/2	5	U	U
Little Badger Creek	P	2	12	U	U
Little Cochetopa Creek	P	1/2	4	U	U
Little Cottonwood Creek	I	1-1/8	10	U	U
Little Froze Creek	P	1/8	2	U	U
Little High Creek	P	1-1/8	7	U	U

Table F-1 (Continued)

Name	Type[1/]	Length in Miles	Area in Acres	Riparian Condition[2/]	Riparian Trend[3/]
Little Mack Gulch	I	1-1/4	10	U	U
Longfellow Gulch	I	1-1/2	13	U	U
Long Gulch (Cotopaxi)	P	1-1/2	15	U	U
Long Gulch	I	1-3/4	16	U	U
Long Hungry Gulch	P	1-3/4	15	U	U
Longs Gulch	I	1-1/8	6	U	U
Low Pass Gulch	P	1-1/8	10	EX	S
Mack Gulch	I	3-3/4	7	U	U
Manzanaras Creek	P	1/8	6	U	U
Martin Creek	P	1/8	1	U	U
May Creek	P	1/8	1	U	U
McCoy Gulch	I	1-3/4	10	U	U
McIntyre Gulch	I	2	20	U	U
Middle Cottonwood Creek	I	2-1/2	14	U	U
Middle Creek	P	1/8	1	U	U
Mill Gulch	P	3/4	3	U	U
Milsap Creek	I	3-1/2	29	U	U
Model Reservoir	R	-	10	U	U
Mosher Creek	P	1/4	1	U	U
Muddy Creek	P	1-1/8	14	F	S
North Abeyta Creek	P	1	6	U	U
North Tallahassee Creek	P	1-1/4	10	U	U
Oak Creek (Cotopaxi)	P	3/4	4	U	U
Oak Creek	P	1/2	3	U	U
Oil Creek	P	1-3/4	13	U	U
Palo Duro Creek	P	1-1/2	8	U	U
Park Gulch	P	3/4	11	U	U
Pass Creek	P	2	8	G	S
Pass Creek	P	1/8	1	U	U
Pine Gulch	P	2	15	U	U
Pantleon Creek	I	1	9	U	U
Poison Canyon	P	1/2	4	U	U
Pole Gulch	I	1-3/4	8	U	U
Pole Canyon	I	2	12	U	U
Poncha Creek	P	1-1/8	7	G	I
Pony Gulch	P	1-1/2	9	U	U
Pope Arroyo	I	1/2	3	U	U
Pruden Creek	P	1/2	2	U	U
Red Gulch	I	1-3/4	19	U	U
Reese Gulch	I	3	12	U	U
Rito Oso Creek	P	1/2	3	U	U
Road Gulch	I	4	18	U	U
Rye Slough	P	3/4	4	U	U
Sand Gulch	I	2-1/4	21	U	U
Sand Gulch	I	1-1/4	10	U	U
Sacramento Creek	I	1/2	4	U	U
Salt Creek	I	1/4	2	U	U
Seep Springs Draw	I	1	8	U	U
Sevenmile Creek	I	1-1/4	8	U	U
Sheep Creek	I	1/4	4	U	U

Table F-1 (Continued)

Name	Type[1/]	Length In Miles	Area In Acres	Riparian Condition[2/]	Riparian Trend[3/]
Sheep Creek	P	3/4	3	U	U
Short Creek	I	1/2	4	U	U
Skagway Reservoir	P	-	22	U	U
Smith Gulch	I	3/8	3	U	U
South Apache Creek	P	1/4	2	U	U
South Fork Huerfano River	P	1/4	2	U	U
South Fork Yellowstone Creek	P	3/4	5	U	U
South Mosquito Creek	P	1/2	4	U	U
South Tallahassee Creek	P	1/2	4	U	U
Spike Buck Gulch	I	4	31	U	U
Spinney Mtn. Reservoir	P	-	1	U	U
Spring Branch	P	1/2	2	U	U
Spring Creek	P	3/4	6	U	U
Stanly Creek	P	1/4	0	U	U
Stanton Creek	P	1/8	0	U	U
Stout Creek	P	1/4	1	G	S
Sullivan Creek	I	1-3/4	6	U	U
Sweet Water Gulch	I	2-1/2	16	U	U
Tallahassee Creek	P	3-1/8	16	G	S
Tarryall Creek	P	1-3/4	3	F	S
Tennessee Creek	P	1	14	U	U
Texas Creek	P	3-1/4	42	G	I
Texas Creek Gulch	I	5	21	P	S
Threemile Creek	P	1	10	P	D
Trail Gulch	I	2	15	U	U
Trout Creek	P	1/2	11	U	U
Trout Creek Pond	R	-	-	G	I
Turkey Gulch	I	3-1/4	20	U	U
Twelve Mile Creek	P	1/8	0	U	U
Two Bit Gulch	P	1/2	3	U	U
Two Creek	P	3/4	8	U	U
Union Creek	P	1/2	4	U	U
Ute Creek	I	1	7	U	U
Wagon Tongue Gulch	P	3/4	4	P	D
Washtub Gulch	I	1	8	U	U
West Creek	P	1/4	2	U	U
West McCoy Gulch	I	2	13	U	U
Wilson Creek	P	3-3/4	40	U	U
Wilson Creek	P	2	6	U	U
Yellowstone Creek	P	1/2	3	U	U

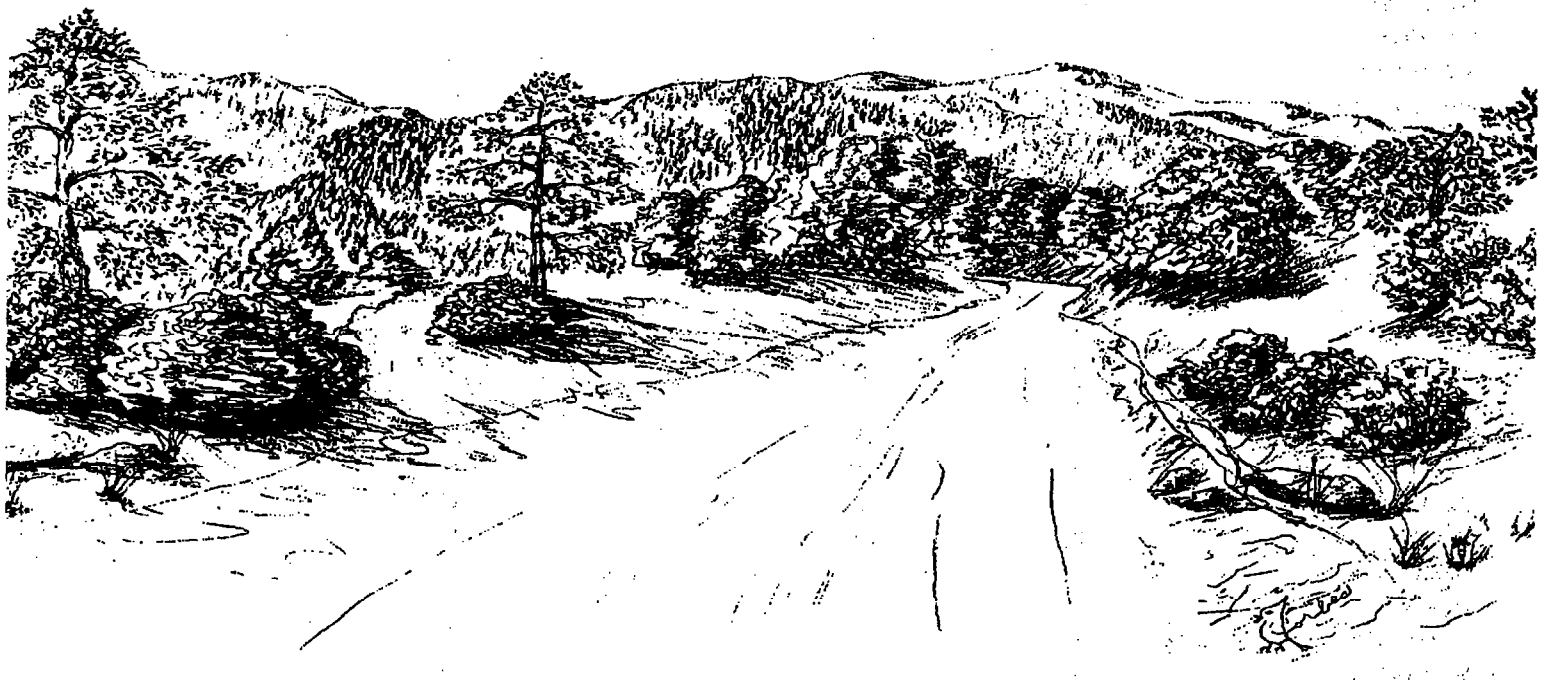
[1/] P - Perennial Stream
I - Intermittent Stream
R- Reservoir
L -Lake

[2/] EX - Excellent
G - Good
F - Fair
P - Poor
U - Unknown

[3/] I - Improving
D -Downward
S - Stable
U- Unknown

APPENDIX G

FLUID MINERALS MANAGEMENT



APPENDIX G
FLUID MINERALS MANAGEMENT

BLM AUTHORITY AND RESPONSIBILITIES FOR OIL AND GAS OPERATIONS

The BLM has responsibility for environmental protection, public health, and safety related to oil and gas operations on BLM-administered lands. There are three pieces of legislation that give primary direction to BLM for these operations: the *Mineral Leasing Act* of 1920, as amended, the *National Environmental Policy Act* of 1969 (NEPA), and the *Federal Land Policy Management Act* of 1976 (FLPMA). Other legislation also affects various aspects of development. Most notably, these include laws to protect cultural resources and endangered species.

The law that directs BLM to make public land available for development of oil and gas resources is the *Mineral Leasing Act.* This legislation directs BLM to make all public land available for oil and gas development with the exception of specific lands, such as national parks, which are listed in the Act or its amendments.

NEPA directs all Federal agencies to analyze and disclose to the public the impacts of major Federal actions. Oil and gas leasing is a major Federal action by definition. BLM prepares an environmental impact statement (EIS) to fulfill the mandate of NEPA (hence, this document).

FLPMA instructs BLM to prepare and disclose to the public plans for the lands under its jurisdiction. Since the *Mineral Leasing Act* requires availability of public land for leasing and since the leasing could lead to development that may have impacts on the environment, all three pieces of legislation are tied together in a workable process to accomplish the congressional intent. The primary focus of the process for oil and gas development is the BLM resource management plan/environmental impact statement (RMP/EIS). Within the RMP, plans are disclosed for development/conservation of oil and gas (as well as all other resources and values). The RMP also analyzes and discloses the environmental impacts of the projected development.

Once decisions have been reached through the planning process as to which lands are available for leasing and under what conditions, they are offered for sale at auction. Those people interested in purchasing oil and gas leases may nominate a parcel, or BLM may offer parcels of its choosing. In either case, the proposed parcel must conform to the RMP decisions and be offered for sale at a public auction. Those parcels that do not sell at the auction are available for noncompetitive sale for a 2-year period thereafter.

Management decisions are incorporated into the lease document as stipulations and notices before it is issued. Public notice of the sale (which includes the list of parcels offered, their location, and the stipulations to be attached) is given 45 days prior to the sale. Significant change to the stipulations made after the lease is issued is also posted for public notice for 30 days prior to making the change.

The purchaser of a lease at the auction must bid at least $2 per acre. The bonus bid must be paid at the sale, and the rent is due at the beginning of each new year as long as the lease is held and is not producing. Leases purchased at auction may be held for 5 years without production. Leases purchased noncompetitively after the auction may be held in nonproducing status for 10 years. If the lessee establishes production, a royalty of 12 1/2 percent must be paid to the government. Half of that money is returned to the state and county of origin for their use. The other half goes into the Federal treasury earmarked for reclamation projects, the National Forest System, National Park Service, etc.

Separate from leasing actions, geophysical explorationists may explore for oil and gas on public land. Geophysical exploration on public land requires approval of the methods employed and mitigation of impacts. The BLM resource area office must receive a copy of the Notice of Intent to perform geophysical operations. The exploration plan is analyzed for conformance with the area resource management plan/EIS, and mitigative measures and reclamation requirements are attached to the approval. BLM specialists examine the Notice of Intent (the plan of operations) and the site, or "line," to be explored, as well as the RMP in determining appropriate mitigative measures and reclamation requirements.

The majority of geophysical exploration operations conducted on public lands are done by exploration companies. Some are associated with petroleum producers, many are not. Geophysical exploration operations may also be conducted on a lease held by the lessee with the same requirements for mitigation of impacts and reclamation. (Further discussion of oil and gas exploration follows.)

A well must be drilled in order to produce oil and/or gas from the lease. Before drilling a well, the lessee, or an operator for the lessee, must file an Application for Permit to Drill (APD). The operator must file the application with the district or resource area office in which the action will take place. The application must include a plan for the drilling of the well and a plan for the protection of the surface and environment. The drilling plan contains information as to the depth of the well, how it will be constructed, how groundwater and other mineral resources will be protected, and how blow-outs and other emergencies will be prevented or addressed. The surface use plan covers such concerns as the location and amount of surface disturbance and how that disturbance will be reduced or eliminated. It covers mitigation of impacts to wildlife, cultural resources, vegetation, soil, surface water, and other land uses and values. Each resource/value is evaluated according to the

RMP decisions. The operator is responsible for incorporating all RMP decisions into the proposed APD. If the APD does not have the appropriate information and mitigation incorporated, the application may be modified or rejected. In most APDs in Colorado, the few RMP decisions not incorporated by the operator are attached to the approved application by the BLM as Conditions of Approval (COAs).

At a minimum, each APD is reviewed by a BLM geologist, petroleum engineer, and surface reclamation specialist and by the Authorizing Officer (area or district manager). The geologist evaluates the need for groundwater and other mineral resource protection and the structural competency of casing point formations. The petroleum engineer evaluates the drilling plan, the well construction, and the safety of the operation. The surface reclamation specialist evaluates the surface plan, checks the proposal against the RMP and other guidance, conducts the onsite inspection, analyzes impacts, proposes mitigation, and writes the environmental assessment (EA). The surface reclamation specialist also calls on other expertise as needed in the analysis of impacts and recommendation of mitigation and reclamation requirements. For example, a BLM archaeologist would recommend any needed mitigation for impacts to cultural resources.

APD information is posted in the local authorizing office for a 30-day public notice period. The APD may not be approved until the comment period has expired. Each lease where an APD is proposed is checked to determine if a bond has been posted to cover abandonment of the well should the lessee/operator default on their obligations under the lease. Each application is evaluated as described above, and subjected to a field inspection of all proposed disturbed areas. Appropriate, site-specific mitigation is then attached to the APD as COAs. A cultural resource inventory is conducted for each APD, and a report sent to the district/resource area archaeologist for evaluation. In designated areas, endangered species or other inventories may be conducted. The proposal is subjected to a *National Environmental Policy Act* (NEPA) review (an EA) that checks for conformance with the RMP and determines whether or not there is a need for additional review (i.e., an expanded EA or environmental impact statement). EAs are prepared for all APDs on Federal lands in Colorado. When all impacts are analyzed, all necessary mitigation incorporated, and the public notice period expired, the APD may be approved.

In cases where the proposed well is obviously part of a larger field development, and such development has not already been scrutinized by a NEPA document other than the RMP, a "field development" EA is prepared. This EA looks at conformance of the specific field development with the general development analyzed in the RMP. As with the APD EA, an EIS is prepared if the projected field development does not conform with the analysis of field development in the RMP.

Over the life of a field, other operations, such as construction of powerlines, pipelines, use of secondary and tertiary recovery methods, and other production facilities may become necessary. Each new surface disturbance is subjected to the same RMP test. Each is analyzed to determine impacts and mitigation. New ideas and technology are incorporated into new mitigative measures as they become available and when they do not impact the lease rights granted. New ideas and technology may also require amendment or maintenance of the RMP/EIS prior to use as mitigation.

As the well(s) plays out and comes to the end of its usefulness, it is abandoned and the disturbed area reclaimed. The operator must submit an abandonment notice for approval. The notice is evaluated by a geologist and a petroleum engineer to determine that the well will be plugged to protect usable water zones, other mineral resources, and the surface from contamination by any oil or gas that might leak up from the depleted reservoir or other fluids and gases up hole or on the surface that could migrate through the old well bore (and casing if left in place) to harm other resources. The surface reclamation specialist checks the final reclamation proposal to ensure it is in accordance with the original APD requirements, and, in some cases, incorporates the latest methods of reclamation. Reclamation is required to restore the well site, road, and other disturbances to as an original (or better) condition as possible. The surface reclamation specialist also inspects the location once or twice at approximately 1-year intervals to monitor the progress of reclamation. If the reclamation does not meet the requirement set out in the APD, the operator will re-do those portions necessary to complete the goals for the reclaimed area. The well will continue to be monitored until the surface reclamation specialist is satisfied that the reclamation has succeeded and the location is stable.

BLM authority to require reclamation has only existed since the passage of the *Federal Land Policy Management Act* of 1976. Wells abandoned prior to that time were reclaimed haphazardly at best and primarily as gratis by the companies involved. These older unreclaimed sites are reclaimed by BLM as the need arises and money is available. In the majority of cases "natural reclamation" has stabilized and revegetated the site. An attempt to further reclaim the location at this time would do more harm than good. BLM only reclaims such locations when a serious erosional or other problem has developed. Some unreclaimed locations are reclaimed by a new lessee as part of a new lease agreement.

Field operations are inspected by BLM to ensure accountability of royalties and compliance with the lease and permit safety and environmental requirements. Field inspections to wells are made at the predrill, construction, drilling, and production phases. Inspections are also made at the plugging of the well, during reclamation, and periodically thereafter as necessary to ensure the reclamation is effective. Petroleum engineering technicians and surface reclamation specialists have primary responsibility for field inspections, however, other specialists may inspect wells as needed. Typically these specialists include petroleum engineers, geologists, archaeologists, wildlife biologists, range conservationists, and others.

The primary function of the petroleum engineering technician is to account for accurate and complete measurement of production. They perform inspections to check the installation and calibration of measuring devices such as tanks for oil and flow meters for gas. Petroleum engineering technicians also inspect for environmental, public health, and safety concerns.

Operators are required to submit monthly production reports, which go to the Minerals Management Service (MMS) and are available to BLM inspectors electronically. BLM verifies the report in the field and MMS verifies the royalty payment. The two agencies work together to ensure that all production is accounted for and royalty is paid.

Operations within the jurisdiction of other Federal or state and local agencies may also be field inspected by those agencies. BLM has several agreements with other agencies that specify conditions where BLM will notify the agency of violations within that agency's jurisdiction and in turn the agency will notify BLM of violations within its jurisdiction.

Oil and Gas Exploration and Development

Oil and gas exploration and development activities progress through five phases, which are in part sequential and may overlap in time: preliminary exploration, exploratory drilling, development, production, and abandonment. Leases are obtained before the second phase (exploratory drilling).

Preliminary Exploration

Petroleum exploration occurs in unexplored portions of areas where petroleum is known or thought to occur in commercial quantities. An area where petroleum is thought to occur in commercial quantities is known as a frontier or rank wildcat area. With declining known oil and gas supplies, it has become profitable to explore for oil and gas in less promising geological provinces and in areas where the climate, terrain, depth of deposits, and other obstacles have discouraged previous efforts. Increasingly sophisticated exploration techniques, improved oil and gas drilling, and transportation technologies have also enhanced prospects for locating, extracting, and marketing petroleum resources.

Geological Exploration

Where the bedrock geology of an area is well exposed, it is often possible to predict where oil might gather. The potential traps (anticlines, faults, or formations with varying porosity) can sometimes be located with the aid of published geologic maps, aerial photos, and landsat imagery. Occasionally, additional data will be gathered by aircraft. Low altitude reconnaissance flights, frequently at elevations of 100 to 500 feet, help identify rock outcrops that can be studied later on the ground. Next, one or more geologists may examine and sample the rock outcrops in the area and map the surface geology. Geological exploration can be performed with little surface damage; four-wheel drive pickups, motorcycles, or all terrain vehicles can be used to cover the area.

Geophysical Exploration

Subsurface geology is not always accurately indicated by surface outcroppings. In such cases, geophysical prospecting methods are used to define subsurface structure. Three geophysical survey techniques can be used to define subsurface characteristics through measurements of the gravitational field, the magnetic field, and seismic reflections.

Gravity and magnetic surveys indirectly measure course subsurface structure. The fieldwork involves small portable units, which are easily transported via light off-highway vehicles, such as four-wheel drive pickups and jeeps, or aircraft. Off-highway vehicle traffic is common in these two types of surveys. Sometimes, small holes (approximately 1 inch by 2 inches by 2 inches) are hand dug for instrument placement at the survey measure points. These two surveys can make measurements along defined lines, but it is more common to have a grid of discrete measurement stations.

Seismic reflection surveys are the most common of the geophysical methods and produce the most detailed subsurface information. The seismic method detects subsurface geologic structural information by producing a source wave at or near the surface that bounces off subsurface layers. The "echoes" or seismic reflections are recorded as a function of time. The deeper the subsurface reflecting layer, the later in time it is detected. The weak seismic reflections are detected at the surface by arrays (groups) of seismometers or geophones that are very similar to microphones. The geophone electrical signals are sent by a connecting cable to the recorder unit where the signals are amplified and then recorded on a multi-track magnetic tape.

The tape is later sent to a computing center where it is rearranged and computer enhanced to present the subsurface reflections in a graphic picture called a seismic section. The seismic reflections are very weak requiring very sensitive geophones. While the geophones can "hear" the desired reflections, they also detect cars and trucks, people and animals moving about, water wells pumping, airplanes (at tens of thousands of feet in the air), trains (many miles away), the wind blowing, and trees and shrubs moving in the wind.

Any of these other activities can produce a "noise" at the geophone, which often is stronger than the desired seismic reflections.

The seismic reflection method needs the seismic source and geophone arrays along a straight line. Sometimes it is possible to work along existing roads if the roads are straight. Where practical, existing roads are used to facilitate access to the seismic operations. Geophone arrays are normally straight along the line length. In difficult seismic data areas, however, they may have considerable width.

To understand the subsurface structures in three dimensions, it is necessary to have seismic lines recorded in a "cross" or line gridded pattern. Grid spacing between lines can be from a fraction of a mile apart to many miles apart depending on the exploration purpose. The exploration purpose will also determine what latitude, if any, there is in moving these lines.

The work of a seismic crew begins with the permit agent obtaining permits from private landowners and government agencies.

The survey crew next places pin flags and other markers at uniform intervals along the seismic line and carefully measures the markers in relation to precisely known geographic locations. For a shot hole explosive seismic source, drilling rigs will be working on the seismic line. When the complete seismic line is ready, the geophone crew arrives and places the geophones in arrays in precise locations to the flagging and lay connecting cables between the geophone arrays and the recorder unit. After the seismic reflection data is recorded, the geophone crew picks up all the geophones and connecting cables and cleans up the seismic line. Most of these individual steps involve one or more equipment trucks to travel the seismic line if the terrain is driveable.

The seismic reflection method is usually referred to by the type of seismic source. The most common seismic sources are vibrator, shot hole explosive, and surface explosive.

The geophysicist, in determining the seismic exploration program parameters, will pick the most appropriate seismic source based on the depth of exploration interest and degree of detail needed to define the subsurface structure.

Vibrator Source.

The vibrator method uses a 4x4- or 4x6-wheel drive truck or buggy mounted hydraulic vibrator source. The primary physical feature is a pad (about 4 feet square) that is slowly lowered from the center of the truck or buggy to make contact with the ground. Connected to the pad is the reaction mass. The reaction mass is moved a few inches up and down hydraulically in a carefully controlled manner to send a seismic source wave into the ground.

The vibrator is a weak seismic source and requires two to eight vibrators working together to create detectable reflections. Since it is a weak source, it has been used successfully to gather seismic reflection information in difficult high population areas such as Los Angeles and Paris.

To be able to use the vibrator source method, it is required that the seismic line goes along a straight road, or if cross country, over gentle, rolling driveable terrain.

Conventional Drilled Shot Hole Source

The shot hole explosive source requires drilling a hole to a predetermined depth, placing explosives at the bottom of the hole and back filling the hole with cuttings if the hole is air filled, or bentonite chips if the hole is naturally water filled.

Shot hole drilling depths will range normally from 25 to 200 feet. The explosive charge size can range from 5 to 50 pounds. The hole diameter is typically 2 to 6 inches. Drill rigs are most often truck or buggy mounted. Cuttings from drilling the hole are normally scattered by hand near the shot hole or put back into the shot hole after explosive charge placement. Proper preplugging of the shot hole with tamped cuttings or bentonite chips prevent the view commonly shown in the movies of holes "blowing out." Some special source testing situations need the detonation of charges in open holes. A shot hole that "blows out" causes a very poor seismic source wave that is very detrimental to the seismic reflection method. Detonation of a properly preplugged shot hole will create the best seismic source wave and cause no surface disturbance.

Portable Drilled Shot Hole Source

Special limited depth drill rigs can be moved in pieces by a helicopter. Helicopter portable drills are used where access limitations or topography restraints prevent use of conventional truck or buggy mounted drill rigs. This is a very expensive option, which also places significant limits on the depth of drilling, and consequently, the size of the explosive charge. These limits can severely restrict the reflection methods ability to define subsurface structures.

Surface Explosive Source

The surface explosive source method involves placing puds (pouches) of explosives on a number of stakes driven into the ground. This is also called the Poulter method, named after its developer.

Explosive puds range in size from 1 to 5 pounds. Stakes are typically 4 to 8 feet in height. The number of stakes used in the source array can range from a few to the more common 10. Occasionally explosives are placed on the ground or snow, but this is a less effective source wave technique. Use of tall (6-foot) stakes or placing the explosives on the surface of deep snow results in little visible surface disturbance, in contrast to the noise level of the detonations. The surface explosive method is very mobile. Generally 4x4 vehicles are used for transportation, although it can be supported with animal pack teams or helicopters.

Mini-hole Explosive Source

The mini-hole explosive source can be used in favorable conditions. A very small portable unit is used to drill a number (a source array) of small diameter shallow holes. Holes are usually 2 to 3 inches in diameter, drilled to depths of 5 to 15 feet and each hole loaded with a small, 1 pound or less, explosive charge. These holes are detonated simultaneously to produce a seismic source wave. This method, however, is usually limited to defining shallow subsurface structures, and, therefore, cannot often be substituted for the significantly more effective deep shot holes.

A given area may be explored several times by the same or different companies over a period of time. Multiple exploration is undertaken for a variety of reasons--first attempts may have been unsuccessful, the depth of exploration interest

may have changed, other competitive companies want their own information, or improved techniques and/or equipment are used.

All the work required to obtain exploration seismic data does not guarantee that the data will indicate any necessary subsurface structures--let alone a subsurface structure containing hydrocarbons. For the explorationist, the unfortunate reality is that obtaining seismic data most often leads to the decision that an area does not have adequate subsurface structures or structures containing economic hydrocarbons and therefore no drilling will follow.

TYPES OF OIL AND GAS DRILLING AND PRODUCTION

Oil and gas wells are drilled primarily with rotary drilling rigs. The rigs use mud or compressed air as a medium to cool the drilling tools, carry cuttings to the surface, and, in the case of mud, to stabilize the drilled hole. In the early days of drilling, the "cable tool" rig was the predominant method of drilling. Cable tools were largely replaced by rotary rigs in the 1950s. Some of the oldest wells still producing in Colorado were drilled with cable tool rigs.

The method of drilling is generally the same regardless of the target production. The depth of the target usually has more to do with the method of drilling than the type of production. In general, deeper wells require larger rigs, which in turn require larger drill pads. Because oil is more valuable than gas, gas wells tend to be shallower in depth. The reason is that deeper wells cost more and the lower profitability of gas production means they do not bear the higher cost of deeper wells. The size of the anticipated production also has a bearing on the expense a given production will bear. For example, a very large gas producing reservoir may better bear the cost of deeper drilling than a shallow, low producing oil reservoir. But, all else being the same, deeper reservoirs cost more to develop than shallow ones.

The biggest differences among the various types of oil and gas wells occur in the production phase of operations. The same basic rotary drilling methods are used for drilling all types of oil and gas wells.

Oil and Gas Co-Production

Reservoirs that produce both oil and natural gas require the siting of facilities for production, clean-up, and storage and/or transportation of the products on location (i.e., the well pad). If the well produces naturally, that is the gas and oil flow to the surface under natural pressures, only a series of pipes and valves at the well "head" are required to regulate the flow of product to the surface. If there is no, or insufficient, natural pressure, a pump is installed to lift the product to the surface. Once the oil and gas comes to the surface, it travels through pipes to separation equipment where water and gases such as carbon dioxide are removed, and the gas and oil are separated. The water and oil are piped to respective storage facilities and the gas put into a transmission pipeline. In a few cases, separation/cleanup and/or storage facilities are located off the well pad for common use by more than one well. But, in the great majority of the wells in the study area, all facilities are located on the same pad on which the well was drilled.

Gas is transported to market through a network of gathering pipelines from each well to a transmission line. The gathering system usually consists of pipe of 2 to 4 inches in diameter, which is laid on the ground or buried several feet below the surface. BLM most often requires that lines be laid near the access road or buried under it to save additional surface disturbance. Measurement of gas is usually through a differential pressure recorder on the well pad.

Oil is produced into tanks either on the well pad or a common tank near the well. Oil is measured for sale from these tanks and transported to distribution points by special truck. In the case of some highly productive fields, oil carrying pipelines may be laid to a distribution point or refinery. In these cases, there is a network of pipelines to each well similar to that for the gas gathering system. Oil gathering lines are usually 4 to 6 inches in diameter, and measurement is either through a sales tank or a sales meter attached to the line.

In some areas, hydrogen sulfide (also known as H_2S or sour gas) may be found with the hydrocarbon production. In these cases, special stainless steel pipe is used to contain production until the hydrogen-sulfide can be separated from the hydrocarbons. The hydrogen sulfide is disposed of by incineration or neutralized by sulfur extraction.

Oil Production

Typically, oil is produced in association with water and gas; however, in some cases oil is produced with almost no water nor associated gas. Facilities to produce such oil are the same as those described above without the equipment for gas cleanup and measurement.

Dry Gas Production

Dry gas is a term applied to any natural gas produced without oil. It usually has some water associated and may have a small amount of light liquid hydrocarbons, called "drip" or condensate. Dry gas wells typically have only a "christmas tree" or valve/gauge assembly, showing above ground. Production facilities may include a pit or tank for collection of separated produced water and a small tank for the storage of the liquid hydrocarbons. As with oil and gas production, there is a gathering pipeline and sales meter for gas distribution.

Carbon Dioxide Production

Carbon dioxide is produced in a manner similar to dry gas. But, carbon dioxide, in combination with water, may form

carbonic acid, which is very corrosive. The produced gas, therefore, must be "cleaned" (impurities removed) as soon as possible after it reaches the surface. For that reason, stainless steel piping is used from well head to separator, and separators are placed as close as possible to the well head. Usually a single large separator is located to service several wells. The use of some stainless steel pipe and common separators are the two most distinguishing surface features of carbon dioxide production.

Exploratory Drilling

Drilling does not begin until a lease has been acquired by the operator. When preliminary investigations are favorable and warrant further exploration, exploratory drilling may be justified. Stratigraphic tests and wildcat tests are the two types of exploratory drill holes.

"Strat" tests involve drilling relatively shallow holes to supplement seismic data. The holes are usually from 100 to several thousand feet deep, and are drilled primarily by rotary drill rigs. As the rock is drilled, the resulting rock chips are brought to the surface by a high-pressure airflow or circulating drilling mud. Samples of these chips are collected, bagged, and identified as to depth of origin. They are then studied by a geologist to determine such data as rock type, age, and formation.

Truck-mounted drilling equipment for strat tests is fairly mobile; therefore, roads and trails to test sites on level solid ground are temporary and involve minimal construction. In hilly or mountainous areas, more road building is necessary.

Generally, access roads are bladed 12 to 14 feet wide and are not crowned nor ditched. Some roads may simply be surface scraped; i.e., vegetation is clipped off next to the soil surface. Other roads may require cuts in excess of 20 feet and fills exceeding 10 feet. Strat tests requiring a large amount of construction (i.e., several acres of cut and fill described previously) are unusual since construction costs may outweigh the information gained.

A space of about one-half acre or less is leveled and cleared of vegetation for the average drill site. If high pressure air is used to remove rock chips or rock cuttings, rock dust may be emitted into the air when samples are not being collected. If mud is used as a drilling fluid, mud pits may be dug; more commonly, portable mud tanks are used. Usually 1 to 3 days are required to drill the test holes, depending on depth to and hardness of the bedrock. In areas with shallow, high-pressure, water bearing zones, casing may be required to keep water out of the hole.

After the surface and subsurface geological studies, the seismic, and other geophysical surveys, comes the evaluation of the prospect. Only by drilling a wildcat well (a well drilled in unproved territory) will the oil company know if the rocks in the prospect they have identified contain oil or gas.

Nationally, about 1 in 16 wildcat wells produces significant amounts of oil or gas. Locally, success ratios may be as high as one in 10. The deeper wells may require several months or more to complete; shallower wells up to a few thousand feet deep may be completed in as little as a few weeks. As a general rule, the deeper the test, the larger the drilling rig and facilities required.

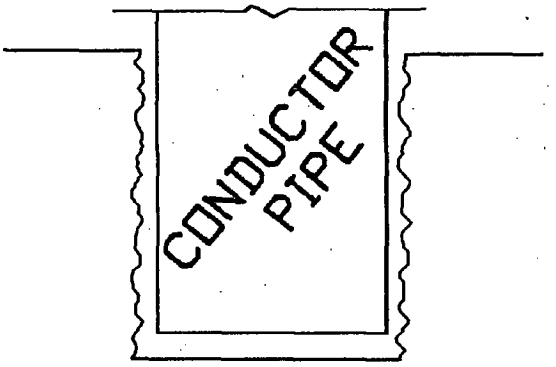
Prior to approval for drilling, onsite inspections are conducted with the proposed drill pad and access road staked out, to assess potential impacts and attach appropriate mitigative conditions to the permit to drill. A drill "pad" (well site) from 1 to 4 acres in size is then cleared of all vegetation, and leveled for the drill rig, mud pumps, mud (or reserve) pit, generators, pipe rack, and tool house. Topsoil and native vegetation are usually removed and stockpiled for use in the reclamation process. The mud pit may be lined with plastic or bentonite to prevent fluid loss or prevent contamination of water resources. Other facilities such as storage tanks for water and fuel are located on the pad or are positioned nearby on a separate cleared area. If the well site is not large enough for the equipment required to rig-up (prepare the drilling rig for operation), a separate staging area may be constructed. Staging areas are usually no larger than 200 by 200 feet and may simply be a wide flat spot along the access road on which vehicles and equipment are parked.

Five thousand to 15,000 gallons of water a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc, for each well. A surface pipeline may be laid to a stream or a water well, or the water may be trucked to the site from ponds or streams in the area.

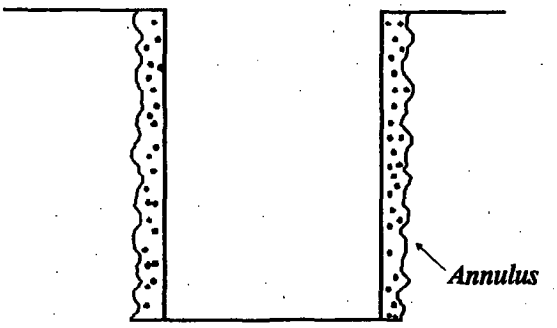
The rigs are very large and may be moved in pieces. In some instances, rigs can be moved short distances on level terrain with little or no dismantling of equipment, which will shorten the tearing-down and rigging-up time. Moving a dismantled rig involves use of heavy trucking equipment for transportation, and crews to erect the rig. Gross weight of vehicles may run in excess of 80,000 pounds.

In order to move a drill rig and well service equipment from one site to another, and to allow access to each site, temporary roads may be built. These roads are generally 16 to 18 feet wide (driving surface) and may be as short as 200 feet or as long as 10 miles or more. Bulldozers, graders, and other types of heavy equipment are used to construct and maintain temporary wildcat roads.

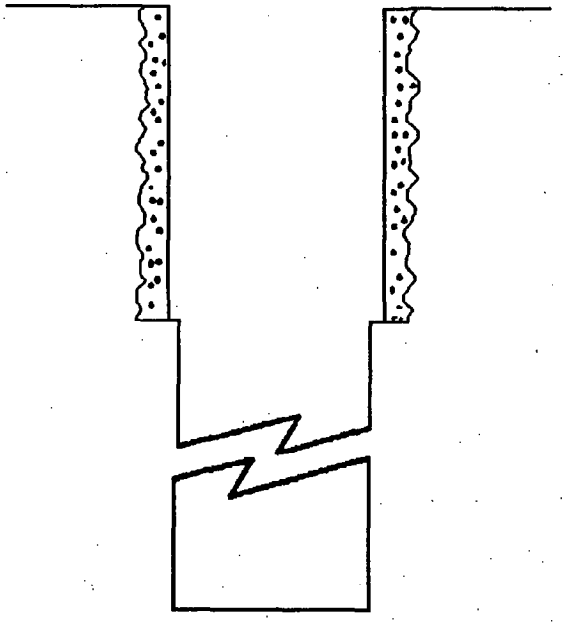
The start of a well is called "spudding in." A short piece of tubing called conductor pipe is forced into the ground (sometimes with a piledriver), and cemented in place. This keeps surface sand and dirt from sloughing into the well hole. Next, the regular drill bit and drill string (the column of drill pipe) take over. These pass vertically through a heavy steel turntable (the rotary table) on the derrick floor and the conductor pipe. The rotary table is geared to one or more engines, and rotates the drill string and bit. As the bit bores deeper into the earth, the drill string is lengthened by adding more pipe to the upper end. (See Figure G-1.)



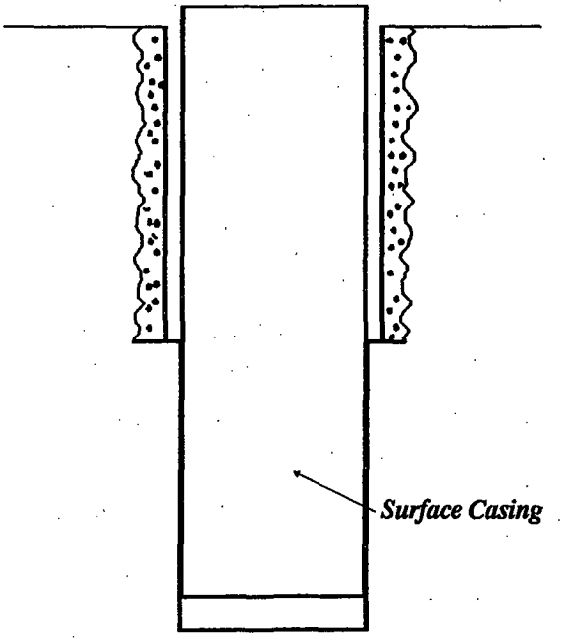
1. Well is initially started with an oversized bit and drilled up to 50 feet deep. A large-diameter pipe known as a conductor pipe is lowered into the hole to keep surface soil from sluffing into the hole while the surface casing hole is being drilled out.



2. Cement is placed in the annulus (the space between the well hold and the pipe) or between a smaller and larger pipe.

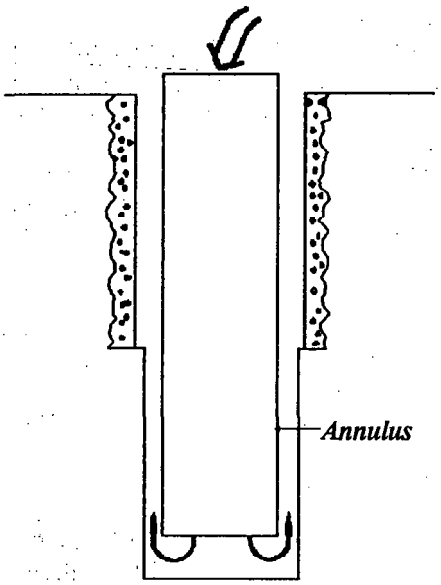


3. Surface casing hole is drilled out from inside the conductor pipe to a predetermined depth; typically about 10 percent of the total depth.

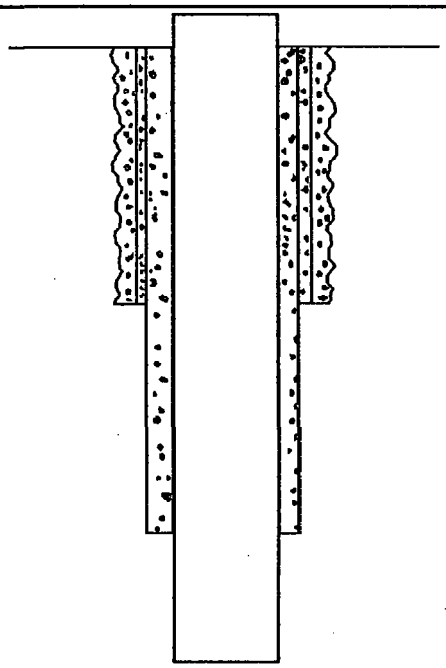


4. Surface casing is lowered into the hole.

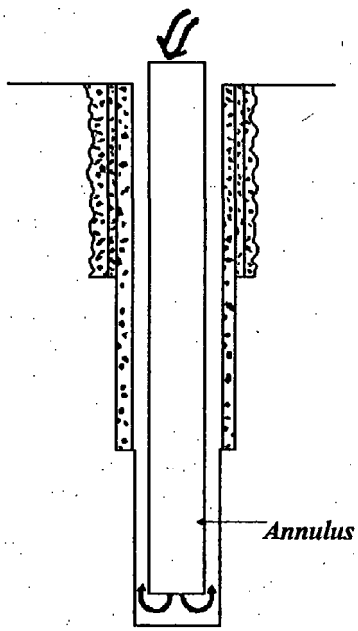
Figure G-1



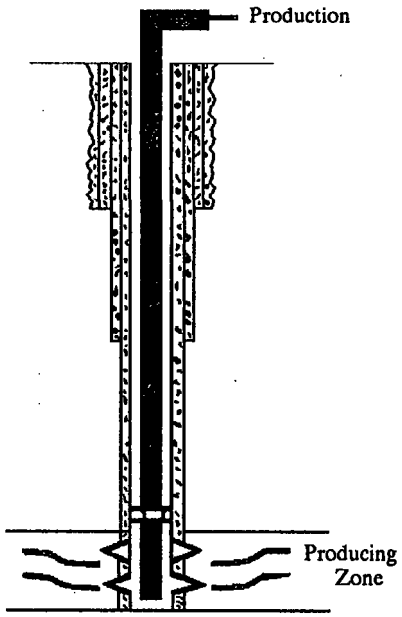
5. Cement is pumped down the surface and forced up the outside through the annulus. The cement is used to hold the surface casing in place. It protects shallow fresh water and other mineral zones.



6. The well is deepened using a bit smaller than the surface casing. The well is now drilled to its final depth. In deep wells, intermediate casing is set before drilling to the final depth.



7. The intermediate casing, or production casing, is lowered into the hole. Cement is pumped down the casing and up the outside through the annulus to seal the casing in place. This cement will also isolate and protect all hydrocarbon-bearing zones, fresh water zones, and other zones of interest.



8. Once the production casing is in place, perforations are made through the casing and cement into the producing formation. Techniques are then used to increase the flow of oil and gas into the well. Production tubing is hung down the well to the producing zone. Oil and gas flow into the well and either flow or are pumped up the production tubing to the surface.

Once the hole reaches a depth of several hundred feet, another string of pipe (the surface casing) is set inside the conductor pipe and cemented in place by pumping cement between the casing and hole wall. Surface casing acts as a safety device to protect freshwater zones (aquifers) from drilling fluid contamination. To prevent the well from "blowing out" in the event the drill bit hits a high pressure zone, "blowout preventers" (large metal rams) are installed around the surface casing just below the derrick floor. These rams will close around, crushing the drill string and sealing the well in the event of a blowout.

After setting the surface casing, drilling resumes using a smaller diameter bit. Depending on well conditions, additional strings of casings (intermediate casing) may be run (installed) before the well reaches the objective depth (total depth or "T.D.").

During drilling, a mixture of water, clay, and chemical additives known as "mud" are continuously pumped down the drill pipe. It exits through holes in the bit and returns to the surface outside the drill pipe. As the mud circulates, it cleans and cools the bit and carries the rock chips (cuttings) to the surface. It also helps to seal off the sides of the hole (thus preventing cave-ins), and to control the pressure of any water, gas, or oil encountered by the drill bit.

The mud is the first line of defense against a possible blow-out since it is used to control pressure. It is for this reason that a pit full of "reserve" mud (the reserve pit) is maintained on location. The reserve mud is used in emergencies to restore the proper drilling environment when radical or unexpected changes in down-hole pressure are encountered.

The cuttings are separated from the mud and sampled so that geologists can note and analyze (log) the various strata through which the bit is passing. The rest of the cuttings pass into the reserve pit as waste. Some holes are drilled at least partially with compressed air which serves the same purpose as drilling mud for cooling and cleaning the bit and evacuating the cuttings from the hole.

During or at completion of drilling activity, the well is logged. Logging means measuring with geophysical instruments the physical characteristics of the rock formations and associated fluids through which the borehole passed. These instruments are lowered to the bottom of the well, and slowly raised to the surface while recording data. Other measuring procedures include the drill stem test, in which pressures are recorded and fluid samples taken from zones of interest. After studying the data from those logs and tests, the geologist and/or petroleum engineer decide if the well will produce petroleum. If the well did not encounter oil and gas, it is plugged with cement and abandoned. The well pad and access road are recontoured and revegetated.

If the well will produce, casing is run to the producing zone and cemented in place. A proper cementing of the production casing string is required to provide coverage and prevent interzonal communication between oil and gas horizons and usable water zones. Initially, this is accomplished by placement of steel casing from the ground surface to a depth generally ranging between 200 and 1,000 feet. The actual length of this "surface casing" is dependent on factors such as depth of freshwater zones, anticipated formation pressures, and the length of the next smaller casing to be set. The annular space between the borehole and the exterior of the surface casing is required to be filled with cement. Cement is pumped down the casing and around the bottom until cement is returned to the surface outside of the casing. This ensures cement completely fills the annular space and precludes interzonal migration of formation fluids (i.e., groundwater). Following the placement of surface casing, the hole is drilled deeper and more casing is installed. Cement is placed in a similar fashion to the surface pipe, however, a quantity of cement sufficient to cover and isolate only those zones having hydrocarbons, usable water, or other mineral values.

If the determination is made that water monitoring wells are necessary in a given area, a separate borehole specifically designed as a monitoring well should be completed. Logical placement of a monitoring well would be in a protected location at the edge or just off the well pad (generally 100 to 200 feet from producing well bore). It should be noted also that monitoring wells and other relatively shallow boreholes have often had adverse impacts on the most critical groundwater source because of interzonal flows and introduction of bacteria and other contaminants into the system. The drill rig is usually replaced by a smaller rig that is used for the final phase of completing the well.

Development

If a wildcat well becomes a discovery well (a well that yields commercial quantities of oil or gas), development wells will be drilled to confirm the discovery, to establish the extent of the field, and to efficiently drain the reservoir. The procedures for drilling development wells are about the same as for wildcats, except there is usually less subsurface sampling, testing, and evaluation. If formation pressure can raise oil to the surface, the well will be completed as a flowing well. Several downhole acid or fracture treatments may be necessary to enhance the formation permeability to make the well flow.

When a well is "acidized," this refers to the process of placing acid in the well bore across the productive interval that causes the solution of some of the mineral materials (e.g., calicide, dolorite, etc.), which reside around the pore space. Upon solution and removal of these minerals, porosity and permeability are enhanced. When a well is hydro-fractured, it simply means fluid, usually gelled water, is pumped down the well, through perforations in the casing and into the formation. Pumping pressures are increased to the point where the formation fractures or breaks, and the sand is added to the injection fluid to "prop-open" the crack once the pressure is released. The pressures required to fracture a given formation is generally quite predictable based on rock type and depth. For some formations, especially coals, abnormally high pressures are required to fracture them.

Pressures, volumes, and rates are all measured and monitored during the fracture process. These parameters provide information as to how the formation is behaving and if the fracture is propagating within the desired interval (i.e., staying in zone). This is especially true in coals, as sustained "high" injection pressure indicates the fracture is moving through the coal.

If pressures fall off, it indicates the fracture has extended beyond the coals and the operation can be halted. In addition to using the foregoing parameters to monitor fracture behavior, other methods for fracture geometry and extent are available (e.g., tracer and tiltimeter surveys). Control is maintained throughout the fracture operation.

A free-flowing well is simply closed off with an assembly of valves, pipes, and fittings (called a christmas tree) to control the flow of oil and gas to other production facilities. A gas well may be flared for a short period to measure the amount of gas per day the well can produce, then shut in or connected to a gas pipeline.

If the well is not free-flowing, it will be necessary to use artificial lift (pump) methods. These are explained, along with well production equipment and procedures, in the following section on production. After a pump is installed, the well may be tested for days or months to see if it is economically justifiable to produce the well and to drill additional development wells. During this phase, more detailed seismic work may be run to assist in precisely locating the petroleum reservoir and to improve previous seismic work.

As with wildcat wells, field development well locations will be surveyed. A well spacing pattern must be established by the state, with approval of the BLM.

Oil well spacing for production from Federal leases is usually a minimum of 40 acres. Most gas well spacing for production from Federal leases uses units of 160, 320, and 640 acres per well. Spacing for both oil and gas wells is based on the characteristics of the producing formation. If a field is producing from more than one formation, the surface location of the wells may be much closer than one per 40 acres. Once well spacing has been approved, development of the lease proceeds.

During the development stage, the road system of the area is greatly expanded. Once the producing wells and their potential productive life are known, a permanent road system can be designed and built. Because it often takes several years to develop a field and determine field boundaries, the permanent road system is usually built in segments. Since the roads in an expanding and developing field are built in segments, many temporary roads (built initially for wildcats or development) end up as long-term (in excess of 15 years) main access or haul roads. The planning of temporary roads for wildcats and development wells is done with road conversion to long term in mind.

Since development wells have longer life spans than wildcat wells, access roads for development wells are better planned, designed, and constructed. Access roads are normally limited to one main route to serve the lease areas, with a maintained side road to each well. Upgrading of temporary roads may include ditching, draining, installing culverts, graveling, crowning, or capping the roadbed. The amount of surface area needed for roads would be similar to that for temporary roads mentioned earlier, and would also be dependent on topography and loads to be transported over it. Generally, main access roads are 20 to 24 feet wide and side roads are 14 to 18 feet wide. These dimensions are for the driving surface of the road and not the maximum surface disturbance associated with ditches, back cuts, or fills. The difference in disturbance is simply a matter of topography. Surface disturbance in excess of 130 feet is not unusual in steep terrain (slopes exceeding 30 percent).

When an oil field is developed on the current minimum spacing pattern of 40 acres per well, the wells are 1,320 feet apart in both north-south and east-west directions. If a section (1 square mile) is developed with 16 wells, at least 4 miles of access roads are built. In mountainous terrain, the length of access roads may be increased since steep slopes, deep canyons, and unstable soil areas must often be circumvented in order to construct stable access to the wells.

Surface use in a gas field may be similar to an oil field (though usually less) even though the spacing of wells is usually 160 acres. Though a 160-acre spacing requires only four wells per section, the associated pipeline system often has similar initial surface requirements (acreage of surface disturbance).

In addition to roads, other surface uses for development drilling may include flowlines; storage tank batteries; facilities to separate oil, gas and water (separators and treaters); and injection wells for salt water disposal. Some of the facilities may be installed at each producing well site, and others at places situated to serve several wells. These facilities are discussed more in the following production section.

Surface use in an oil and gas field may be affected by unitization of the leaseholds. In many areas with Federal lands, an exploratory unit is formed before a wildcat is drilled. The boundary of the unit is based on geologic data. The developers unitize the field by entering into an agreement to develop and generate it as a unit, without regard to separate ownerships. Costs and benefits are allocated according to agreed terms.

Unitization reduces the surface-use requirements because all wells are operated as though on a single lease. Duplication of field processing facilities is minimized because development operations are planned and conducted by a single unit operator, often resulting in fewer wells.

The rate of development well drilling depends on whether the field is operated on an individual lease basis or unitized, the probability of profitable production, the availability of

drilling equipment, protective drilling requirements (drilling requirements to protect Federal land from subsurface petroleum drainage by off-setting non-Federal wells), and the degree to which limits of the field are known. The most important development rate factor may be the quantity of production. If the discovery well has a high rate of production and substantial reserves, development drilling usually proceeds at a fairly rapid pace. If there is some question whether reserves are sufficient to warrant additional wells, development drilling may occur at a much slower pace. An evaluation period to observe production performance may follow between the drilling of successive wells.

Development on an individual lease basis usually proceeds more rapidly than under unitization, since each lessee must drill his own well to obtain production from the field. On a unitized basis, however, all owners within the participating area share in production of a well regardless of whose lease the well is on. Spacing requirements are not applicable to unit wells. The unit is developed on whatever the operator considers to be the optimal spacing pattern to maximize recovery.

As mentioned earlier, drilling in an undeveloped part of a lease to prevent drainage of petroleum to an offset well on an adjoining lease (protective drilling) is frequently required in fields of intermingled Federal and privately-owned land. The terms of Federal leases require such drilling if the offset well is on non-Federal lands, or on Federal lands leased at a lower royalty rate. Many fields go through several development phases. A field may be considered fully developed and produce for several years, then a well may be drilled to a deeper pay zone. Discovery of a new pay zone in an existing field is a "pool" discovery, as distinguished from a new field discovery. A pool discovery may lead to the drilling of additional wells--often from the same drilling pad as existing wells--with the boreholes separated only by feet or inches. Existing wells may also be drilled deeper.

Usually 4- to 6-inch diameter pipelines transport the petroleum between the well, the treating and separating facilities, and central collection points. These lines can be on the surface, buried, or elevated. Most pipelines in the planning areas are buried.

Trucking and pipelining are the two methods used separately or in conjunction to transport oil out of a lease or unitized area. Trucking is used to transport crude oil from small fields where installation of pipelines is not economical and the natural gas in the field is not economically marketable. It is not practical to truck natural gas.

Pipelines are the most common way to transport oil and gas. If a field has substantial amounts of natural gas, separate pipelines will be necessary for oil and gas. Pipelines move the oil from gathering stations to refineries. As existing fields increase production or new fields begin production, new pipelines may be needed. These new lines usually vary in size from 4 to 16 inches in diameter, and range in length from a few miles to tie into an existing pipeline, to hundreds of miles to supply a refinery. Construction of a pipeline requires excavating and hauling equipment, a temporary and/or permanent road, possibly pumping stations, clearing the right-of-way of vegetation, and possibly blasting.

Natural gas pipelines transport gas from the wells (gathering or flow lines) to a trunk line then to the main transmission line from the area. Flow lines are usually 2 to 4 inches in diameter and may or may not be buried. Trunk lines are generally 6 to 8 inches in diameter and are buried, as are transmission lines which vary in diameter from 10 to 36 inches. The area required to construct a pipeline varies from about 15 inches wide (for a 2- to 4-inch surface line) to greater than 75 feet for the larger diameter transmission lines (24 to 36 inches). Surface disturbance is primarily dependent on size of the line and topography of the area on which the line is being constructed.

Compressor stations may be necessary to increase production pressure to the same level as pipeline pressure. The stations vary in size from approximately 1 acre to as much as 20 acres for a very large compressor system.

Construction techniques for natural gas lines are similar to those used for oil pipelines.

Production

Production in an oil field begins just after the discovery well is completed and is usually concurrent with development operations. Temporary facilities may be used at first, but as development proceeds and reservoir limits are determined, permanent facilities are installed. The extent of such facilities is dictated by the number of producing wells, expected production, volume of gas and water produced with the oil, the number of leases, and whether the field is to be developed on a unitized basis.

The primary means of removing oil from a well in the planning areas is by pumping jacks (familiar horsehead devices). Pumps are powered by electric motors (power-lines required) or if there is sufficient casing-head gas (natural gas produced with the pumped oil), or another gas source is available, it may be used to fuel internal combustion engines.

Some wells drilled in the area produce sufficient water that must be disposed of during the operation of the well. Although most produced waters are brackish to highly saline, some are fresh enough for beneficial use. If water is to be discharged, it must meet certain water quality standards. Because water may not come from the treating and separating facilities completely free of oil, oil skimmer pits may be established between separating facilities and surface discharge.

Another method of disposing of wastewater is through subsurface injection. In Colorado, injection disposal wells are authorized by the Colorado Oil and Gas Conservation Commission (COGCC) under primacy of the U.S. Environmental Protection Agency. BLM engineers review the proposal for impacts to other minerals and groundwater, but have no approval authority over

the well or target zone. When water is disposed underground, it is always introduced into a formation containing water of equal or poorer quality. It may be injected into the producing zone from which it came or into other producing zones. In some cases, it could reduce productivity of the field and may be prohibited by state regulation or mutual agreement of operators. In some fields, dry holes or depleted producing wells are used for salt water disposal, but occasionally new wells are drilled for disposal purposes. Cement is squeezed between the casing and sides of the well to prevent the salt water from migrating up or down from the injection zone into other formations.

Underground oil is under pressure in practically all reservoirs. This pressure is usually transmitted to the oil through gas or water in the reservoir with the oil. When oil is pumped out of the well, pressure is reduced in the reservoir around the drill hole. This allows the gas or water in the reservoir to push more oil into the space next to the well. A reservoir that has mostly gas pushing the oil is called "gas drive," and one that has mostly water pushing the oil is called "water drive." Oil that is recovered under these natural pressures is considered primary production. Primary production accounts for about 25 percent of the oil in a reservoir.

Methods of increasing recovery from reservoirs generally involve pumping additional water or gas into the reservoir to maintain or increase the reservoir pressure. This process is called secondary recovery. Recently, the trend has been to institute secondary recovery processes very early in the development of a field. Surface disturbance from a water flooding recovery system is similar to drilling and development of an oil and gas well itself; i.e., a drill pad and access road are constructed and water pipelines may be built. Surface use is increased substantially since as many as four injection wells may be used for each oil well in the field (there are many different patterns as well as many other methods of secondary recovery).

Tertiary recovery methods increase recovery rates by lowering the viscosity of the oil either by heating it or by injecting chemicals into the reservoir so that the oil flows more easily. Heating of reservoir oil can be accomplished by injecting steam into the reservoir. Tertiary recovery methods are not yet widely used in this area. By the year 2000, ultimate recovery (including secondary and tertiary recovery) from any given oil reservoir is expected to average 40 percent nationally.

Crude oil is usually transferred from the wells to tank storage facilities (a tank battery) before it is transported from the lease. If it contains gas and water, they are separated before the oil is stored in the tank battery. The treating and separating facilities are usually located at a storage tank battery on or near the well site.

After the oil, gas, and water are separated, the oil is piped to storage tanks located on or near the lease. There are normally at least two tanks, so that one tank can be filling as the contents of the other are measured, sold, and transported. The number and size of tanks vary with the rate of production on the lease, and with the extent of automation in gauging the volume and sampling the quality of the tank contents.

Horizontal Drilling

The recent development of horizontal drilling holds promise of further reductions in disturbance of surface resources and values. Use of directional, horizontal, and multiple-completion drilling technology could further reduce the number of surface locations and provide greater flexibility in siting locations and provide greater flexibility in siting locations. These techniques will also increase production and ultimately lower costs of production.

There are, however, many problems with these techniques yet to be solved before they will come into widespread use. The two most pressing of these problems in Colorado at the moment are interference with spacing patterns and the cost of the operations. Most industry experts agree that the latter will be solved through additional experience and some additional technical advances. The problem of spacing patterns for horizontal holes more directly involves Federal and state policy.

Current spacing patterns are based on the most efficient recovery of the resource. Spacing patterns in Colorado are set by the COGCC. Spacing patterns on Federal lands are also set by the COGCC, but with the concurrence of BLM, who has the responsibility for Federal lands. If BLM and state government were to set different spacing patterns, the result would be unsolvable drainage conflicts, lost revenues, and lost resource. It could also mean the drilling of more wells than are necessary as competing companies developed reservoirs under differing jurisdictions.

In Colorado, most fields are developed on a 40-, 80-, 160-, 320-, or 640-acre pattern. Forty acres is the spacing pattern authorized for all unspaced areas. However, most new field operators apply for large spacing based on reservoir characteristics soon after field discovery. The spacing pattern is based on the calculated area of reservoir rock that one well can drain. Calculations are based on conventional (vertical) wells.

Horizontal wells are drilled to the producing formation, or close to it, then proceed horizontally through the producing formation. The advantage of these wells is that much more of the reservoir rock is exposed to the bore hole, and therefore, more product may be produced through one well. In addition, more than one horizontal hole may be extended from the same vertical bore or even from the horizontal portion of the bore, thereby limiting additional surface use. Spacing patterns frequently must be adjusted to permit this type of development.

For example, a field with 40-acre spacing may have one horizontal well drilled in the NW1/4NW1/4 with the horizontal portion running east all the way to the NE1/4NE1/4. This well would penetrate and produce all four of the northern tier of well spaces, thereby eliminating the need to drill three wells. The elimination of the need to

drill three wells would require Federal and state approval to circumvent the spacing order. Real life examples may get much more complicated than this one.

In many cases, such as the simple example given above, the oil and gas operator may have to apply for a variance to the state spacing order. Both BLM and COGCC are committed to working with industry on these problems to take full advantage of the new technology.

Abandonment

The life span of fields varies because of the unique characteristics of any given field. Reserves, reservoir characteristics, the nature of the petroleum, subsurface geology, and political, economic, and environmental constraints all affect the life span of the field from discovery to abandonment. The life of a typical field is 15 to 25 years. Abandonment of individual wells may start early in the life of a field and reach a maximum when the field is depleted.

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well site, and the well. In all cases, all formations bearing usable-quality water, oil, gas, or geothermal resources, and/or prospectively valuable deposits of minerals will be protected. Generally, in a dry (never produced) well, the hole below the casing is filled with heavy drilling mud, a cement plug is installed at bottom of the casing, the casing is filled with heavy mud, and a cement cap is installed on top. A pipe monument giving the location, lease number, operator, and name of the well is required unless waived by the Authorized Officer. If waived, the casing may be cut off and capped below ground level. Protection of aquifers and known oil and gas producing formations may require placement of additional cement plugs.

In some cases, formerly producing wells are plugged as soon as they are depleted. In other cases, depleted wells are not plugged immediately but are allowed to stand idle for possible later use in a secondary recovery program. Truck-mounted equipment is used to plug former producing wells. In addition to the measures required for a dry hole, plugging of a depleted producing well requires a cement plug in the perforated section in the producing zone. If the casing is salvaged, a cement plug is put across the casing stub. Cement pumpjack foundations are removed or buried below ground level. Surface flow and injection lines are removed, but buried pipelines are usually left in place and plugged at intervals as a safety measure.

After plugging, the drilling rig is removed and the surface, including the reserve mud pit, is restored to the requirements of the surface management agency. This may involve the use of dozers and graders to recontour those disturbed areas associated with the drill pad plus the access road to the particular pad. The reserve pit (the part of the mud pit in which a reserve supply of drilling fluid and/or water is stored) must be evaporated or pumped dry, and filled with soil material stockpiled where the site was prepared. There will be little leakage if the pit was lined with plastic or bentonite. The area will be reshaped to a useful layout that will allow revegetation to take place, restore the landform as near as possible to its original contour, and minimize erosion. After grading the subsoil and spreading the stockpiled topsoil, the site is seeded with a grass mixture that will establish a good growth. A fence may be erected to protect the site until revegetation is complete, particularly in livestock concentration areas.

CONDITIONS OF APPROVAL - ALL ALTERNATIVES

Introduction

Post-lease operations proposals are reviewed to ensure conformance with the plan. The mitigative measures listed represent the post-lease environmental protection to which BLM is committed as a result of the analysis in the plan/EIS. Note that there is no commitment to the specific wording of a Condition of Approval (COA).

The listed mitigative measures may apply to all oil and gas exploration and development activities and associated rights-of-way. The Authorized Officer will choose among these measures at the field development stage to mitigate or avoid environmental impacts identified on a site-specific basis. When attached to an approval document, the measures are known as COAs. The Authorized Officer is not limited to the list of COAs shown here, but may develop others as unforeseen impacts occur as long as the new COAs conform with the limitations of the granted lease rights and the guidance set forth in this plan and subsequent amendments.

COAs are not added to applications if they are unnecessary (do not apply to the case in question) or, are duplicative, as when the mitigative measure is already incorporated in the operator's submittal.

Geophysical Operations

The following guidance is for the development of standards to be attached, as appropriate, to the Notice of Intent (NOI) for geophysical operations at the discretion of the Authorized Officer and in accordance with the resource management plan/environmental impact statement (RMP/EIS) record of decision. The statements below will be used as guidance by BLM field personnel in determining what protective measures will be used on geophysical operations. Only those items pertaining to a given operation will be appended to the NOI, and only if they are not already in the proposed plan of operation.

A. Notification

If noncompliance with terms and conditions occurs, the operator will be notified by BLM and instructed as to the appropriate action. If the operator fails to take appropriate action, the operator will be subject to enforcement action in accordance with 43 CFR 3163.

Wildfires begun or sighted during seismic operations will be reported immediately to the Cañon City Fire Dispatch Office and/or the resource area office of jurisdiction. The operator is liable for the full cost of fire suppression of all fires on or in the vicinity of the project set or caused by his employees, whether set directly or indirectly as a result of operations.

The operator shall notify the Authorized Officer, or his representative at least 48 hours prior to beginning operations.

The operator shall also report progress on a weekly basis until completion. A prework conference may be required.

Immediately upon completion of operations, a Notice of Completion of Oil & Gas Exploration Operations and an updated BLM planimetric map or USGS topographic map showing revisions to the original NOI shall be submitted to the Authorized Officer. The map will be used to perform a final compliance inspection of the exploration area.

A copy of all COAs, along with a copy of the submitted NOI, shall be kept in the field by each seismic crew, for inspection by BLM personnel.

Any exploration greater than one-quarter mile from the proposed seismograph line route filed with the NOI will require prior approval from the Authorized Officer.

B. Cultural Resources

The Programmatic Agreement between BLM, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation, signed February 6, 1987, contains guidance for oil and gas, seismic, and other land use operations. Appendix B of the agreement specifically outlines BLM procedures for both oil and gas APDs and for seismic operations. In addition, guidance is provided in: *Handbook for Cultural Resources Inventory/Mitigation* (Colorado State Office Release 8-13), dated 1990.

In addition to the above guidance, the operator shall immediately bring to the attention of the Authorized Officer any and all antiquities or other objects of historic, paleontological, or scientific interest, including, but not limited to, prehistoric or historic ruins or artifacts discovered as a result of operations. The operator and the Authorized Officer shall consult and determine the best option for avoiding or mitigating site damage.

Operators are also reminded that removal, injury, defacement, or alteration of any object of scenic, archaeological, historical, or scientific interest is a Federal crime and may be punishable by fine and/or jail terms.

C. Threatened, Endangered, and Sensitive Species

An inventory for threatened and endangered plant species is required on any portions of the line or staging areas proposed in known or realistic potential habitat for threatened, endangered, or candidate plant species. A map will be maintained by BLM outlining these areas and made available to the public.

D. Construction

All infestations of noxious or poisonous weeds, resulting from surface disturbance caused by the operator, will be controlled before spreading occurs into the surrounding area. Method of weed control will be reviewed by the Authorized Officer prior to commencement.

No dirt work nor clearing of vegetation will occur without specific approval. All merchantable timber and/or firewood shall be purchased by the operator at the total appraised price that is determined by BLM.

During periods of adverse conditions such as thawing, heavy rains, snow, or flooding, all activities off existing maintained roads that create excessive surface rutting will be suspended. When adverse conditions exist, the operator will contact the Authorized Officer for an evaluation and decision based on soil type, slope, vegetation, and cover.

Drill hole cuttings will be returned to the hole if possible, or at a minimum, raked and spread out so as not to impede regrowth of vegetation or to create erosion problems.

Operations shall be done in a manner that prevents damage, interference, or disruption of water flows and improvements associated with all springs, wells, or impoundments. It is the operator's responsibility to enact the precautions necessary to prevent damage, interference, or disruptions. Vibrator sources will not be operated closer than 300 feet, and large explosive charges, greater than 40 pounds, will not be used closer than 1,320 feet of springs, wells, or impoundments. The Authorized Officer may approve closer source distances if the contractor demonstrates that the resource will be protected.

During periods of adverse conditions caused by climatic factors such as thawing, heavy rains, snow, or flooding, all activities off existing maintained roads that create excessive surface rutting will be suspended. When adverse conditions exist, the operator will contact the Authorized Officer for an evaluation and decision based on soil types, slope, vegetation, and cover.

No fence will be cut unless no other alternative exists. Before cutting through any fences, the operator shall firmly brace the fence on both sides of the cut; a temporary gate will be installed for use during the course of operations unless the fence is immediately repaired. On completion of operations, fences shall be restored to at least their original condition.

Activities of seismic operators shall not prevent, obstruct, nor unduly interfere with any activities of other authorized users of the public lands. Removal or alteration of existing improvements (fences, cattle guards, etc.) is not allowed without prior approval. Fences are to be braced to BLM standards prior to cutting.

All debris, such as paper, cans, wire, flagging, or other trash, shall be removed and properly disposed of upon completion. No oil nor lubricants shall be drained onto the ground. All vehicles (including drills) will be limited to existing roads, except in approved areas. Improvement of existing roads and trails is not permitted, unless prior approval is obtained.

Water for drilling purposes will not be obtained from Federally owned or controlled water sources such as reservoirs and springs unless specific permission is obtained from the Authorized Officer.

Any available information concerning water sands or artesian flows must be reported to the resource area office.

Whenever possible, a portable mud pit shall be used when drilling with fluids.

There will be no straight line of sight dozing. Any path dozed through a timbered area will take an irregular path. Any pushed trees are to be stockpiled adjacent to the line so they are readily retrievable without additional disturbance. All trees are to be pulled and spread back onto the line or access route.

There will be no removal of brush or grass by blading. Brush may be crushed or removed by keeping the blade 6 inches off the ground surface. In open or brush areas, vehicle paths will take an irregular path to discourage line of sight paths.

Blading will be allowed only if the trail is impassable by vehicles or geophysical equipment. No widening nor realignment will be allowed. Existing trails may have to be reclaimed or closed.

New trails can be constructed only when vehicle and equipment passage is impossible and only with the concurrence of the Authorized Officer. No straight line of sight trails will be allowed. All trails will be reshaped to original contour (including bench cuts). Waterbars will be placed on slopes as directed by the Authorized Officer.

Existing fords are to be used if possible. A cut and stockpile process will be used to create a low water crossing or upgrade an existing crossing unless otherwise specified by the Authorized Officer.

E. Explosives

Powder magazine sites on public lands must be approved in writing by the area manager prior to use. Transportation, storage, and use of explosives on BLM surface will be done in accordance with ATF P 5400.7 (11/82).

F. Rights-of-Way

Access to Federal lands across non-Federal lands is not guaranteed by the government. Permission to enter or cross private or state-owned lands must be obtained from the landowner(s).

G. Miscellaneous

All personnel (contractors, subcontractors) working in the field with the seismic operator will be familiar with and follow the conditions appended to the NOI.

Helicopters will operate between staging areas and seismic line within corridors and at altitudes that allow safe, efficient, and environmentally sensitive operations. Operating parameters will be determined on a line-to-line basis as mutually agreed by BLM, helicopter operator, and contractor.

Aircraft landing sites on public lands must be approved in writing by the area manager prior to use.

H. Reclamation

All surface disturbance would be recontoured and revegetated according to an approved reclamation plan.

Reclamation of disturbed areas shall be completed, as directed by the Authorized Officer, within 30 days of terminating seismograph work on any line. Delay of reclamation for any reason, such as weather, must be approved by BLM. Adequate vegetative cover (and seed mixture, based on site-specific analysis, to be used) shall be established by the Authorized Officer.

Application for Permit to Drill Operations

The following guidance will be used to develop COAs, which are attached, as appropriate, to approved APDs, sundry notices, or oil and gas related right-of-way actions at the discretion of the Authorized Officer and in accordance with the RMP/EIS record of decision.

This appendix shows the most common COAs used; however, the reader is reminded that COAs are designed for specific operations. In practice, COAs shown below may or may not be used on any given approval document, and other COAs, not specifically stated here, will be written to accomplish the tasks envisioned in this plan. The categories shown below are a good representation of the list of mitigative measures considered by BLM resource specialists for every approved field operation.

A. Notification

In order for BLM inspectors to check the initial construction operations, it is necessary that BLM be notified when construction begins. To help ensure that all parties understand the requirements for construction, the operator must ensure that all employees and subcontractors are adequately aware of the COAs. Examples of such notification requirements are shown below:

The operator or his contractor will contact the approving office 48 hours before beginning any work on public land.

The operator will give the dirt contractor a copy of the Surface Use Plan and any additional BLM COAs before any work begins. A copy of the approved Surface Use Plan will be available onsite for inspection during construction.

The operator or his contractor will contact the approving office 48 hours before starting reclamation work and within 48 hours of completion of reclamation work.

Proper precautions shall be taken at all times to prevent or suppress fires. Range or forest fires will be reported to the BLM district or resource area office. All other fires or explosions that cause damage to property, equipment, loss of oil or gas, or result in injuries to personnel will be reported to the Authorized Officer.

B. Other Agency Approvals

Some operations on public lands affect adjoining private lands and require approval by state, local, or other Federal agencies. It is solely the responsibility of the operator to be aware of these requirements and gain the necessary approvals. Upon notification by another agency of operators' failure to obtain necessary permitting, a notice of noncompliance will be issued and operations may be suspended. In a few cases, BLM wants to make it clear that "BLM approved" operations may not proceed until such approval is granted. In those cases, a COA is appended to the approved application such as: Use of water for operations will be approved by obtaining a temporary use permit from the Colorado State Water Resources Engineer and by receiving permission from the landowner or surface managing agency to use the land containing the water source.

C. Cultural Resources

The Programmatic Agreement between BLM, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation, signed February 6, 1987, contains guidance for oil and gas, seismic, and other land use operations. Appendix B of the agreement specifically outlines BLM procedures for both oil and gas APDs and for seismic operations. In addition, guidance is provided in: *Handbook for Cultural Resources Inventory/Mitigation* (Colorado State Office Release 8-13), dated 1990.

In addition to the above guidance, the operator shall immediately bring to the attention of the Authorized Officer any and all antiquities or other objects of historic, paleontological, or scientific interest, including, but not limited to, prehistoric or historic ruins or artifacts discovered as a result of operations. The operator and the Authorized Officer shall consult and determine the best option for avoiding or mitigating site damage.

Operators are also reminded that removal, injury, defacement, or alternation of any object of scenic, archaeological, historical, or scientific interest is a Federal crime and may be punishable by fine and/or jail terms.

D. Threatened, Endangered, and Sensitive Species

The lessee may be required to provide inventory information for certain species if it is determined that inadequate information is available to make appropriate decisions relating to mitigation. These species could involve threatened, endangered, sensitive and/or rare plant or animal species, or other species protected by law or of high interest, such as bighorn sheep lambing areas, elk calving areas, raptors, etc.

Apply "Suggested Practices for Raptor Protection on Powerlines" on all proposed transmission lines to be constructed to ensure they are properly grounded to prevent unnecessary electrocution of raptors.

Locations of all known populations of Colorado BLM sensitive plants and selected high priority remnant vegetation associations would be protected from human-induced surface disturbing activities to the extent such protection does not unduly hinder or preclude exercising valid existing rights. The area of protection will include the actual location of the populations or occurrences of important vegetation associated to receive protection, and shall be determined in consultation and coordination with the Colorado Natural Areas Program (CNAP).

Those populations/occurrences, upon which analysis determines protection to be necessary, shall be protected by: 1) requiring relocation or rerouting proposed well sites, pipelines, roads, other surface facilities, etc., or 2) applying other protective mitigation (i.e., fencing). BLM will effectively mitigate potential impacts to important populations/occurrences to the degree that existing development rights are not unduly hindered or precluded.

E. Resources (other than oil and gas)

Surface-disturbing activities within or adjacent to intermittent or perennial water sources, associated floodplains, and riparian areas will only be allowed where mitigative measures can be employed to protect floodplains, water quality, and riparian values.

Well pads, roads, and facilities will be constructed and maintained to avoid unnecessary impacts to air quality.

Raptor and sandhill crane nests will be protected from human-induced surface-disturbing activities to the extent such protection does not unduly hinder or preclude exercising valid existing rights.

All trees requiring removal shall be disposed of by the operator. Where earth blading is required, stumps shall be removed and scattered or buried in an area designated by the Authorized Officer. Where earth blading is not required, stump height shall not exceed 12 inches. A wood permit from BLM for the wood removed (for the appraised value) will be required prior to any clearing.

Water wells drilled to provide water for drilling purposes will be approved by, and offered to, BLM for use prior to plugging the water well. Water rights will be held by BLM. BLM will be notified of any water aquifers encountered during drilling that could be developed for water prior to final plugging of the well.

All operations will be conducted so as not to cause pollution or change the character of streams, lakes, ponds, water holes, seeps, or marshes. This relates directly to damages caused to fish and wildlife resources. Surface disturbance that causes active soil movement will be corrected.

F. Construction

Linear-type facilities such as roads, powerlines, and pipelines shall cohabit and follow a common route unless otherwise approved by the Authorized Officer. Surface disturbance will be minimized.

Well pads, roads, and facilities will be located to minimize visual impacts.

To protect watersheds from accelerated erosion, increased slumping, and increased sediment and salinity loading, all development activities may be curtailed at the discretion of the Authorized Officer during periods when the soil is saturated.

Trash and garbage must be contained in an closed receptacle or in an earthen pit. If an earthen pit is used, it must be covered to prevent contents from escaping. Burning and/or burying is not authorized. Contents from a trash receptacle or pit must be hauled to an approved county landfill. This pertains to all phases of lease operations.

Surface disturbance and vehicular travel will be limited to the approved location and approved access route. Any additional area needed must be approved in advance.

Above-ground facilities will be painted to blend with the surrounding environment using a specified color from the Rocky Mountain Regional Committee Standard Environmental Color chart.

Roads (on lease)

Existing roads should be used to the extent possible. Additional roads, if needed, shall be kept to an absolute minimum and location of routes must be approved by BLM prior to construction. On determination of an impending field development, a transportation plan will be requested to reduce unnecessary access roads. Roads will be constructed and maintained to BLM road standards (BLM Manual Section 9113) unless otherwise authorized by the Authorized Officer.

Companies controlling roads that provide access into critical wildlife areas may be required to close the road with a lockable gate to prevent general use road during critical periods of the year when resource problems are experienced (during hunting seasons, winter, etc.). This restrictive measure will be applied where needed to protect wildlife resources or to minimize environmental degradation.

Use of closed road segments will be restricted to legitimate, authorized agents of: 1) the lessee and/or their subcontractor(s), 2) BLM, 3) other agencies with a legitimate need (CDOW, other law enforcement agencies, etc.). Unauthorized use or failure to lock gates during specified time frames by the lessee or its subcontractors would be considered a violation of the terms of the APD or associated grants. This will apply to BLM roads and other roads on public lands.

Improvement or upgrading of existing roads and trails shall conform to the same requirements as the approval APD.

The operator shall regularly maintain all roads used for access to the lease operation. This shall include installation of additional surfacing and surface drainage control structures needed, which was not foreseen during construction.

At cessation of operations, the Authorized Officer will decide which roads will be closed and rehabilitated and which will remain open for public use.

Any access routes previously available to the public will not be unnecessarily blocked off from public use.

Cattle guards heavy enough to handle proposed road traffic will be installed whenever access roads are through pasture gates or fences. These cattle guards shall be maintained on a regular basis to ensure their effectiveness at turning livestock. This includes cleaning out under cattle guard bases when needed.

Improvement to existing access routes, when necessary, will be limited to a 14-foot wide or existing width crowned and ditched road surface with turnouts as needed and minimum disturbance of surrounding soil and vegetation (abrupt back-sloped borrow ditch). New construction will be limited to the same specifications as above. Cleared trees and brush along the road right-of-way will be windrowed to the side in convenient clearings. Surfacing material will not be placed on the access road or location without prior BLM approval.

The operator will be required to construct waterbars on abandoned roads and pipeline routes. General guidelines for installation of waterbars are: less than 2-percent grade - 200-foot spacing; 4- to 5-percent grade - 75-foot spacing; greater than 5-percent grade - 50-foot spacing. Unstable soils may require closer spacing, whereas the spacing may be greater on stable soils and rock outcroppings. Waterbars shall be constructed to drain freely to the natural ground level and to prevent siltation and clogging.

New roads constructed for oil and gas purposes within critcal big game winter range and isolated and/or roadless areas will be reclaimed upon completion of the oil and gas operation.

Pads

Selecting Locations for Well Sites, etc.: In planning well sites, tank batteries, sump, reserve and mud pits, and pumping stations, the operator shall select locations that involve the least disruption to scenic values and other surface resources. The operator shall employ construction techniques and design practices, including selection of material, camouflage techniques, and rehabilitation practices that will preserve scenic aesthetic qualities. The following guidelines can be used by operators to assist in minimizing surface disturbance and to aid in the maintenance of the best possible conditions for rehabilitation.

Steep slopes shall be avoided, the site shall be located on the most level location obtainable that will accommodate the intended use.

View the site location as to how it will affect road location. What may be gained on a good location may be lost from an adverse access route. Adjust the site layout to conform to the best topographic situation. Deep vertical cuts and steep long fill slopes should be avoided. All cut and fill slopes should be constructed to the least percent slope practical.

The top 12 inches or available soil material will be removed from the location and stockpiled separately from the trees on the location. Topsoil along the access will be reserved in place.

Pits (all)

Excavations used for the permanent impoundment of usable water should be sloped at a 3:1 grade to establish safe access for humans, livestock, and wildlife.

A minimum of 2 feet of free board will be maintained between the maximum fluid level and the top of the berm. These pits will be designed to exclude all surface runoff. Pits will have the maximum volume in cut.

Prior to closure, a randomly selected sample of drilling pits within established fields will be sampled for hazardous materials; i.e., Target Compound List for semivolatiles, volatiles, metals. In wildcat wells, all pits will be sampled for hazardous materials prior to abandonment, unless specifically exempted by the Authorized Officer. Sampling will be done by an independent contractor agreeable to the operator and Authorized Officer. Testing will be done at a lab with quality control standards acceptable to the EPA Contract Laboratory Program (CLP).

Final written certification is required that only RCRA exempted materials are present within mud pits. If the operator cannot provide certification, the pit(s) in question will be sampled for hazardous materials prior to abandonment with appropriate dispostion of contents.

Reserve and other containment pits are used during the exploration and/or operation of the lease may require fences and/or other devices to exclude migratory birds, livestock, and/or wildlife. The need and type of protective requirement will be determined on a case-by-case basis.

All pits, cellars, rat holes, and other bore holes unnecessary for further lease operations, excluding the reserve pit, will be back-filled immediately after the drilling rig is released to conform with surrounding terrain. Pits, cellars and/or bore holes that remain on location must be fenced as specified for the reserve pit.

Reserve pit fluids will be allowed to evaporate through the entire summer season (June through August) after drilling is completed, unless an alternate method of disposal is approved. After fluids disappear, the reserve pit muds will be allowed to dry sufficiently to allow back-filling. Back-filling of the reserve pit will be done so muds and associated solids will be confined to the pit and not squeezed out and incorporated in the surface materials. When the work is complete, the pit area will support the weight of heavy equipment without sinking.

Semi-closed or closed mud systems may be required where conditions warrant. Produced water will be injected, contained in a lined pit, or hauled to a Federally approved disposal facility.

Installed pit liners must be impermeable and must be resistant to weather, sunlight, hydrocarbons, aqueous acids, alkalies, salt, fungi, or other substances likely to be contained in the drilling fluids or produced water.

The reserve pit liner will be of sufficient strength and construction to ensure impermeability. The liner will be underlain by a suitable bedding material and other measures taken as needed to protect the integrity of the liner.

A leak detection system will be installed to monitor lined reserve pits. This system must be installed in order to detect liner leakage. Leak detection plan must be submitted to and approved by the Authorized Officer during APD approval. This plan must include the system design including line installation, monitoring plan, and the individual responsible for the required monitoring.

For lined pits, the liner and contents will be buried in place and effectively capped with clay or other impermeable materials, or disposed of in a nonpolluting method acceptable to the Authorized Officer.

If air or gas drilling, the operator shall control the blooie line discharge dust by use of water injection or any other acceptable method. The blooie line discharge shall be a minimum of 100 feet from the blow out preventer and be directed into the blooie pit so the cuttings and waste are contained in the pit.

Pipelines

Alignment, siting, and reclamation of pipelines and flow-lines should be designed to conform to adjacent terrain and to prevent or minimize vehicular travel. If maintenance is

necessary in problem areas, consider use of an all-terrain vehicle (ATV) or snowcat, etc., in lieu of regular truck. Surface disturbance for pipeline construction would be restricted to the minimum amount necessary, as determined by the Authorized Officer.

Relocation of portions of the line may be necessary to reduce the impact to surface resources.

For associated pipeline rights-of-way, except those expressly authorizing a road after construction of the facility is complete, the right-of-way holder shall not use the right-of-way as a road for purpose other than routine maintenance. Necessary routine maintenance will be determined through consultation with the Authorized Officer.

Existing telephone, telegraph, powerlines, pipelines, roads, trails, fences, ditches, and like improvements shall be protected during construction, operation, maintenance, and termination of an oil and gas facility. Damage caused by such activities shall be properly repaired to a condition satisfactory to the Authorized Officer or the facility owner/operator.

Pipeline routes will be graded to conform to the adjacent terrain, waterbarred, and reseeded. When clearing is necessary, the width disturbed will be kept to a minimum. Bladed materials shall be placed back into the cleared route upon completion of construction.

Pipeline construction shall not block, dam, nor change the natural course of any drainage. Suspended pipelines will provide adequate clearance for runoff.

Pipeline trenches shall be compacted during back-filling. These trenches will be maintained in order to correct settlement and prevent erosion. Waterbars and other erosion control devices will be repaired as necessary.

Pumping stations shall be kept in a neat and well-maintained condition.

Reclamation and abandonment of pipelines and flow-lines may involve replacing fill in the original cuts, reducing and grading cut and fill slopes to conform to the adjacent terrain, replacement of surface soil material, waterbarring, and revegetating in accordance with rehabilitation practices.

Crossing over pipelines owned by other companies shall be accomplished in accordance with an agreement secured with that company.

G. Drilling

Water for drilling purposes will not be obtained from Federally owned or controlled water sources such as reservoirs and springs unless specified permission is obtained from the Area Manager.

BLM will be notified of any water aquifers encountered during drilling that could be developed for water prior to final plugging of the dry hole. Water rights will be held by BLM.

H. Production

Compaction and construction of berms surrounding tank batteries will be constructed prior to storage of fluids and designed to prevent lateral movement of fluids through the utilized materials. Berms must be constructed to contain at minimum 120 percent of the storage capacity of the largest tank within the berm. All loading lines will be placed inside the berm.

Surface buildings, supporting facilities, and other structures, not required for present or future operations, shall be removed upon termination of use.

All improvements, including fences, gates, cattle guards, roads, trails, pipelines, bridges, water developments, and control structures will be maintained in a serviceable and safe condition.

Any release of production water on or across the land will need prior approval by BLM.

Mud, separation pits, and other containments used during the exploration or operation of the lease for storage of oil and other hazardous materials shall be adequately fenced, posted, or covered. Additional protective measures may be needed to minimize hazards and prevent access to humans, livestock, waterfowl, and other wildlife. Pits should be allowed to dry before back-filling and rehabilitation.

All production and storage facilities must have adequate protection from spills. The *Spill Prevention Control and Countermeasure Plan* required by the Environmental Protection Agency must be available for inspection at all appropriate field offices. All spills must be reported to the Authorized Officer.

The reserve pit and that portion of the location and access road not needed for production or production facilities will be reclaimed as described in the reclamation section. Enough topsoil will be kept to reclaim the remainder of the location at a future date. This remaining stockpile of topsoil will be seeded in place using the prescribed seed mixture.

A gate may be required to limit public access during the wildlife winter use periods (December 15 through March 31) when the operator maintains a road open for winter use.

If the well is located within 2,500 feet (one-half mile) of residences, appropriate noise mitigation (i.e., hospital muffler, vegetation screening, electric motors, etc.) will be employed to ensure adherence to Federal, state, and local noise standards during operation of the well.

Within 60 days of completion of construction, the holder shall provide the Authorized Officer an as-built survey of facilities as constructed.

I. Reclamation

All disturbed areas not needed for lease operations will be revegetated as soon as possible. The operator will re-establish perennial vegetation compatible to surrounding undisturbed vegetation. The plant species to be seeded and the seeding rate will be approved by the Authorized Officer prior to seeding. Successful revegetation will be considered completed when the percent canopy cover is equal to surrounding undisturbed vegetation. The species considered in measuring percent cover will be those seeded as well as desirable pre-existing species. Undesirable weedy species such as kuchia, cheatgrass, and other noxious weeds will not be included unless otherwise directed by the Authorized Officer. The operator will continue revegetation efforts using any and all cultural methods available until this standard is met.

Noxious weeds introduced because of soil disturbance and reclamation will be treated by methods approved by the Authorized Officer. These methods may include biological, mechanical, or chemical. Should chemical methods be approved, the lessee must submit a Pesticide Use Proposal to the Authorized Officer 60 days prior to the planned application date.

In the event a producing well is developed, the unused disturbed areas surrounding the well location will be recontoured to appropriate confirmation (one which allows lease operations and avoids steep cut and fill slopes) as soon as possible. Some or all of the stockpiled topsoil will be evenly distributed over these recontoured areas. Brush cleared prior to construction of the well site shall be scattered back over the recontoured area.

Mulching of the seedbed following seeding may be required under certain conditions (i.e., expected severe erosion), as determined by the surface owner/manager.

Surface topsoil-like material, if available, will be stripped from all areas where surface disturbance is necessary and stockpiled in a manner and location that will allow easy replacement. These stockpiles shall be protected from loss. After reshaping the site, soil material should be distributed to a uniform depth that will allow the establishment of desirable vegetation. Disturbed areas shall be scarified prior to replacement of surface soil material.

All disturbed areas will be recontoured to blend as nearly as possible with the natural topography. This includes removing all berms and refilling all cuts. All compacted portions of the pad will be ripped to a depth of 12 inches unless in solid rock.

After revegetation is complete, stockpiled trees will be scattered evenly over the disturbed areas. Access will be blocked to prevent vehicular access.

Seed certification tags will be submitted to the Authorized Officer for seed used in reclamation.

Prior to abandonment of acilities authorized by this grant, the holder shall contact the Authorized Officer to arrange a joint inspection of the right-of-way. The inspection will be held to agree on an acceptable abandonment and rehabilitation plan. The Authorized Officer must approve the plan in writing prior to the holder commencing any abandonment and/or rehabilitation activities. The plan may include removal of surfacing material from the road, recontouring, replacement of topsoil, seeding, mulching, etc.

Cut and fill slopes shall be reduced and graded to conform the site to the adjacent terrain. Disturbed sites will be prepared to provide a seedbed for re-establishment of desirable vegetation and reshaped to blend with the natural contour. Such practices may include contouring, terracing, gouging, scarifying, mulching, fertilizing, seeding, and planting.

J. Miscellaneous

On determination by the Authorized Officer of an impending field development, a transportation plan will be required to reduce unnecessary access roads.

Additional site surveys, grading plans, and engineering designs may be required in VRM Class II areas.

Should additional site-specific environmental analyses at the time of exploration or development reveal the need for additional restrictions or the continuance of existing lease stipulations, these restrictions will become part of the development or operational plan.

All survey monuments, witness corners, reference monuments, and bearing trees shall be protected against destruction, obliteration, or damage. Any markers so affected must be re-established at the lessee's expense in accordance with accepted BLM survey practices defined in the *Manual of Surveying Instructions for the Survey of the Public Lands of the United States.*

Burning solid or liquid wastes usually requires a burning permit. The permit must be obtained from the state air quality agency.

POTENTIAL FOR OCCURRENCE AND DEVELOPMENT OF OIL AND GAS RESOURCES IN THE ROYAL GORGE PLANNING AREA

The Royal Gorge Planning Area (RGPA) is situated within portions of the Anadarko Basin, Las Animas Arch, Denver Basin, Raton Basin, Park Basin, and Uinta-Piceance-Eagle Basins, USGS petroleum provinces as used by Dalton (1981). Hydrocarbon occurrences in these provinces reflect a widely diverse set of petroleum sources, reservoirs, resource potential, and trapping mechanisms, which are discussed by province as follows.

Oil and Gas Potential

Criteria for rating oil and gas potential within the RGPA are described in Attachment 1 and are the basis for the rating described within each province. Areas identified by the U.S. Geological Survey (USGS) as a play have a high potential. All remaining prospectively valuable (PV) lands as based on criteria described in Attachment 2 are rated as moderate or low. Areas not designated as PV are rated as having no potential unless otherwise noted.

Anadarko Basin Province: This is a large northwest trending basin, which includes parts of Colorado, Kansas, Oklahoma, and Texas. The Hugoton Embayment is the northwest, shelf-like extension of the Anadarko Basin and encompasses part of Prowers and Baca Counties in southeastern Colorado. It is limited on the west by the Las Animas Arch.

Basin sediments, ranging from the Pliocene-Miocene to Cambrian in age, are as much as 7,000 feet thick in southeastern Colorado, and thin out to the north and to the west. The dominant lithology of the producing formations are shown in Table G-1. Carbonates, mudstones, shales, and sandstone represent both near shore and offshore marine deposits, and continental deposits.

The majority of the fields are stratigraphic traps; however, a few have traps resulting from a combination of stratigraphy and structure. Table G-1 lists the oil and gas fields and production zones in Baca and Prowers Counties.

Las Animas Arch Province: That part of this province within the RGPA includes Otero, Bent, and Kiowa Counties. The arch itself is a long anticlinal structure trending north-northeast across Bent, Kiowa, Cheyenne, and Kit Carson Counties. It is a broad, gently dipping uplift separating the Denver Basin from the Hugoton Embayment. Structural features and extensive nonconformities indicate deformation occurred principally during late Mississippian-Pennsylvanian time, and late Cretaceous-early Tertiary time.

The stratigraphy is similar to that of southeastern Colorado. Carbonates and siliciclastic rocks represent near shore and offshore marine and continental deposits. Carbonaceous beds present in many formations in the area are probably the source rocks for oil and gas. Volk (1971) and MacMillan (1980) indicate that Mississippian age formations contain source rocks. MacMillan (1980) and geochemical data from drill cores and outcrops (Merewether, 1987) indicate that Pennsylvanian age rocks also have oil and gas source beds. Additionally, source rocks have been identified in two Cretaceous formations, and are probably present in others.

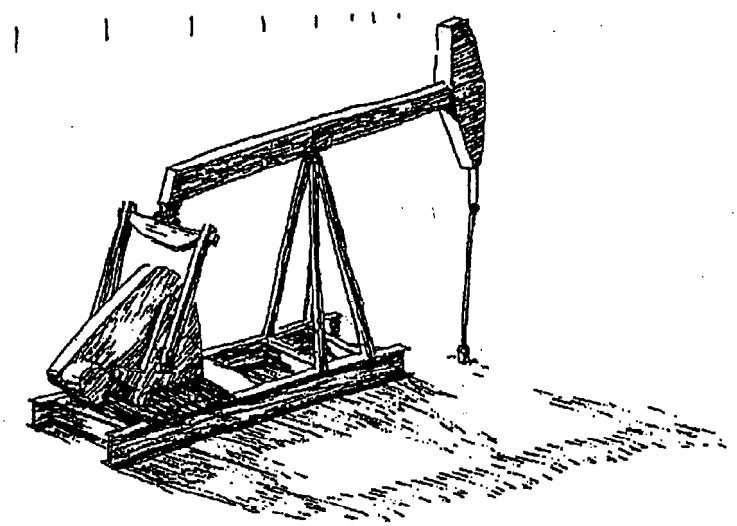


TABLE G-1
Oil and Gas Fields and Production Zones in Baca and Prowers Counties

System	Series	Producing Formation	Oil and Gas Fields	Dominant Lithology	Thickness (Feet)
Cretacous	Lower	Dakota S.S. (J sand)	Prairie Dog, Signal Hill	Sandstone, Mudstone	0-350
Permian	Leonardian	Red Cave	Greenwood, Verde	Sandstone, Carbonates, Evaporitic Rocks	0-250
Pennsylvania	Virgilian (Hermosa)	Wabunsee	Brun, Flank, Walsh	Carbonate Rocks, Shale, Sandstone, and Conglomerate	1400-3000
		Snawnee (Topeka Ls)	Flank, Greenwood, Midway, Playa, Prairie Dog Stonington, Vilas, Walsh, Windmill		
	Missourian	Lansing	Campo, Fortuna, Greenwood, Midway, Rooster		
	Demoinesian	Marmaton	Buffalo Creek, Clyde, Lamar, Prairie Dog, Sand Creek		
		Cherokee	Flank, Clay Creek		
	Atokan	Atoka	Flank, Verde		
	Morrowan	Morrow (McClave)	Flank, Greenwood, Midway, Barrel Springs, Barrel Springs North, Berry PatchBeta, Channing Clyde, Clyde North, McClave, Sand Creek, Table Top		
		Keyes	Clyde, Verde		
Mississippian	Osagean	Osage	Comanche	Carbonate Rocks and Mudstone	0-600
	Not specified	Not specified	Clay Creek, Comanche		

Oil and gas production comes primarily from the Pennsylvanian Formations, followed closely by formations of Mississippian age. Table G-2 lists the oil and gas fields and production zones for Bent and Kiowa Counties. Otero County has presently no producing wells, but has 41 drilled and abandoned wells and 3 service wells. Most of the fields in the Pennsylvanian series are stratigraphically entrapped, with only a small number having structural control as the principle trapping mechanism. Mississippian fields, however, are in general structurally controlled with local reductions in porosity contributing to the lateral extent of the fields.

TABLE G-2
Oil and Gas Fields and Production Zones in Bent and Kiowa Counties

System	Series	Producing Formation	Oil and Gas Fields	Dominant Lithology	Thickness (Feet)
Pennsylvanian	Missourian	Lansing	Brandon, Buscadero, Calvary, Cowboy, Mallard, Rita, Trooper	Carbonate Rocks Shale, Sandstone, and Conglomerate	1200-2500
		Kansas City	Buscardo, Rita, Sentinel		
	Desmoinesian	Marmaton	Astraunot, Black Kettle, Left Hand, Little Dude, McClave, Mockingbird, Sentinel, Sheridan Lake		
		Cherokee	Bent's Fort, Caddoa		
	Atokan	Atoka	High Rock, Lubers, McClave Purgatoire, Sniff Ranch		
	Morrowan	Morrow (McClave)	Bent's Fort, Beta, Brandon Buscadero, Calvary, Chivington, Colt, Cowboy, Harness, Haswell, Indio, Left Hand, Lubers, McClave, NeeNoshe, North Buffalo, Salt Lake, Table Top, Tropper, Wagon Trail		
		Keyes	Black Kettle, Indian, Left Hand, Sentinel		
Mississipian	Meramecian	St Louis	Calvary, Rose Ranch	Carbonate Rocks and Mudstone	0-600
		Spergen	Calvary, Quiver, Tonto		
	Not Specified	Not Specified	American, Brandon, Buscadero, Calvary, Lingo, Quiver, Rose Ranch, Tonto, Wild Sage Brush		

The USGS has defined three principle plays within the Las Animas Arch, which are: a Mississippian structural play in shelf carbonates, an early Pennsylvanian stratigraphic play in fluvial sandstones, and a Middle to Late Pennsylvanian stratigraphic play in siliciclastic and carbonate rocks. Play areas have been assigned a high potential with remaining portions of the province having a moderate potential.

Raton Basin-Sierra Grande Uplift Province: The Raton Basin is partly in New Mexico and partly in Colorado. The La Veta syncline is primarily in the Colorado portion of the basin and contains the thickest accumulation of sediments in the entire basin (15,000 to 20,000 feet). This broad, asymmetrical syncline trends northwesterly, and has a steeply dipping (sometimes overturned) west flank and a gentle dipping (generally less than 1 degree) east flank. Its axis is interrupted by the Spanish Peaks intrusion in the vicinity of the Huerfano-Las Animas County line. The northeast trending Delcarbon syncline splits off the La Veta syncline north of the Spanish Peaks. On the east, the Raton Basin is limited by the Sierra Grande Uplift. This northeast to east trending uplift separates Raton Basin from the Hugoton Embayment. On the west, the Raton Basin is limited by the Sangre de Cristo Uplift, and on the north side it is limited by the Apishapa Uplift. Structural deformation occurred during the Pennyslvanian and again during Cretaceous-Tertiary time.

In the basin, the oldest strata overlying the Precambrian rocks are believed to be Devonian (Merewether, 1987). Sediments consist of siliciclastic and carbonate rocks, which represent marine and nonmarine depositions during Paleozoic, Mesozoic, and Cenozoic time. Source rocks for oil and gas have been identified in Paleocene and Cretaceous formations, and are also believed to exist in Permian and Pennsylvanian formations. Cretaceous coal beds in the Raton and Vermejo Formations are a source of methane gas. The Department of Energy "Methane Recovery from Coalbeds Projects" estimated the basin coal beds contain at least 8 Tcf. and possibly as much as 18.4 Tcf. of gas (Murchison, 1988).

Current production within Huerfano County is from Gardner, Sheep Mountain/Dike Mountain, and Three Bridges fields. The Sheep Mountain/Dike Mountain area has 23 wells which produce CO_2 gas from Dakota and Entrada sandstones and represents the largest field in the basin. Production zones from other fields include Codell, Raton, Vermejo, and Trinidad formations. Table G-3 shows oil and gas fields and production zones in Huerfano and Las Animas Counties.

TABLE G-3
Oil and Gas Fields and Production Zones in Huerfano and Las Animas Counties

System	Series	Producing Formation	Oil and Gas Fields	Dominant Lithology	Thickness (Feet)
Cretaceous	Upper	Raton	Three Bridges		0-2075
		Trinidad	Three Bridges	Sandstone	0-255
		Pierre	Garcia	Shale, Sandy Shale	21300-2900
		Apishapa	Garcia	Shale	
		Codell	Gardner	Sandstone, Shale	0-30
	Lower	Dakota - Purgatoire	Sheep Mountain, Dike Mountain	Sandstone	240-350
Jurassic		Entrada	Sheep Mountain, Dike Mountain	Sandstone	40-100
Triasssic		Windgate	Model	Sandstone	
Permian	?	?	Nina View	?	?

The USGS has defined two principle plays in the Raton Basin based on the arcal extent, in the subsurface, of the combined Purgatoire and Dakota formations and the combined Trinidad, Vermejo, and Raton formations. Both of these units consist mainly of siliciclastic rock, which were deposited in marine and continental environments. A detailed description of these plays are in Merewether (1987). In addition to these plays, an unconventional development of methane from coal beds within the Raton and Vermejo formations has been identified within the basin. The USGS plays, in addition to the coal bed methane play, have a high potential for oil and gas. Remaining areas within the province are rated as prospectively valuable with low to moderate potential.

Denver Basin Province: The southern part of the Denver Basin Province intrudes into the RGPA, and encompasses Pueblo, Crowley, Fremont, Teller, and El Paso Counties (see Figure 1). This oil and gas province includes the large Denver-Cheyenne Basin, and the smaller Florence Basin. The Denver-Cheyenne Basin, which covers parts of Wyoming, Nebraska, Kansas, and Colorado, is a doubly plunging asymmetrical syncline with its long axis oriented in a north-south direction. The beds dip steeply to the east on the west flank, however, on the east flank they dip very gently (one-half to 3 degrees) to the west. The basin has two prominent structural lows, one near Denver and one near Cheyenne, where as much as 14,000 feet of basin-fill deposits are preserved. The deposits range from Cambrian to Holocene. Florence Basin is a very small, north-south basin, a few miles west of the Denver-Cheyenne Basin, in Fremont County. It is actually a graben between two horst blocks; the Wet Mountain horst block to the west, believed to be thrust over part of the graben, and the Brush Hollow horst block to the east. The dip of the graben is to the west.

This part of the Denver Basin Province has not had the high activity typical of this basin to the north. Only 109 wells have been drilled in El Paso County, 99 in Pueblo County, and 28 in Crowley County, which represents about one well per 25 square miles. For this reason, the eastern two thirds of this province (within the RGRP) has been designated as a moderate potential area.

On the western side, Florence Basin has been designated as a high potential area. Since 1862 about 1,500 wells have been drilled (as of 1987), with a cumulative production of 15,037,601 bbls. of oil. All of the production so far has been from the Pierre Shale, but deeper exploration efforts could very well discover other production zones. On the western side of the Florence Basin, the Wet Mountains are overthrust on part of the basin; therefore, a band of moderate potential grading to low potential surrounds the Florence Basin.

The rest of the western part of the Denver Basin Province (all of Teller County, the extreme western end of El Paso County, and most of Fremont County) is underlain by Precambrian rocks and has been designated as a nominal potential area. There is evidence that the mountain front in El Paso County is thrust over younger Paleozoic to Cretaceous formations, and this overthrust zone is considered to have moderate potential for oil and gas. The western fifth of Fremont County has sedimentary rocks that have been designated as a low potential area.

Park Basin Province: This province consists of three topographic and structural intermontane basins (North, Middle, and South Parks) between the Front Range to the east and the Park-Mosquito Ranges on the west. Only South Park is within the RGPA and incorporates all of Park

County. This basin is characterized as being an asymmetric faulted syncline or complex half-graben with its long axis oriented north-south along the east side of the basin, where very thick strata of Cretaceous-Tertiary and Permo-Pennsylvanian sediments have been deposited. The eastern side of the basin is bound by a major thrust fault, the Elkhorn, which displaced Precambrian rocks of the Front Range over Cretaceous and Tertiary sediments of the basin. Potential fields consist of Cretaceous formations present beneath these major over thrusts. The regional dip of the strata in the complex half-graben is generally to the east. There are very steep dips (25 to 90 degrees) both on the eastern and western side of the basin.

The stratigraphic column can be subdivided into four distinct structural evolution stages: older Paleozoics, Permo-Pennsylvanian, Mesozoics, and Tertiary. Rock sequences are thicker on the eastern side of the basin where all the oil and gas exploration has occurred.

Twenty-four wells have been drilled as of February 3, 1988, some with good oil shows in the Cretaceous strata, but so far no commercial discoveries have been made.

The eastern part of Park County is underlain by Precambrian rocks and has been designated as a nominal potential area. The central-eastern part of South Park Basin has been designated as a moderate potential area because though no commercial production exists yet, good oil shows have been encountered while drilling. The overthrust area is considered to have a moderate potential. The remaining part of South Park Basin has been designated as a low potential area because of limited exploration and thinner sedimentary strata.

Uinta-Piceance-Eagle Basins Province: Within the RGPA only Lake and Chaffee Counties are included in this province. All of Lake County and all but a small portion of eastern Chaffee County are underlain by Precambrian rocks. No oil and gas test drilling has been conducted in either Lake or Chaffee Counties as of February 3, 1988. Very little potential exists for any exploration in these counties, and no plays have been identified or are anticipated.

Oil and Gas Activity

Historical Background: Since the drilling of the first well in Colorado near Cañon City in 1860, over 4,800 wells have been drilled within the 6 provinces within the RGPA, excluding approximately 800 to 1,000 dry holes completed in the Florence-Cañon City Field for which no records are available. The Florence Field was discovered in 1876 with the completion of an 1,187-foot well in the fractured pine shale. Since this discovery, a total of 76 fields have been established in the RGPA. Cumulative production (as of October 1988) was 32,102,154 barrels of oil (2.1 percent of the state total) and 520,317,961 Mcf of gas (7.6 percent of the state total).

Table G-4 is a summary of drilling activity broken out by petroleum province, mineral ownership, and well type. Approximately 4 percent or 187 wells were drilled on Federal lands with a success rate of 43 percent. Anadarko and Las Animas Arch provinces have been the most active, with about 89 percent of the wells that have been drilled. (Table G-5)

Present Activity: Oil and gas activity in southeastern Colorado has been on a down turn since 1984, which is due in part to market conditions resulting from the collapse of oil prices. Tax incentives, however, for the development of coal-bed methane (CBM) in the Raton Basin and the exploration and development of Pennsylvanian Morrow sandstone in the Las Animas Arch area have resulted in a sustained level of activity in these provinces.

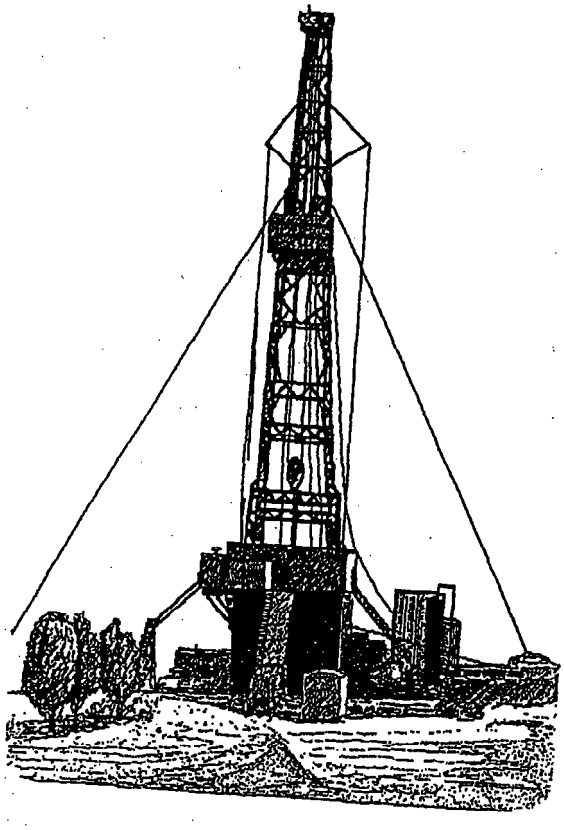


TABLE G-4
Drilling Statistics Royal Gorge Resource Area

Petroleum Province	Wildcat D&A	PWR	Total	% Sucess Rate	D&A	Wells Drilled[1/] Development Pwr Total	% Sucess Rate	Total D&A	Sucess Pwr	Federal[2/] Total	% Rate	D&A	Pwr	Total
Anadarko Basin	1,088	193	1,281	15	695	1,347	2,042	66	1,783	1,540	3,323	46	18	31	49
Las Animas Arch	363	58	42	14	154	211	365	58	517	269	786	34	21	17	38
Denver Basin	159	0	159	0	82	47	129	36	241	47	288	16	2	0	2
Raton Basin	95	44	139	32	9	1	10	10	104	45	149	30	14	0	14
CO_2	0	1	1	100	2	42	44	95	2	43	45	96	0	33	33
SUB TOTAL											194			47	
Park Basin	17	0	17	0	0	0	0	NA	17	0	17	0	4	0	4
Eagle Basin	0	0	0	NA	0	0	0	NA0	0	0	0	NA	0	0	0
TOTAL	1,722	296	2,018	15	942	1,648	2,590	64	2,664	1,944	4,802	40	59	81	187

[1/]Hotline Well History Database (through 12/31/88)
[2/]AIRS and MRO Database

TABLE G-5
Oil and Gas Activity 1986 Through 1988[1/]

Petroleum Province	CY 1986 Dry	CY 1986 New Pwr	CY 1986 Ex-Pwr	CY 1987 Dry	CY 1987 New Pwr	CY 1987 Ex-Pwr	CY 1988 Dry	CY 1988 New Pwr	CY 1988 Ex-Pwr	Total Well Status 12/31/88 Dry	Pwr	New Pwr	Ex-Slw	Pwr	Ex-Pwr	Total
Andarko Basin	14	6	1	5	3	31	10	2	13	29	11	45	36	187	98	321
Las Animas Arch	7	6	3	8	4	8	7	5	15	22	15	26	65	115	85	265
Denver Basin	14	6	6	2	7	5	0	3	3	16	16	14	11	43	2	56
Raton Basin	2	1	0	2	1	1	1	8	4	5	10	5	3	32	3	38
Park Basin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eagle Basin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	37	19	10	17	15	45	18	18	35	72	52	90	115	377	188	680

NOTE: There is a difference in number of P&A'd wells reported by the state on different reports.
[1/]1988 Oil and Gas Statistic, COGCC

Reasonable Foreseeable Development Activity (RFD): Historical trends, USGS estimates, mineral ownership patterns, and professional judgment were incorporated in formulating the RFD.

Field size varies greatly within the resource area (Table G-6). Fields that include Federal minerals have an average of one to two wells on BLM-administered lands, excluding the Sheep Mountain CO_2 Unit.

It is expected that exploration and development activity will continue at about the same pace for Anadarko Basin and Las Animas Arch provinces within high potential areas. An increased demand for CO_2 for enhanced oil recovery (EOR) projects should be expected if incentives for EOR are legislated by Congress.

Forecasting Activity Based on Historical Trends: There has been a great deal of speculation as to what the future holds for the oil and gas industry. One scenario expects domestic exploration and development to increase gradually from present levels; however, others predict another boom cycle similar to that triggered by the embargo of 1973.

Trend analysis and statistical forecasting based on historical activity indicates that 2,902 wells are expected to be drilled within the planning area, exclusive of CBM activity. Of those, 83 (approximately 3 percent) are expected to be drilled on Federal lands. Table G-7 is a forecast matrix for each petroleum province. A major assumption is that approximately 90 percent of the wells drilled on Federal lands will be within the high potential or play areas as defined by the USGS for Anadarko Basin, Las Animas Arch, and Raton Basin. The remaining 10 percent will be within

TABLE G-6
Field Size

Petroleum Province	Oil Wells	Acres	Gas Wells	Acres
Anadarko Basin	1-31	40-1,240	1-63	160-10,080
Las Animas Arch	1-45	40-1,800	1-25	160-4,000
Denver Basin	43	17,200	NA	NA
Raton Basin	1	40	3-30	480-4,800
CO_2				
Park Basin	NA	NA	NA	NA
Eagle Basin	NA	NA	NA	NA

Coal deposits in the Raton Basin have attracted interest from several operators, because of the unconventional fuels tax credit and low cost of drilling shallow wells (Johnson, 1990). The highest CBM potential area in the basin includes about nine townships (Tps. 32 through 35S., Rs. 65 through 67 W.) in and adjacent to the Purgatoire River valley, about 15 miles west of Trinidad.

Fifty-five CBM wells were permitted during 1989 in Raton Basin. Of these, 16 were completed for production and remain shut-ins and 2 completed as dry holes, 11 wells have been drilled, but have not had completion reports filed, and 26 permits are still active (Dwight's *HOTLINE Weekly Drilling Report*, 12/28/89).

moderate potential areas, and one well is projected for South Park Basin.

Coal bed methane activity is expected to be concentrated within that portion of Raton Basin defined by Tremain (1984) as having high total gas content (greater than 400 cubic feet/ton). Within this area, there are approximately 10,000 acres of Federal oil and gas mineral estate. This acreage, based on 160-acre spacing for CBM wells, translates to about 60 wells that would either involve Federal minerals for well locations or within spacing units. An additional 20 wells are forecast for CBM on Federal lands within the moderate CBM potential area. Our dependency on fossil fuels is self-evident.

TABLE G-7
20-Year Oil and Gas Activity Forecast (Wells)

Petroleum Province	Percent Fed.	Forecast Total	Fed.	Potential Areas High	Mod.	Low
Anadarko Basin	1.5	1,995	29	26	3	0
Las Animas Arch	4.8	543	26	23	3	0
Denver Basin	0.7	258	2	2	1	0
Raton Basin	9.4	78	7	6	1	0
CO_2	73.3	24	18	16	2	0
CBM		NA	80	60	20	0
Park Basin	23.5	5	1	0	0	1
Eagle Basin	NA	0	0	0	0	0
TOTAL	3.0	2,902	163	133	29	1

ASSUMPTIONS FOR OIL AND GAS ACTIVITY ON LEASES WITHIN THE RGPA

Oil and gas operations consist of two levels of ground-disturbing activity: exploration and production. Activities in support of exploratory drilling are generally temporary in nature with drilling completed on an average, within 3 to 4 weeks. Exploratory wells are often referred to as "wildcat" wells. A wildcat well is a well drilled outside the boundaries of a proven oil or gas field. Completion on this type of well is the only positive method of establishing whether the area contains oil and gas resources. Based on historical activity in the RGPA, a wildcat well has about a 1 in 15 chance of discovering oil and gas resources sufficient to establish production. Projected surface disturbance that could result from this type of activity is as follows:

Exploratory Wells

A. 79 wells over a 20-year period (life of RGRMP)

B. Average well site is 250 ft. x 250 ft. = 1.43 acres.

C. Roads

1. Surface 16 to 18 feet wide

2. Length of road about .25 mile per well

3. Total disturbance by roads per well is .55 acre

D. Total surface disturbance per exploratory well is approximately 2 acres.

E. Total surface disturbance estimated over 20-year period is 158 acres.

Development wells would involve continued "in-field" drilling of existing fields and new fields discovered over the life of the plan. These types of drilling utilize the same type of operations as required for a wildcat well with the possible exception of the establishment of an all weather road following completion of operations for production.

Development wells

A. 91 wells over a 20-year period

B. Average well site is 250 ft. x 250 ft. = 1.43 acres

C. Roads:

1. Surface 18 to 20 feet wide with ditches, etc.; total surface width 40 feet.

2. Length of road about .25 mile.

3. Total area disturbed by roads per well is 1.2 acres.

D. Total surface disturbance per development well is 2.6 acres per well.

E. Total surface disturbance estimated over 20-year period is 237 acres.

Based on the RFD, total estimated surface disturbance from oil and gas operations over the 20-year life of the RGRMP is 395 acres. This disturbance equates to less than 0.02 percent of the mineral estate within the RGPA.

STANDARD LEASE TERMS AND CONDITIONS

The standard terms and conditions for oil and gas leasing are part of all Federal leases regardless of other considerations. These terms and conditions will automatically apply to all alternatives.

"Sec. 6. Conduct of Operations - Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee."

"Prior to disturbing the surface of the lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Area to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short-term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historical or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects."

The "lease rights granted," as used in this section have also been partially defined in the Code of Federal Regulations, part 3101.1-2, shown below.

A lessee shall have the right to use as much of the leased lands as is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold subject to: Stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the Authorized Officer to minimize adverse impacts to other resource values, land uses, or users not addressed in the lease stipulations at the time operations are proposed. To the extent consistent with lease rights granted, such reasonable measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. At a minimum, measures shall be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters; require that operations be sited off the leasehold; or prohibit new surface-disturbing operations for a period in excess of 60 days in any lease year.

The lease form is shown as Figure G-2.

LEASE STIPULATIONS

Introduction

Oil and gas leases are issued granting the lessee the right to extract the oil and gas resource. Section 6 of the lease restricts lease rights granted by requiring protection of other resources during development of the oil and gas. If it is necessary to restrict the rights more than in the standard lease contract, stipulations are appended to the lease. Additional restrictions needed to protect resources and values under this alternative are shown below, categorized by type of stipulation.

Stipulations are applied by legal description to oil and gas leases on the basis of standard quarter-quarter sections (40 acres) or lots. That is, any lease parcel containing at least a quarter-quarter section or lot needing mitigation will have the appropriate stipulation appended to the lease document. If the parcel of land needing mitigation is smaller than a quarter-quarter section or lot, no leasing stipulation is appended to the document since that small a parcel can be avoided by standard lease terms further defined in Code of Federal Regulations, Title 43, subpart 3101.1-2 . This means that sites requiring special protection, such as a 1-acre site, do not require leasing stipulations. If, however, the same 1-acre site must have protection for one-quarter mile radius around the site, a leasing situation providing that protection would be written for the entire surrounding 40-acre square (e.g., 1/4 1/4 section).

These stipulations are evaluated for use on all Federal mineral estate regardless of surface ownership, with the exception of the Federal mineral estate underlying surface administered by the U.S. Forest Service.

Rgulations covering modification and waiver of stipulations are in the *Code of Federal Regulations* (CFR), Title 43, Subpart 3101.1-4. Generally, a waiver, exception, or modification may be approved if the record shows that circumstances or relative resource values have changed or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts, and that less restrictive stipulations will protect the public interest. Waivers, exceptions, or modifications can only be granted by the Authorized Officer. If the proposed waiver, exception, or modification is inconsistent with the plan, the plan will be amended or the change to the stipulation will be disallowed. Even where no exception criterion is identified, exceptions are considered on a case-by-case basis. Definitions used by the BLM for waiver, exception, and modification are in the Glossary.

Exceptions to leasing stipulations will be granted by the Authorized Officer if the reason for the exception is consistent with that analysis. No public notice is required for exceptions to lease stipulations that conform to the plan. Other possible exceptions may be granted only with a plan amendment and public notification.

Form 3100-11
(June 1988)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Figure G-2

Serial No.

OFFER TO LEASE AND LEASE FOR OIL AND GAS

The undersigned *(reverse)* offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 Op. Atty. Gen. 41), or the

READ INSTRUCTIONS BEFORE COMPLETING

1. Name
   Street
   City, State, Zip Code

2. This application/offer/lease is for: *(Check only One)* ☐ PUBLIC DOMAIN LANDS ☐ ACQUIRED LANDS (percent U.S. interest _____)
   Surface managing agency if other than BLM: _____ Unit/Project _____
   Legal description of land requested: *Parcel No.: _____ *Sale Date (m/d/y): ____ / ____ / ____
   *SEE ITEM 2 IN INSTRUCTIONS BELOW PRIOR TO COMPLETING PARCEL NUMBER AND SALE DATE.

T.	R.	Meridian	State	County

Total acres applied for _____

Amount remitted: Filing fee $ _____ Rental fee $ _____ Total $ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T.	R.	Meridian	State	County

Total acres in lease _____

Rental retained $ _____

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas *(except helium)* in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3120 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term of lease:

☐ Noncompetitive lease (ten years)

☐ Competitive lease (five years)

☐ Other _____

THE UNITED STATES OF AMERICA

by _____
(Signing Officer)

_____ _____
(Title) (Date)

EFFECTIVE DATE OF LEASE _____

(Continued on reverse)

Figure G-2

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof; (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect in either public domain or acquired lands do not exceed 246,080 acres in Federal oil and gas leases in the same State, of which not more than 200,000 acres are held under option, or 300,000 acres in leases and 200,000 acres in options in either leasing District in Alaska; (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)(2)(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this _____ day of _____, 19 _____.

_____
(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

(a) Noncompetitive lease, $1.50 for the first 5 years; thereafter $2.00;
(b) Competitive lease, $1.50; for primary term; thereafter $2.00;
(c) Other, see attachment, or

as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due at the rate specified in (a), (b), or (c) for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations on production removed or sold. Royalty rates are:

(a) Noncompetitive lease, 12½%;
(b) Competitive lease, 12½%;
(c) Other, see attachment; or

as specified in regulations at the time this lease is issued.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties shall be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production shall be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee shall not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor shall lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in lieu of rental of not less than the rental which otherwise would be required for that lease year shall be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge shall be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (30 U.S.C. 1701). Lessee shall be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

Sec. 3. Bonds—A bond shall be filed and maintained for lease operations as required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall exercise reasonable diligence in developing and producing, and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations—To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium—Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee shall include in any contract of sale of gas the provisions of this section.

Sec. 9. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity—Lessee shall: pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee shall comply with section 28 of the Mineral Leasing Act of 1920.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time. Lessee shall be subject to applicable provisions and penalties of FOGRMA (30 U.S.C. 1701).

Sec. 14. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

Modifications to stipulations are made if and when resource management determines the stipulation is no longer effective as written. This situation occurs when new information (for example, from a monitoring program, technical data, etc.) shows that the protective measure is unnecessarily restrictive.

Modification of a stipulation requires preparation of an environmental assessment to determine potential impacts and plan amendment or maintenance needs. If modification is determined by the Authorized Officer to be substantial, a 30-day public notice will be given prior to modifying the lease stipulation.

Waiver means the complete elimination of a stipulation from a particular lease contract. A stipulation is waived by the Authorized Officer after preparation of an environmental assessment and a decision is made that the stipulation in question is no longer required for a particular lease. The decision to waive a substantial stipulation requires a plan amendment and a 30-day public notice period prior to waiver.

Special Stipulations

The following stipulations will be added, as prescribed in this plan, to future oil and gas leases on both Federal surface and split-estate lands. Actual wording of these stipulations may be adjusted at the time of leasing to reflect future legislation, court decisions, or policy changes; however, the protection standards in these stipulations would be maintained. Any change to the protection content of the stipulation would require an amendment to the RMP/EIS.

I. No Surface Occupancy Stipulations (NSO) Alternative D

The No Surface Occupancy stipulation is intended for use only when other stipulations are determined insufficient to adequately protect the public interest. The plan analysis shows that less restrictive stipulations are inadequate to protect the resource in question. These resources/values to be protected were also considered for no leasing areas, but it is determined that No Surface Occupancy is adequate for resource/value protection. An NSO stipulation is not needed if desired protection does not require relocation of proposed operations by more than 200 meters (43 CFR 3101.1-2).

The Uniform Oil and Gas Lease Stipulation Format, shown in Figure G-3, will be used to append all new NSO stipulations to the lease document.

Serial No.____

NO SURFACE OCCUPANCY STIPULATION

No Surface Occupancy or use is allowed on the lands described below (legal subdivision or other description).

For the purpose of:

Any change to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance of the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Figure G-3
Uniform Oil and Gas Lease Stipulation Format

1. Within area of approved surface coal mine: Conservation of natural resources. This stipulation may be waived without a plan amendment if the lessee agrees that any well approved for drilling will be plugged below the coal when the crest of the highwall approaches within 500 feet of the well, and that the well will be re-entered or redrilled after the completion of mining operations through the well location. A suspension of operations and production will be considered for the lease only when a well is drilled and then is plugged, and a new well or re-entry is planned when the mine moves through the location.

2. The following areas will have NSO stipulations appended to leases issued within them for the protection of scenic, natural, and cultural values and resources. No exception criterion is identified.

Lake DeWeese Recreation Area
St. Scholastica R&PP site
Deer Mountain Fire Station
Odd Fellows Lodge
Colorado Division of Parks (AHRA) 14 sites
Five Points Campground
Reservoir Rights-of-Way
Garden Park ACEC
Mosquito Pass ACEC
High Mesa Grasslands ACEC
Droney Gulch ACEC

3. The following areas will have NSO stipulations appended to leases issued within them for the protection of improvements and avoidance of refuse disposal areas. No exception criteria identified.

Chaffee County Landfill R&PP
Park County Landfill R&PP

4. Raptors (includes golden eagle and osprey, all accipiters, falcons except kestrel, butteos, and owls). Raptors listed

and protected by the *Endangered Species Act* are addressed separately. NSO within one-fourth mile radius of nest site.

Exception for raptor nest site. The NSO area may be altered depending on the active status of the nest site or the geographical relationship of topographic barriers and vegetation screening to the nest site.

5. Mexican Spotted Owl. NSO within one-half mile radius of the confirmed roost site and nesting site.

There are no exceptions for confirmed sites.

6. Lesser Prairie Chicken. NSO within one-quarter mile radius of a lek site (courtship area).

Exception for lek sites. The NSO area may be altered depending on the active status of the lek or the geographical relationship of topographical barriers and vegetation screening to the lek site.

II. Timing Limitation Stipulations (TL) Alternative D

The Timing Limitation (often called seasonal) Stipulation (Figure G-4) prohibits fluid mineral exploration and development activities for time periods less than year-long. The dates and location(s) limiting activity are as specific as possible. A timing limitation stipulation is not necessary if the time limitation involves the prohibition of new surface disturbing operations for periods of less than 60 days (43 CFR 3101.1-2).

Timing limitations shorter than 60 days do not require a lease stipulation. The restriction is added directly to the field operation approval as a Condition of Approval and may be noted on the lease as Lease Notices. In those cases, however, where two or more time restrictions combine or overlap to form a restriction of more than 60 days, the closure will be attached to the lease as a stipulation, as a matter of Colorado BLM policy. Additional restrictions of 60 days or less may still be added to field operations for protection of resources/values other than those stipulated.

Serial No. ____

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

On the lands described below:

For the purpose of (reasons):

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Figure G-4
Uniform Oil and Gas Stipulation Format

Big game species (includes species of mule deer, elk, pronghorn antelope, and bighorn sheep). Note: Critical winter habitat includes severe big game winter range or other definable winter ranges as mapped by the Colorado Division of Wildlife.

1. Big Game Critical Winter Habitat - December 1 to April 30

Exception for big game critical winter habitat. Under mild winter conditions, the last 60 days of the seasonal limitation period may be suspended. Severity of the winter will be determined on the basis of snow depth, snow crusting, daily mean temperatures, and whether animals were concentrated on the critical winter range during the winter months.

Exception for big game critical winter habitat. This limitation may or may not apply to work requiring a Sundry Notice pending environmental analysis of any operational or production aspects.

2. Big Game Birthing Areas: (by species)

Elk calving and deer fawning - April 16 to June 30

Pronghorn Antelope fawning - May 1 to July 15

Rocky Mountain bighorn sheep lambing - May 1 to July 15

Exception for big game birthing areas. When it is determined through a site-specific environmental analysis that specific actions would not interfere with critical habitat function or compromise animal condition within the project vicinity, the restriction may be altered or removed.

3. Mexican Spotted Owl

Mexican spotted owl nesting and fledgling habitat - February 1 to July 31.

The Mexican spotted owl has been listed as a threatened species by U.S. Fish and Wildlife Service. The following habitat management guidelines and restrictions will be used to protect the Mexican spotted owl. These guidelines are adopted from the interim timber harvest management guidelines issued by the Forest Service, Southwest Region (Federal Register, Vol. 54, No. 124, June 29, 1989).

Proposed restriction for Mexican spotted owl habitat. Core habitat areas are nesting, feeding, and roosting areas and are not considered to be overlapping. The Mexican spotted owl territory is estimated at 2,000 acres. In core areas, 450 acres, with multiple sightings of the Mexican spotted owl but with no confirmed nest or roost sites, surface disturbance activities are restricted within the 450 acres of the total territory (2,000 acres). On the remaining acreage within the Mexican spotted owl territory, other surface activities are allowed pending impact assessments through the environmental analysis process.

In areas with a confirmed nest and roost site, surface management activities will be limited and will be determined on a case-by-case basis to allow as much flexibility as possible outside of the core area. The core area with a confirmed nest and roost site is 1,480 acres with restricted surface disturbance activities.

There are no exceptions.

4. Bald Eagle

Winter roost site - November 16 to April 15

Restriction for bald eagle winter roost site.

The sensitivity of bald eagles to human disturbance activities requires a one-half mile buffer area around the roost site to avoid relocation to less suitable areas.

Exception for winter roost habitat. If there is partial or complete visual screening of the area of activity, the primary zone around the roost site may be reduced to one-quarter mile.

5. Peregrine Falcon

Cliff nesting complex - March 16 to July 31

Restriction for peregrine falcon cliff nesting complex. The sensitivity of peregrine falcon to human disturbance activities requires one-half mile buffer area around the nesting complex to prevent abandonment and desertion of established territories.

The following exception would apply only after formal Section 7 Consultation with the U.S. Fish and Wildlife Service was consummated.

Exception for nesting habitat. During years when a nest site is unoccupied or unoccupied by or after May 15, the seasonal limitation may be suspended. It may also be suspended once the young have fledged and dispersed from the nest.

6. Lesser Prairie Chicken

Nesting habitat - March 1 to July 31

Restriction for lesser prairie chicken nesting habitat. This species is a threatened species in Colorado and sensitive to habitat encroachment. Limited nesting habitat is available and full protection is necessary to ensure nesting success.

Exception for nesting habitat. In the future, restrictions may be lifted if additional inventory shows shifts in nesting habitat use.

7. Least Tern and Piping Plover

Nesting habitat - April 1 to July 31

Restriction for tern and plover nesting habitat. Both species utilize similar habitats for nesting (flat, open reservoir beaches) and are extremely sensitive to disturbance. They are Federally listed as endangered and require full protection. No exceptions will apply.

8. Merriams Turkey

Winter range - December 1 - April 1

Restriction for winter range. During heavy winter snows, turkeys are vulnerable to disturbances and could suffer losses if forced off winter ranges.

Exception for winter ranges. In certain areas, snows may occur irregularly and restrictions may be lifted temporarily as conditions dictate. Seasonal restrictions may apply in these areas on a case-by-case basis.

III. Controlled Surface Use Stipulations (CSU)

The Controlled Surface Use (CSU) Stipulation (Figure G-5) is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values or resource concerns, some aspects of lease activities must be strictly controlled. The CSU stipulation is used to identify constraints on surface use or operations that may otherwise exceed the mitigation available under Section 6 of the standard lease terms, regulations, and operating orders. The CSU stipulation is less restrictive than the NSO or TL stipulations, which prohibit all occupancy and use on all or portions of a lease for all or portions of a year. The use of this stipulation should be limited to areas where restrictions or controls are necessary for specific types of activities rather than all activity.

Serial No.____

CONTROLLED SURFACE USE STIPULATION

Surface occupancy or use is subject to the following special constraints.

On the lands described below:

For the purpose of:

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Form #/Date

Figure G-5
Uniform Oil and Gas Stipulation Format

1. For the conservation of natural resources, operations proposed within the area of an approved underground coal mine will be relocated outside the area to be mined or to accommodate room and pillar mining operations. This stipulation may be waived without a plan amendment if the lessee agrees that the drilling of a well will be subject to the following conditions: (1)(a) well must be plugged when the mine approaches within 500 feet of the well; (b) well must be plugged in accordance with Mine Safety and Health Administration (formerly Mine Enforcement and Safety Administration) Informational Report 1052; (c) operator will provide accurate location of where the casing intercepts the coal by providing a directional and deviation survey of the well to the coal operator; or (2) relocate well into a permanent pillar or outside the area to be mined. A suspension of operations and production will be considered when the well is plugged and a new well is to be drilled after mining operations move through the location.

2. For the protection of perennial water impoundments and streams, and/or riparian/wetland vegetation zones, activities associated with oil and gas exploration and development including roads, transmission lines, storage facilities, are restricted to an area beyond the riparian vegetation area.

Exceptions: This stipulation may be excepted subject to an onsite impact analysis with consideration given to degree of slope, soils, importance to the amount and type of wildlife and fish use, water quality, and other related resource values.

This stipulation will not be applied where the Authorized Officer determines that relocation up to 200 meters can be applied to protect the riparian system during well siting.

3. Visual Resource Management Class II Areas: Relocation of operations more than 200 meters as required to protect visual values: Exception criteria include mitigative measures to screen operations from scenic viewsheds and restoration of disturbed areas to a condition substantially unnoticeable to casual observer.

IV. Special Administrative Stipulations (SA)

These are stipulations provided by another agency or organization. BLM encourages other agencies to use the Rocky Mountain Regional Coordinating Committee's Uniform Stipulation Format, however, that is not always feasible.

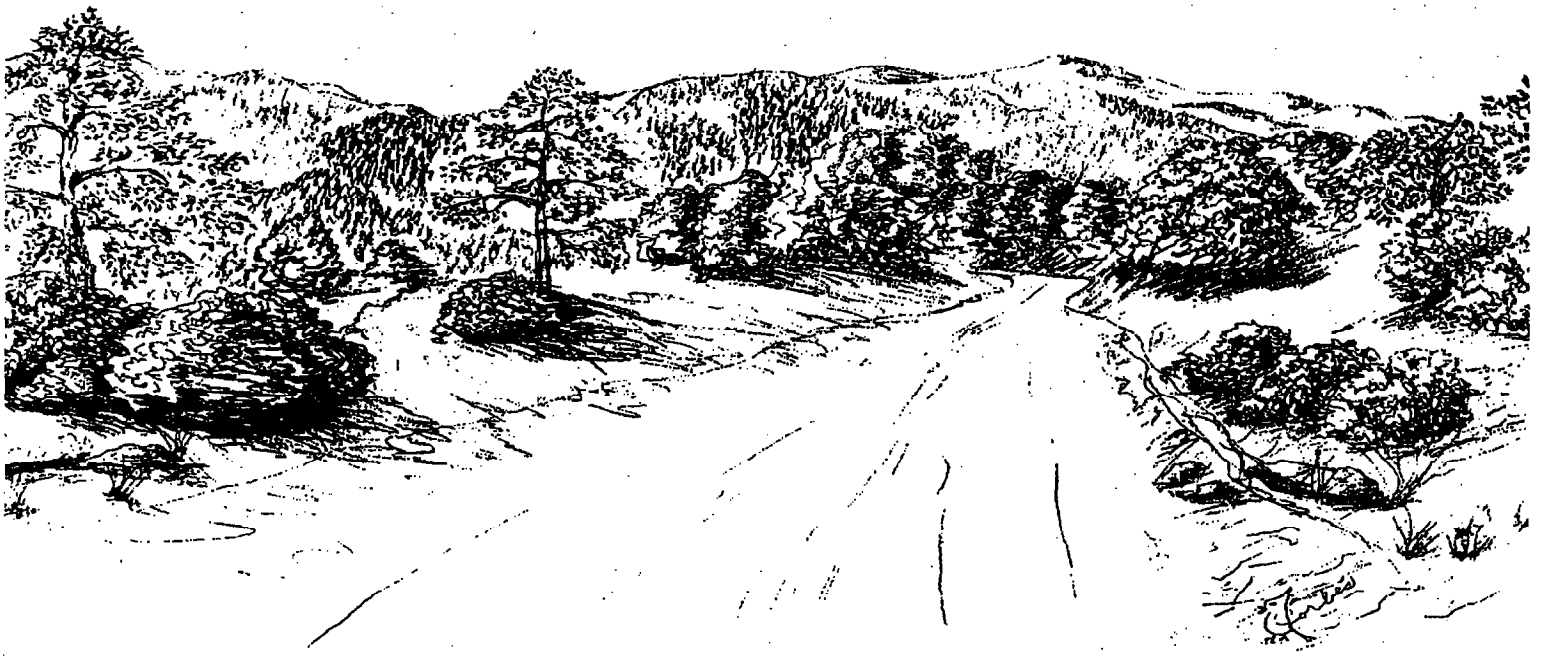
Bureau of Reclamation Lands will be subject to Special Stipulations developed by that agency. The "Special Stipulation" currently in use by the Bureau of Reclamation is available for review in the resource area office.

V. No Lease Areas (NL)

The 1920 *Mineral Leasing Act* subjects all Federally-owned mineral estate to oil and gas leasing, with certain exceptions (see 43 CFR 3100.0-3). Exceptions include units of the National Park System; incorporated towns, cities and villages; wilderness study areas; wilderness areas; and others. BLM may make discretionary closures to leasing if resource/values are of sufficient importance and there is no way to mitigate impacts through a less stringent stipulation.

APPENDIX H

LOCATABLE MINERALS AND MINERAL MATERIALS



APPENDIX H
LOCATABLE MINERALS AND MINERAL MATERIALS

LOCATABLE MINERALS

Locatable minerals occur on 233,933 acres of BLM-administered lands within the planning area. Approximately 1,585 acres are high potential, 40,960 acres are moderate potential, and 191,388 are low potential locable minerals.

Major Mining Districts

Leadville District (including St. Kevin)

Replacement and vein deposits in Paleozoic and younger sedimentary rocks have been some of the most productive in the mineral belt. In the Leadville Limestone, the mineralization is concentrated in paleokarst solution-collapse breccias, which served as permeable zones for passage of the hydro thermal solutions. In the St. Kevin district just west of Leadville, the sediments have been eroded away and all that remains are the veins in Precambrian rocks. The district has had over 100 years of nearly continuous mining activity. Production has come from both primary sulfide and secondary oxide ores. The most favored site for mineralization appears to be in solution-collapse breccias in dolomites below sills; the Leadville Limestone is the most extensively mineralized. Primary replacement ores consist of pyrite, sphalerite, and galena with local concentrations of chalcopyrite. Silver is present as argentiferous galena and small amounts of argentite. The Leadville district is a classical example of mineral zoning where local contact-metamorphic magnetite-specularite-siderite bodies occurring adjacent to intrusions grade outward into high-temperature hydrothermal tungsten mineralization. The next zone outward is the most important volumetrically and contains the vein and replacement copper-zinc-lead-silver-gold ores. This main sulfide mineralization is also zoned where copper-silver-gold veins grade outward into lead-zinc-silver replacements. Low-temperature gold veins occupy the periphery of the district. Not everywhere are all zones identified or developed.

Cripple Creek District

Gold deposits were discovered in the Cripple Creek district in 1891. To the end of 1958, the district had a total recovered output of about 19,070,000 fine ounces of gold and 2,185,000 fine ounces of silver. Ore deposits of the Cripple Creek district are located within or at the margin of an irregular mass of Miocene breccia, of nonvolcanic as well as volcanic origin. These rocks occupy a steep-walled basin or caldera about 4 miles long and 2 miles wide in Precambrian rock. Development of the Cripple Creek basin took place in several stages, the earliest predating the igneous activity that furnished the fragmental material of the breccia and ended with formation of the gold deposits. Early detailed geologic investigations made of the Cripple Creek district yielded the classic picture of a crater in Precambrian rocks that was formed by explosive eruptions. Mineralization followed recurrent fissuring and culminated in deposition of the gold ore. Mineral deposits were formed during three general stages. The first stage is characterized by quartz-fluorspar veins and coarse pyrite. Minerals of the second stage include the ore minerals, the tellurides of gold, accompanied in places of tellurides of silver and copper, and pyrite, sphalerite, galena, tetrahedrite, and gangue minerals. Minerals of the third stage, deposited chiefly in openings, include clear and smoky quartz, chalcedony, fine-grained pyrite, calcite, and locally cinnabar. One of the outstanding features of the vein system in the Cripple Creek district is the occurrence of relatively short individual veins in long narrow vein zones. Many of these vein zones lie close to the margin of the breccia mass, others persist for rather long distances into the breccia, and some cross the contact into the Precambrian rocks for 2,000 feet or more.

Westcliffe District

There are actually two volcanic centers, closely related, in this area, one at Silver Cliff and one at Rosita. The Rosita silver and galena deposit was discovered in 1872. The biggest single producing mine in this area was the Bassick. Interest and production has continued in this area up to present day. In 1878, Silver Cliff came into existence with the discovery of silver. The two centers are arranged like knobs on a dumbbell, about 4 miles apart. The Silver Cliff volcanic center is a poorly defined subsided cauldron while Rosita forms a conspicuous highland block that constitutes the core of the original volcano. This district has also had major production of copper and zinc.

Minor Districts or Deposits

Copper Deposits

The three main copper mines in the RGPA (Sedalia, Cotopaxi, and Betty) were discovered in the latter part of the 19th century. The Sedalia was opened about 1883; the Cotopaxi mine was reported in production in 1883; and the early history of the Betty mine is obscure. These are copper skarn deposits. The term skarn is used for coarse-grained granoblastic (nonfoliated) assemblages of calcium-bearing silicates, developed in high-grade regional metamorphic rocks of calcareous or dolomitic composition, and formed by recrystallization and metasomatic introduction of such elements as Si, Al, Fe, and Mg. Mineralization is variable: deposits of iron oxide minerals, Cu, Zn, and even Pb sulfides and scheelite occur as skarns. In Chaffee County, copper-tungsten vein-skarn deposits are closely bunched in the Cleora district in the southeastern corner of the county, with a few other skarn deposits on Poncha Pass. Copper and copper-zinc skarns are less numerous by far than tungsten skarns and tend to occur scattered, isolated, or in small groups; thus they are not congregated in clearly defined districts.

Copper-Tungsten Skarn (Cleora district): These deposits are tabular veins, fault and fracture controlled, and occur mainly in amphibolites. They have well-defined fracture-filling quartzose veins that have been mineralized by *both* copper and tungsten minerals.

The Cleora district includes eight separate mines in an area 2 miles southeast of Salida, both north and south of the Arkansas River, T.49N., R.9E., secs. 2, 10, 11, and 15.

Copper-Zinc Skarns: These deposits are mainly in amphibolites as hosts and are confined to Precambrian metamorphics of pre-Boulder Creek age. Deposits are best described as epigenetic disseminated-replacement deposits. They are much less common than tungsten skarns. These are either foliation controlled or fault and fracture controlled.

Deposits in Park County include:

Betty Mine (Lone Chimney)	T.15S., R.73W., sec. 21

This district also includes the Copper King/Copper Queen and Mill Gulch Mines. Copper, zinc, lead, silver, and gold have been produced from the Betty mine.

Deposits in Fremont County include:

Isabel Mine	T.16S., R.72W., sec. 31
Green Mountain Mine	T.19S., R.72W., sec. 26
Leeks Lode	T.18S., R.72W., sec. 30
Baker Gulch	T.18S., R.72W., sec. 29
Cotopaxi Mine	T.48N., R.11E., sec. 25

First production of copper at the Cotopaxi Mine occurred in the 1800s. This deposit consists of a xenolith fully enclosed in granite rocks. Main ore minerals consisted of sphalerite and chalcopyrite.

Carson Prospect	T.48N., R.12E., sec. 18

Deposits in Chaffee County include:

Sedalia Mine	T.50N., R.9E., sec. 18

This was once the largest copper mine in Colorado. Large tonnages of copper and zinc have been shipped from this location, and interest in this deposit continues today.

Tungsten Deposits

Many of the tungsten skarns of Chaffee County apparently were first prospected during World War I and were reprospected during World War II. Tungsten ore was discovered in the Tarryall district of Park County in the summer of 1943, and intensive prospecting took place in Park and Fremont Counties during World War II and the Korean War.

The Guffey district is along the southern Park County line, with a few scattered deposits elsewhere in Fremont County.

Tungsten Skarns: Formed by recrystallization and metasomatism of calc-silicate gneiss, which are minor stratiform metasedimentary units in the pre-1,700 M.Y. metamorphic complex.

Deposits within the Guffey district include the following:

B&G Claim	T.14.S, R.74W., sec. 25
School Section	T.14S., R.74W., sec. 36
West Deposit	T.15S., R.73W., sec. 23

Deposits in Fremont County include:

Charlene Claims	T.16S., R.73W., secs. 3, 10
Venture Claim	T.16S., R.72W., sec. 29
Four Claim Group	T.16S., R.73W., sec. 25
Oliver Prospect	T.19S., R.72W., secs. 33, 34
Jack of Diamonds Prospect	T.19S., R.72W., sec. 20
Devils Hole	T.11S., R.73W., sec. 11

Deposits in Chaffee County include:

Poncha Pass Cabin	T.48N., R.8E., sec. 5
Lucky Claim	T.48N., R.8E., sec. 5

The various deposits in the Tarryall district fall outside of the planning boundaries.

Placer Deposits

Nearly all placer deposits in Colorado were formed during the Pleistocene. Deposits related to Bull Lake and Pinedale glaciations include most of the placers. Most placer deposits derived their gold from bedrock of Early Tertiary age.

Park and Lake Counties are two of the three most important counties in the state for placer gold production. Chaffee County has had a significant level of production. To a much lesser extent, Fremont, Huerfano, and Teller Counties have had production.

Thorium/Uranium Deposits

The main area of interest is the Wet Mountain Thorium district where several hundred veins containing thorium are present. These veins also contain a number of other minerals of interest, T.21S., R.71W., T.20S., R.71W., and northeastern part of T.22S., R.72W.

The major uranium districts are as follows:

Tallahassee Creek Area	T.17S., R.73W., secs. 21, 22, 25, 26, 27, 35, 36 T.17S., R.72W., secs. 30, 31
High Park	T.15S., R.71W., secs. 25, 36
Garo	T.11S., R.76W., secs. 6, 7, 8, 17

There are numerous records of smaller deposits and areas of interest in the RA.

Miscellaneous Deposits

Fluorspar

Browns Canyon area	T.51N., R.8E., secs. 21, 22, 26, 27
Poncha Springs	T.49N., R. 8E., sec. 15
Cotopaxi/Blue Spar	T.47N., R.12E., sec. 12
Cañon City	T.16S., R.70W., secs. 29, 31, 32

Gypsum

Coaldale Deposits	T.47N., R.11E., secs. 5, 6 and T.48N., R.11E., secs. 31, 32

This is the major occurrence in the area. Other small deposits are shown on GIS maps.

Table Mountain Area	T.17S., R.68W., secs. 9, 10, 24, 25

Limestone

Locatable grade limestone suitable for manufacturing cement is principally found in the Niobrara Formation. This formation is in the eastern part of the resource area.

Florence Deposit	T.19.S, R.68W., secs. 15, 16, 17, 20, 21
Calcite Area	T.49N. , R.9E., secs. 1, 12, 13, 24, 25, 36 and T.48N., R.10E., secs. 5, 6, 7, 8

Other miscellaneous deposits are shown on both locatable and salable GIS maps.

Miscellaneous Mining Districts

Granite

Base and precious metals	T.11S., R.79W., secs. 19, 20, 28, 29, 31, 32

Guffey

Base and precious metals	T.15S., R.73W., secs. 1, 2, 11, 12, 14

Grape Creek

Base and precious metals	T.20S., R.71W., secs. 17, 18, 19, 20

Dawson Mtn.

Base and precious metals	T.19S., R.71W., secs. 14, 15, 16, 17, 20, 21

This is not meant to be a comprehensive list. There are several hundred individual deposits within the RA.

MINERAL MATERIALS

Mineral materials occur on 371,677 acres of BLM-administered lands within the planning area. Approximately 47,030 acres are high potential, 311,903 acres are moderate potential, and 12,352 are low potential mineral materials.

Sand and Gravel

Areas with moderate and high potential for development were identified. All sand and gravel deposits were assumed to be used for aggregate purposes and generally used for road construction.

Limestone (includes dolomite)

Limestone deposits exist in numerous sedimentary deposits. The main deposits of interest in this analysis are lower Paleozoic limestones and dolomites including Manitou Limestone and Fremont Limestone. Limestone accounts for 65 to 75 percent of total crushed rock operations. Since about 1950, two large mountain-front quarries in Manitou Limestone northwest of Colorado Springs have produced crushed rock for concrete aggregate, road fill, hot-mix paving, gravel, riprap for dams, and miscellaneous construction/industry uses. Limestone is used mostly as crushed rock and in manufacturing cement. In the past 100 years or more, limestone has also been used for mortar, agricultural lime and stock feed, sugar refining, metallurgical processes, and other industrial and municipal needs.

Sandstone

Sandstone has a wide variety of uses including crushed rock, riprap, ornamental stone, railroad ballast, and dimension stone. Formations of particular interest include: Dakota Sandstone, Lyons Sandstone, and Harding Sandstone. Sandstone from ten or more rock units in the Front Range Urban Corridor has met widely varying needs in the past century including use as dimension stone, crushed rock, riprap, landscaping rock, silica rock, and sand. Quarrying operations, however, have tended to be small at many locations, commonly intermittent, and often short lived. Use of sandstone in building has been mostly confined to exterior facing and interior decorative applications; slab and crushed sandstone are also used for walks, patio paving, and landscaping. Crushed or broken stone for road fill or riprap in dam construction is quarried locally as needed. Lyons Sandstone is a predominantly sandstone unit near the western edge of the hogback belt. Locally, light-colored, weakly cemented Lyons has supplied silica sand. Sandstone from the upper part of the Dakota Group provided dimension stone for many of the older buildings in eastern Colorado because of its hardness, strength, bedding that facilitated cutting of large slabs, resistance to weathering, and gray to light-brown color. The Dakota has also been used for riprap in dams and as landscaping rock.

Course Grained Igneous Rocks

Coarse-grained igneous rocks, which occupy nearly two-thirds of the east face of the Front Range within the mapped area of the corridor, are now of economic interest chiefly as sources for nonreactive aggregate and other crushed-rock uses. In many places, coarse-grained igneous rocks are disintegrated by weathering to depths of 15-35 feet. Naturally disintegrated rock is used locally for surfacing mountain roads. Unweathered rock for crushing is available from three rock units of major areal extent and others of more limited distribution. The three major units are: one large and several smaller bodies of Boulder Creek Granodiorite; small irregular bodies of Silver Plume Quartz Monzonite; and Pikes Peak Granite. Igneous and metamorphic rocks of the urban corridor have supplied small amounts for concrete aggregate, riprap, road metal, roofing granules, precast construction panels, etc.; building stone, paving blocks, and monuments; landscaping rock; and minerals for chemical and metallurgical uses over the past century.

Quartz Monzonite

Precambrian Quartz monzonite has been used primarily for dimension stone. The main deposits of interest are the Cripple Creek Quartz Monzonite and Quartz Monzonite in the Texas Creek area.

Granodiorite

Granodiorite has been used for railroad ballast, crushed rock, and dimension stone. The main formations of interest would be the whitehorn granodiorite and the Precambrian X granodiorite in many locations in the resource area.

Granite

The primary use for granite has been for road surfacing and also as dimension stone. There are extensive granitic areas in the RA particularly in Teller County.

Gneiss

Gneiss is not generally thought of as useful for industrial material, but one deposit in the Westcliffe area has been used as dimension stone. This area is considered to have moderate potential for additional development.

Pegmatite

Although composed primarily of common rock-forming minerals (quartz, feldspar, and mica) pegmatites are more noted for their unusual and occasionally rare accessory minerals, including precious and semiprecious gems and some minerals having only a few known world occurrences. Pegmatites are economically important for their mineral concentrations of not only feldspar and mica but also important metals; lithium, beryllium, niobium, tantalum, uranium, etc. Some have yielded economic quantities of gem stones and mineral specimens.

Some of the more important pegmatite districts in the RA include the Micanite (south of Guffey) Royal Gorge area, and Texas Creek area. Hundreds of individual deposits are reported. Currently, pegmatites are also being used as crushed landscaping rock.

Travertine

Travertine is a finely crystalline massive deposit of calcium carbonate, formed by chemical precipitation from solution in surface and ground water. The three major deposits in the RGRA were formed on fault zones. These are the Wellsville, Twin Mountain, and some small deposits north of Cotopaxi. Travertine has been used extensively as dimensional or monumental stone.

Volcanic Rocks

There is a wide variety of volcanic rocks used as industrial rock. They have been grouped together in this analysis.

Volcanic basalt has various uses such as decorative stone and railroad ballast. Pumice is used as aggregate and as an abrasive. Volcanic ash is used as abrasives. Some volcanic rock is used as ornamental stone, particularly the Gribbles Park, Thom Ranch, East Gulch, and Wall Mountain tuffs. Some volcanic rocks in Waugh Mountain, Thirty Nine Mile, Buffalo Peaks, and other various volcanic rocks such as sills or dikes related to the Spanish Peaks intrusion may have use as railroad ballast. Some volcanic rock has been used as crushed landscaping rock, in particular various volcanic units in the Westcliffe area.

Clay

Clay in Colorado is used primarily for facing bricks and to a lesser extent, refractory brick. Common and refractory clays have been mined to varying degrees from a number of formations, but most have come from Cretaceous and Paleocene units. In south-central and southeastern Colorado, the Dry Creek Canyon Member of the Dakota Sandstone and the Glencairn Shale Member of the Purgatoire Formation are the clay units. Common and low-duty refractory clays suitable for brick, tile, and pipe manufacture come from the Pierre Shale, and the Raton Formation at Trinidad. The most prominent application for bentonite is as a component in oil-well drilling muds, but what little has been produced in Colorado was used for canal sealing and some industrial applications, namely fillers.

Because of low unit value and high transportation costs, deposits of mineral materials such as sand and gravel, building stone, and clay are valuable, for the most part, when they are near market sites or periodic site specific projects. It appears that the future trend will result in mineral materials being developed further away from population centers as supplies diminish and as public opposition to development intensifies. Additionally, there has been a recent public outcry over quarry scars. Mineral materials, unlike base and precious metals, oil and gas, coal, etc., are sold in large quantities and at generally low costs. For this reason mineral materials are generally produced in locations close to the market and generally close to transportation networks. A large number of quarries and gravel pits are located on the outskirts of both Pueblo and Colorado Springs with other pits and quarries scattered throughout the resource area. High transportation costs are the major limiting factor in locating pits and quarries. On the contrary, mineral material development in or around metropolitan areas such as Colorado Springs is often opposed by residents. This creates more interest in those deposits further from population centers. Fremont County is becoming of much more interest to Colorado Springs companies. South Park gravel could become of more interest to Denver companies.

One of the major conflicts that exists over the availability of an area for mineral material disposal is whether the area is encumbered with an unpatented mining claim. This encumbrance results in a closure of the area to mineral material disposal.

The basic issue in regard to future mineral material development is to identify whether an area is open or closed to mineral material development. Currently there are no areas within the RGPA closed to mineral material development because of a Bureau initiated action, although some areas are closed because of conflicts with unpatented mining claims, minimal closures were determined necessary because mineral material development is a discretionary action and the decision to allow mineral material development can be made on a case by case basis with NEPA analysis providing the basis to make an informed decision. Designations within the RMP which could restrict future mineral material development would include ACECs, wild and scenic river designations, and specific closure areas.

The RGPA contains a wide variety and supply of mineral materials. The available supply is often dependent on specific contract needs and other factors such as contractor specifications, distance to market, access, environmental constraints, etc. The planning area has a good

supply of most mineral materials in demand. It is difficult to predict which deposits will be needed; therefore, it is important that as much area as possible be available to meet future demand.

Disposal of mineral materials is handled on a case-by-case basis. Disposals are not BLM initiated, but are made on a request basis. The decision to issue a sale or permit is a discretionary action. Disposals are not made where the area is encumbered with a mining claim; therefore, these areas could be considered closed to mineral material disposal.

There are currently 12 mineral material sites within the planning area. These are summarized in Table H-1.

TABLE H-1
Mineral Materials Sites

Site Name	Location	Commodity
Gately Pit	T.17S., R.69W., sec. 35	Clay
Rhyolite Quarry	T.22S., R.72W., sec. 8	Rhyolite
Red Mountain Quarry	T.17S., R.68W., sec. 1	Dolomite
Salida Sand and Gravel	T.49N., R.9E, sec. 8	Sand and gravel
Red Jasper Granite Quarry	T.15S., R.71W., sec. 3	Quartz monzonite
Lakewood Clay Pit	T.18S., R.68W., sec. 10	Clay
High Plains Stone Pit	T.17S., R.68W., sec. 15	Sandstone, moss rock
Glen Vista Pit	T.19S., R.72W., sec. 32	Decomposed syenite
Teller County Pit	T.15S., R.70W., sec. 3	Decomposed granite
Chaffee County Pit	T.14S., R.78W., sec. 22	Gravel
Custer County Pit	T.23S., R.72W., sec. 2	Gravel
Penrose Moss Rock Area	T.18S., R.68W., secs. 5, 8	Sandstone

APPENDIX I

COAL MINERALS MANAGEMENT

APPENDIX I
COAL MINERALS MANAGEMENT

UNSUITABIITY ANALYSIS

Background

The Federal coal leasing process, opinions expressed by the public, and the principles of multiple resource management require that areas with potential for coal leasing and development be analyzed through a comprehensive land use plan and environmental analysis. Areas of Federal coal are screened for coal development potential, unacceptable environmental conflicts, and significant surface owner opposition to mining.

Four screening steps must be applied during land use planning:

1. Identification of areas with coal development potential.
2. Application of the 20 unsuitability criteria.
3. Identification of significant surface owner opposition to the surface mining of Federal coal.
4. Application of multiple use trade-offs.

Based on application of these four steps, a determination is made in the land use plan identifying lands acceptable for further consideration for coal leasing.

Coal resources of the Royal Gorge Planning Area (RGPA) have had extensive historic development, but are currently in a state of only limited development. The majority of the coal resources are within areas of fee and split-estate lands with only a small percentage of the area under total BLM management. It is currently anticipated that an increase in demand for Raton Basin coal will occur as a result of the *Clean Coal Act*, which requires low sulphur coal, and the increased interest by the State of Colorado in coal development.

Potential Development Areas

The Trinidad Known Recoverable Coal Resource Area (KRCRA) contains coal resources with low to high potential for development during the next 20 years. The entire KRCRA will be carried forward during the subsequent screening process. Additional areas outside the boundaries of the KRCRA will also be carried forward if either substantial evidence that a resource with potential for development exists or an expression of interest is received during the life of the plan.

The RGPA encompasses two coal-bearing basins (Denver and Raton) and two small coal fields (Cañon City and South Park). The southern tip of the Denver Coal Basin intrudes through the northern resource area boundary to about Township 16 South. The northern half of the Raton Coal Basin lies within Colorado from the New Mexico border to south of Walsenburg, and is known as the Trinidad-Walsenburg field. The Cañon City coal field lies just south of Cañon City, and is all on private land. The South Park field, in Park County, encompasses Federal, state, and private lands, but the coal is dipping very steeply (25 to 90), making mining difficult, and no interest exists for this field.

Only the Trinidad-Walsenburg field will be further discussed, and more specifically, the Trinidad KRCRA within that field. That part of the Denver Coal Basin that intrudes into the northern part of the resource area has been covered by the Northeast Resource Management Plan (RMP). The Cañon City coal field and the South Park coal field will not be addressed because the former is on private land, and the latter has unattractive coal resources at present.

The Trinidad KRCRA covers about 438,204 acres in parts of Las Animas and Huerfano Counties (approximately 131,000 acres are Federal coal). It is roughly bounded on the east by I-25, and on the west by Colorado Highway 12. The Purgatoire River forms the southern boundary, and the northern boundary is a few miles north of Walsenburg. The KRCRA area is a dissected upland consisting of a series of flat-topped benches that rise from an elevation of about 6,000 feet on the east side to about 9,000 feet at the western boundary. Just to the west of the KRCRA, West Spanish Peak is the highest point in the area at 13,623 feet. The Cucharas, Apishapa, and Purgatoire Rivers and tributaries drain the area as they flow eastward.

Appendix I

The U.S. Geological Survey Colorado Coal Land Leasing Minutes No. 14 (Biven, et al., 1979) established the Trinidad KRCRA based on the following criteria:

1. "Included lands are generally underlain by a coal bed having a minimum thickness of 4 feet. Thickness data are from outcrops, mines, prospects, and drill holes.

2. Included lands have less than 3,000 feet of overburden above the uppermost 4-foot coal bed.

3. Where data points, such as outcrop, drill holes, etc., show a 4-foot- thick coal bed, the measurement is projected a distance of 2 miles around the data point, except where the coal bed is obviously absent. This procedure establishes belts of land from 2 to several miles wide from the outer edge (outcrop) of the coal, and northward from the southern edge of the KRCRA. Data points on the accompanying map show both more than, and less than, 4 feet of coal, but the data points are in various coal beds, and individual coal beds thicken and thin. There are as many 24 named coal beds in the area.

Available data, including proprietary information, indicate that at least one bed at practically any locality will be at least 4 feet thick, which is enough to justify the KRCRA. Detailed identification and correlation of these coal beds, and specific delineation of where a bed is 4 feet thick, is beyond the scope of this report and would follow in reports for other purposes.

4. For the following reason, a broad area lacking data points in the central part of the KRCRA and essentially surrounded by the belts of land described above, was included in the KRCRA:

   a. The belts of land described in 3 above are established whenever data points are reasonably abundant. These belts practically encircle the broad area in the central part. There may be a limited amount of additional nonproprietary drilling data in the files but a thorough search and determination is not warranted at this stage because of the KRCRA is considered amply justified on the basis of other factors as discussed herein.

   b. Geologic reports on three competitive lease applications covering essentially all of the Federal lands in this area, concluded that "the data throughout the field appear to be adequate to infer the presence everywhere of a coal bed (as much as) 4 feet thick; locally the data show thicker coal".

   c. Proprietary information in this office indicates that at least most of this broad area is underlain by coal beds 4 feet or more thick under less than 3,000 feet of overburden.

5. The southern boundary of the KRCRA is delineated by no-Federal coal ownership.

6. The western boundary of the main KRCRA tract is delimited by the area covered in the above geologic reports by Bass (see b above), and by the outcrop of the Trinidad Sandstone.

7. In the northwest part of the area, the coal-bearing formations are overlapped and covered by the Poison Canyon Formation. The projections of the coal beds southwestward beneath the Poison Canyon Formation is hypothetical and therefore not appropriate for purposes of the KRCRA.

8. The coal beds can be worked for the extraction of coal by conventional surface and/or underground mining methods."

The LaVeta syncline makes up the Colorado portion of the Raton Basin. This broad, asymmetrical syncline trends northwesterly, and has a steep dipping (sometimes overturned) west flank, and a gentle dipping east flank. Its axis is interrupted by the Spanish Peaks intrusion in the vicinity of the Huerfano-Las Animas County line. The northeast trending Delcarbon syncline splits off the LaVeta syncline north of the Spanish Peaks.

Also a northeast-trending monocline locally steepens the dips of the formations east of Spanish Peaks. Very little faulting occurs in the KRCRA area, except for isolated groups of normal faults such as in T. 33 S., R. 66 W.

Formations of Cretaceous and younger age outcrop in and around the KRCRA. Exposures are fair to poor, with the best exposures being along the Cucharas and Purgatoire Rivers. The formations exposed are, in descending order, the Huerfano Formation (Eocene), the Cucharas Formation (Eocene), the Poison Canyon Formation (Paleocene), the Raton Formation (Upper Cretaceous-Paleocene), the Vermejo Formation (Upper Cretaceous), and the Trinidad Sandstone (Cretaceous). Only the Raton and Vermejo Formations have coal of commercial value. The Poison Canyon Formation contains lignite coal in a few places at its base, but it is of no significance to the KRCRA. Igneous rocks in the form of stocks, plugs, sills, and northeasterly trending dikes are common in the Trinidad coal field. Sills and dikes are most abundant in the eastern and southeastern part of the KRCRA, and have locally metamorphosed the coal beds to natural coke.

Coal beds in the Trinidad coal field are generally thinner compared to coals of other Rocky Mountain area coal fields, and often contain partings of bone and shale. In the KRCRA, the Huerfano-Las Animas County line separates steam coal in the northern part of the field from coking coal in the southern part. Steam coal is of a nonagglomerating, high-volatile C, bituminous rank. Coking coal is of an agglomerating, high volatile A and B, bituminous rank. Heating value is from approximately 11,000 to 14,000 BTU, on an as-received basis.

Commercial coal is limited to two separate zones; the lower zone is in the Vermejo Formation and the upper zone is in the Raton Formation. A relatively barren conglomeratic sequence at the base of the Raton Formation separates the two coal bearing zones. Coal beds in the Vermejo Formation are generally thicker, more persistent, and of better quality than those in the Raton Formation. Individual beds within these zones are lenticular and generally trend northeastward. Some of the coal beds are split into two or more benches.

In the Vermejo Formation, the coal zone is just above the Trinidad Sandstone and extends 110 to 270 feet upward to the basal conglomerate of the Raton Formation. The more persistent coal beds are toward the base of the Vermejo Formation. There are at least 24 coal beds named in this zone making correlation of the coal beds difficult. Because of lateral discontinuity, some beds may have more than one name. An average of chemical analyses from 10 mines within the KRCRA, from the Vermejo Formation are as follows (Harbour and Dixon, 1959):

Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	BTU
2.6%	32.5%	52.6%	12.3%	0.66%	12,843

In the Raton Formation, the coal zone lies above the basal conglomerate. As stated previously, the coal is generally thinner and more discontinuous than in the Vermejo Formation. There are about 17 named coal beds in the Raton Formation, 9 of which are listed in Harbour and Dixon (1959). An average of chemical analysis from 10 mines within the KRCRA, from the Raton Formation are as follows (Harbour and Dixon, 1959):

Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	BTU
3.1%	36.3%	50.8%	9.7%	0.55%	12,961

According to Johnson (1961) coal was first discovered in the Trinidad field in 1846 by the military expeditions of Abert and Emory. Since then about 370 areas have been mined, mostly wagon and truck mines for domestic use, along the outcrops. Several larger mines such as Delagua, Boncarbo, and Ludlow have been mined for industrial use as coking coal. Coal production peaked during the period 1911-1920, averaging 5,652,034 tons annually. Cumulative coal production through May 1988 is a little over 249 million tons (75 million in Huerfano County, and 174 million in Las Animas County). There has been no coal production in Huerfano County since 1984, when production for that year was 10,454 tons. Coal production has also slowed down by half in Las Animas County since 1984.

The New Elk (previously the Allen), the Golden Eagle (previously the Maxwell), and the Raton Creek mines are the only ones presently permitted to mine, with only the Golden Eagle being in production. The production from the Golden Eagle in 1989 was 901,963 tons, in 1990, 1,551,193 tons, in 1991, 1,039,986, and in 1992, 418,809 tons. Coking coal being produced at the Golden Eagle mine is currently being sold for steam coal on the spot market because of a low demand. No Federal coal is presently being mined, though the Golden Eagle Mine anticipates mining Federal coal before the end of the year. There is one Federal coal lease (C-067) in the KRCRA, which has 962 acres and is operated by Basin Resources, Inc. It is located 3 miles west of Weston along the Purgatoire River.

Table I-1 shows a comparison of the coal reserve figures in the Amuedo and Ivey report (1974), USGS Bulletin 1112-E (Johnson, 1961), and USGS Bulletin 1072-C (Landis, 1959). Amuedo and Ivey used a 4-foot minimum coal thickness, and broke down the reserves into three categories: 0'-1000', 1000'-2000', and 2000'-3000' overburden. Johnson used three coal thickness ranges (14"-28", 28"-42", and 42") along with the three overburden categories that Amuedo and Ivey used. In Table I-1 only Johnson's 42" coal thickness range is used, to compare as closely as possible to Amuedo and Ivey's 4 foot minimum criterium.

Table I-1 shows that Amuedo and Ivey's total reserves figure for coal 4 feet thick or greater is 2,700.5 million tons, compared to Johnson's 1,335.8 million tons of coal with greater than 42 inches of thickness. In some cases, Amuedo and Ivey had access to confidential core data, which could account for some of the difference. Johnson's grand total reserves (for all three of his coal ranges) are also low compared to Landis' grand total reserves, even when one takes into account that Landis calculated all the coal within the respective zones.

his coal ranges) are also low compared to Landis' grand total reserves, even when one takes into account that Landis calculated all the coal within the respective zones.

In the U.S. Bureau of Mines Information Circular 8713 (Speltz, 1976) strippable coal reserves are estimated at 113 million tons within the KRCRA. The author admits that these reserve figures are speculative. Strippable coal reserve figures derived from Amuedo and Ivey indicate total reserves to be about 151,200,000 tons, with only about 32,400,000 tons of Federal coal involved.

These reserve figures were derived by outlining the acreage (on the Amuedo and Ivey maps) covered by the individual coal zones of at least 2- inch thickness, and with 200 feet or less of overburden. The cumulative acreage was then multiplied by an estimated average overall coal thickness of 3 feet. The resulting acre-feet figure was then multiplied by 1,800 tons per acre-foot (the average weight of bituminous coal). Overlays were made showing the strippable coal areas.

The strippable coal information was derived from three different sources: Amuedo & Ivey (1974), Speltz (1976), and the URA/MFP done by the BLM in 1977. Information from Amuedo and Ivey seems to be the most accurate because of the detailed coal bed analyses they did, some of which were based on confidential industry figures. Speltz in his report states that the reserve figures he used were speculative. The source of the URA/MFP information is not clear. Also the URA/MFP just delineates certain Federal coal areas as being strippable. If an average thickness of 3 feet is assumed over the strippable Federal coal on 53,000 acres, and there is an average of 1,800 tons per acre assumed, calculation shows about 286 million available tons. This represents about 10 percent of the total coal reserves.

Table I-1 shows only 32.4 million tons of strippable Federal coal; however, it must be assumed there is other underground minable Federal coal and should be shown here as part of the total coal reserve base. If an average thickness of only 4 feet is assumed over the entire Federal coal acreage of 131,000 acres, and there is an average of 1,800 tons per acre-foot, a calculation of these figures would show the total other underground minable Federal coal is at least 936,000 million tons. This represents about 35 percent of the total coal reserves.

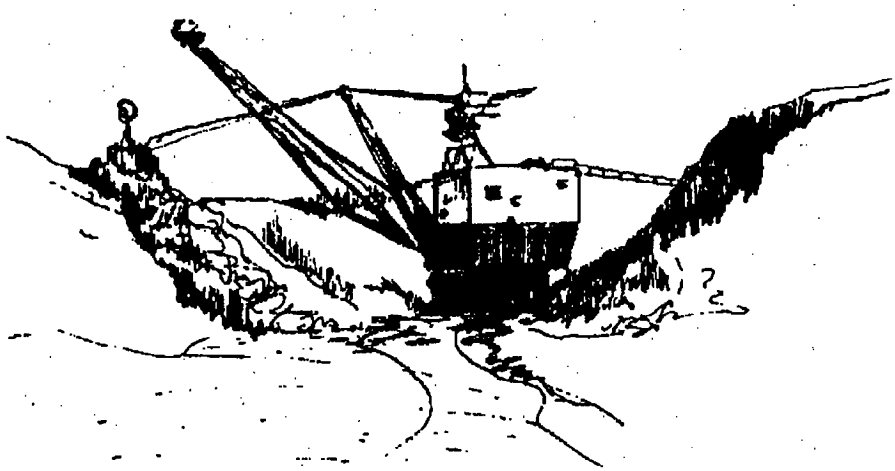


TABLE I-1
Comparison of Coal Reserve Figures

Township & Range	AMUEDO & IVEY (1974) 4' Minimum Coal Thickness (MM Tons) Overburden 0-1000'	1000-2000'	2000-3000"	Total Reserves	R.B. JOHNSON (Bull. 1112-E, 1961) 42" Coal Thickness(MM Tons) Overburden 0-1000"	1000-2000"	2000-3000"	Total Reserves	Grand Total Reserves (14-28" 28-42" & > 42')	E.R. LANDIS (Bull. 1072-C 1959) Grand Total Reserves
T.27S., R.66W.	-	-	-	-	1.3	-	-	1.3	1.9	1.9
T.27S., R.67W.	88.1	51.6	-	139.7	9.0	29.5	10.5	99.0	187.9	187.9
T.27S., R.68W	14.2	5.1	-	19.3	14.2	7.7	-	21.9	29.9	29.9
T.28S., R.66W.	61.69	1.1.	-	62.7	30.4	-	-	30.4	149.9	149.9
T.28S., R.67W.	43.4	82.4	27.2	153.0	7.4	3.6	0.5	11.5	101.4	101.4
T.28S., R.68W	-	4.8	2.1	6.9	1.6	-	-	1.6	19.5	19.5
T.28S., R.69W.	-	-	-	-	-	-	-	-	0.5	0.5
T.29S., R.65W.	33.1	-	-	33.1	38.8.	.0.2	-	39.0	69.4	70.5
T.29S., R.66W.	98.3	61.8	-	160.1	39.0	23.1	-	62.1	311.5	327.7
T.29S., R.67W.	1.7	38.7	69.9	110.3	-	-	-	-	4.8	4.8
T.29S., R.68W.	-	-	19.4	19.4	-	-	-	-	-	-
T.29S., R.69W.	-	-	0.4	0.4	20.6	0.8	0.07	21.4	44.4	30.0
T.30S., R.65W.	52.4	8.5	-	60.9	22.5	3.4	-	25.9	247.2	338.6
T.30S., R.66W.	7.6	66.5	12.1	86.2	-	0.4	-	0.4	93.0	197.2
T.30S., R.67W.	-	-	-	-	-	-	-	-	-	-
T.30S., R.68W.	-	-	1.0	1.0	0.03	3.4	-	3.4	12.0	12.6
T.30S., R.69W.	0.5	3.5	2.1	6.1	10.3	10.7	5.5	26.5	63.5	55.5
T.31S., R.64W.	2.8	-	-	2.8	18.9	-	-	18.9	26.8	27.4
T.31S., R.65W.	131.0	12.8	-	143.8	109.9	-	-	109.9	268.4	629.6
T.31S., R.66W.	20.0	6.6	15.9	42.5	-	-	-	-	7.4	318.4
T.31S., R.67W.	-	-	2.6	2.6	-	-	-	-	-	23.6
T.31S., R.68W.	-	0.2	1.2	1.4	0.03	0.6	0.9	1.5	3.2	3.2
T.31S., R.69W.	-	-	-	-	4.6	2.3	1.2	8.1	36.3	20.6
T.32S., R.64W.	42.8	-	-	42.8	65.4	-	-	65.4	167.4	240.2
T.32S., R.65W.	147.3	50.3	-	197.6	26.8	-	-	26.8	160.4	684.7
T.32S., R.66W.	31.0	22.5	4.9	58.4	7.9	-	-	7.9	19.6	506.8
T.32S., R.67W.	-	-	37.8	37.8	-	-	-	-	-	424.8
T.32S., R.68W.	17.0	0.6	-	17.6	2.6	-	-	2.6	4.3	37.4
T.32S., R.69W.	0.7	-	-	0.7	1.6	-	-	1.6	2.2	2.2
T.33S., R.63W.	17.0	0.6	-	17.6	2.6	-	-	2.6	4.3	37.4
T.33S., R.64W	9.5	-	-	9.5	53.0	-	-	53.0	187.7	289.7
T.33S., R.65W.	9.8	-	-	19.8	47.2	-	-	47.2	125.9	714.4
T.33S., R.66W.	61.1	57.2	6.1	124.4	118.6	-	-	118.6	171.4	798.2
T.33S., R.67W.	135.2	85.3	13.4	233.9	37.3	0.03	-	37.3	205.0	673.9
T.33S., R.68W.	38.3	15.1	10.5	63.9	63.0	10.2	-	73.2	230.5	416.4

Table I-1 (Continued)

Township & Range	AMUEDO & IVEY (1974) 4' Minimum Coal Thickness (MM Tons) Overburden 0-1000'	1000-2000'	2000-3000"	Total Reserves	R.B. JOHNSON (Bull. 1112-E, 1961) 42" Coal Thickness(MM Tons) Overburden 0-1000"	1000-2000"	2000-3000"	Total Reserves	Grand Total Reserves (14-28" 28-42" & > 42')	E.R. LANDIS (Bull. 1072-C 1959) Grand Total Reserves
T.34S., R.63W.	18.3	58.2	34.6	111.1	1.6	-	-	1.6	8.0	214.0
T.34S., R.64W.	48.8	3.3	-	52.1	57.8	-	-	57.8	175.0	777.1
T.34S., R.65W.	37.9	13.1	-	51.0	41.2	-	-	41.2	137.4	1,027.3
T.34S., R.66W.	52.9	17.2	-	70.1	0.2	-	-	0.2	69.3	834.3
T.34S., R.67W.	6.2	71.1	8.2	85.5	7.5	-	-	7.5	103.2	380.0
T.34S., R.68W.	64.9	48.2	-	113.1	139.2	8.5	1.9	149.6	324.4	317.4
T.34S., R.69W.	-	1.2	0.4	1.6	4.8	6.8	5.8	17.4	42.1	45.7
T.35S., R.61W.	-	-	-	-	-	-	-	-	-	15.2
T.35S., R.62W.	7.2	-	-	7.2	-	-	-	-	-	54.5
T.35S., R.63W	43.8	5.7	-	49.5	1.7	-	-	1.7	2.9	85.4
T.35S., R.64W.	9.9	33.6	-	43.5	16.9	-	-	16.9	72.6	248.7
T.35S., R.65W.	-	4.8	-	4.8	-	-	-	-	6.9	310.9
T.35S., R.66W.	-	1.9	-	1.9	-	-	-	-	13.6	341.5
T.35S., R.67W.	-	6.9	-	6.9	-	-	-	-	9.4	138.4
T.35S., R.68W.	47.4	33.2	0.2	80.8	8.9	4.8	4.8	18.5	129.7	119.2
T.35S., R.69W.	1.4	20.8	11.1	33.3	4.2	3.3	5.9	13.4	44.5	93.4
				2,700.5				1,335.8	4,268.6	12,618.4

Unsuitability Criteria

The 20 unsuitability criteria and corresponding exceptions would be applied to all areas passing the initial coal potential screening (43 CFR 3461).

The criteria and subsequent screenings are used for two primary purposes.

1. Determine areas suitable for further consideration for leasing.
2. Determine areas suitable for further consideration for certain types of mining (i.e., underground).

These determinations are to be based on the best available information; on-the-ground inventories are not authorized.

There may be some cases where sufficient information is not available. These cases should be clearly identified, and it should be defined where in the overall process, the information will be provided.

CRITERIA 1 = All National Park System, National Wildlife Refuge System, National Wilderness System, National Trail System, National Wild and Scenic Rivers System, National Recreation System, or any lands acquired through Land & Water Conservation Funds, National Forest System, and any lands in incorporated towns, cities, or villages are considered unsuitable.

CRITERIA 2 = All Federal lands within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes are considered unsuitable.

CRITERIA 3 = All 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 are considered unsuitable.

CRITERIA 4 = All lands designated as wilderness study areas shall be considered unsuitable.

CRITERIA 5 = All scenic Federal lands designated by visual resource classification analysis as Class I shall be considered unsuitable.

CRITERIA 6 = All lands under permit by the surface management agency and being used for scientific studies involving food or fiber production shall be considered unsuitable.

CRITERIA 7 = All public and private places included in the National Register of Historic Places shall be considered unsuitable.

CRITERIA 8 = All Federal lands designated as natural areas or are being studied as potential areas of critical environmental concerns (ACECs) or as National Natural Landmarks shall be considered unsuitable.

CRITERIA 9 = All federally designated or habitat proposed for designation as critical habitat for listed threatened or endangered plan and animal species shall be considered unsuitable.

CRITERIA 10 = All Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state as endangered or threatened shall be considered unsuitable.

CRITERIA 11 = All bald or golden eagle nests or sites on Federal lands determined to be active with an appropriate buffer zone of land around the site shall be considered unsuitable.

CRITERIA 12 = All bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

CRITERIA 13 = All Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a appropriate buffer of Federal land around the next site shall be considered unsuitable.

CRITERIA 14 = All Federal lands that are high priority habitat for migratory bird species of a regional or national interest basis as determined jointly by the surface managing agency and the USFWS shall be considered unsuitable.

CRITERIA 15 = All Federal lands that the surface managing agency and the state jointly agree are habitat for resident species of fish, wildlife, and plants of high interest to the state and are essential for maintaining these priority species shall be considered unsuitable (e.g.; active strutting grounds for sage grouse, winter range crucial for deer, elk migration routes, range for plant species, etc.).

CRITERIA 16 = All 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 shall be considered unsuitable.

CRITERIA 17 = All Federal lands committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

CRITERIA 18 = All Federal lands with national resource waters, as identified by states in their water quality management plans, and a buffer zone on Federal lands of one-quarter mile from the outer edge of the far banks of the water shall be considered unsuitable.

CRITERIA 19 = All Federal lands identified by the surface management agency, in consultation with the state, as alluvial valley floors shall be considered unsuitable.

CRITERIA 20 = All Federal lands which a state or indian tribe propose to be excluded shall be considered unsuitable.

Multiple Use Trade-offs

Coal planning regulations state that multiple land use decisions shall be made that may eliminate additional coal deposits from further consideration for leasing in order to protect resource values of a locally important or unique nature not included in the unsuitability criteria.

Examples of items that can be included in this analysis are identified in 30 CFR 762.5. These items are similar in concept to the unsuitability criteria and are used to help generate sound decisions regarding future leasing.

The Trinidad KRCRA occurs in an area with a relatively small percentage of federally managed surface estate. Inventories of "other" resource values not specifically identified in the coal unsuitability criteria that should be considered are not available. No additional values requiring consideration were identified during consultations with the state. The letter sent to the State of Colorado is Attachment 1 to this appendix.

The only areas identified during scoping sessions were subdivisions and VRM Class II areas.

During surface owner consultations, we became aware that a significant percentage of the area with potential for surface mining had been subdivided. This is an important factor not addressed in the Coal Unsuitability Criteria. Little development has occurred to date, but potential for housing development in the future is strong.

Visual resources are also an important concern. There are no VRM Class I areas (wilderness) within the planning boundaries of the resource area. There are some VRM Class II areas, which are the most important VRM areas within the planning boundaries. These are given special attention in the multiple use analysis.

Surface Owner Consultations

The Trinidad Known Recoverable Resource Area contains approximately 415,000 acres of land. Within this area about a third was determined to have potential for either surface mining or underground mining. The remaining area was determined to have potential for underground mining only.

The area with potential for surface mining is shown on Map 2-9 (Chapter 2).

The remaining areas did not require this screen and will be restricted to underground mining activity only.

This area falls within Las Animas County. A search of courthouse records was conducted in 1989 and 1990 to determine surface ownership within this area. A mailing list of 257 names and addresses was developed over this time, and a letter (Attachment 1) was mailed to each name in January 1991.

The following results were received:

- Letters sent - 257
- Responses received - 57
- Surface owners qualified or assumed qualified - 57
- Responses "in favor" - 22
- Responses "opposed" - 13
- Responses "unsure" - 22

Prioritization

A fifth step of land use planning involves identifying priority areas for leasing. Areas could be prioritized as to where particular data gaps would be eliminated. For example, if an area has high potential for development and minimal environmental concerns, it would be identified as a "first priority" and receive priority treatment in eliminating any data

gaps. This is not a tract delineation process, but only a process to identify, by priority, the areas needing data gaps filled. This is an optional section and is not critical to the success of the resource management plan (RMP), but is recommended. It should be re-emphasized that data gaps should be the exception and not the rule.

Summary

The previous procedures will satisfy all planning criteria and are also tailored to fit RGPA needs. Application of unsuitability criteria to the Trinidad KRCRA, which covers about 438,204 acres, should provide the needed flexibility for potential leasing over the next 20 years whether Bureau or privately initiated.

The following summarizes the coal screening process.

Coal Screen 1 (Development Potential)

Total acres with potential for Federal coal development - 131,000.
Acres with potential for underground mining only - 77,964.
Acres with potential for underground or surface mining - 52,980.

Coal Screen 2

Coal unsuitability criteria was applied to the entire area with potential for coal development including those areas with potential for underground mining only. This was to determine if there were large areas where surface developments supporting underground mining should be restricted.

There were no acreages eliminated from further consideration for surface mining or surface facilities through application of the 20 criteria since none of the criteria were applicable. There were, however, concerns related to Criteria 5, 9, 10, and 15, which are explained in Coal Screen 4.

Coal Screen 3

The surface owner consultations were completed on approximately 30,000 acres with potential for surface mining. Response to the 250 + letters and public meetings was inconsequential.

No acreages were eliminated because of this screening.

Coal Screen 4

Table I-2 shows the acres eliminated from further consideration because of multiple use analysis.

TABLE I-2
Summary or Acres Eliminated from Further Consideration

	Acres by Alternative			
	Existing	**Resource-Conservation**	**Resource Utilization**	**Preferred**
Subdivisions	None	All (Unknown)	None	All (Unknown)
Big Game Birthing Habitat	None	167	None	167
Big Game Critical Winter Habitat	None	23,955	None	None

ATTACHMENT 1

(Copy of letter)

3400

(CO-057)

January 14, 1991

Dear Landowner:

The Bureau of Land Management (BLM) is screening Federal coal areas to identify those that should be further considered for possible leasing in accordance with the Department of the Interior coal management regulations. The areas involved in this screening are those lands with private surface estate and Federal coal estate and are shown on the enclosed Coal Surface Owner Consultation Acreage (2/27/90) list. Our review of county records shows that you own the surface of lands on which the United States has retained ownership of the coal. The screening is also restricted to those areas previously identified as having some potential for surface mining of coal. The screening is part of the planning process for the preparation of a resource management plan for management of BLM-administered lands and Federal minerals in the Royal Gorge Planning Area, which includes the Raton Basin in southeastern Colorado. The resource management plan, now being prepared, is scheduled for completion in late 1992.

The Surface Mining Control and Reclamation Act of 1977 gives certain types of protection to surface owners who qualify under the law. The law contains both a consultation requirement and a consent requirement. BLM must consult with surface owners as part of the planning process and ask whether they favor or oppose leasing of coal under their land (the consultation requirement). If you qualify, the BLM cannot issue a coal lease and authorize a company to surface mine the coal under your land unless you agree to let that mining occur (the consent requirement).

Qualified Surface Owners

The protections of the surface mining law apply only to surface owners as defined by the surface mining law. The law defines surface owners as a person or persons who:

(1) hold legal or equitable title to the land surface;

(2) have their principal place of residence on the land; or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface coal mining operations; or receive directly a significant portion of their income, if any, from such farming or ranching operations; and,

(3) have met the conditions of paragraphs (1) and (2) for a period of at least three years prior to the granting of consent.

If you meet the requirements of law listed above, you can help ensure that your preferences are considered in the BLM planning process by letting us know whether or not you meet each of the requirements.

The purpose of this letter is to consult with you and give you an opportunity to tell us whether you favor or oppose leasing the coal under your land. BLM is not now proposing to lease the coal under your land nor asking for your consent to allow leasing and mining. One of purposes of the resource management plan is to help BLM decide which coal lands in the Raton Basin should or should not be further considered for possible leasing. The decision as to which specific coal lands would be considered for leasing will be made in a separate process, at which time you would be contacted for consent.

The reason for this consultation with you and other surface owners in your area is to give BLM an opportunity to understand your feelings about surface mining of coal under your land. The coal under your land might be included in a tract we would offer for Federal leasing. If a significant number of qualified surface owners in your area, however, are opposed to surface mining of coal under their land, the decision may be to refrain from leasing any Federal coal in that area for surface mining. If this is the case, receiving your views at this early stage of planning will allow us to avoid making specific plans for coal leasing in your area.

If you have already given your consent to a coal company or someone else to surface mine the coal under the land, it is important that the BLM know about this in preparing its land use plans. The enclosed consultation form provides an opportunity for you to list any such agreements.

You may want to seek the advice of someone outside the Federal government (for example, neighboring surface owners, a lawyer, or someone familiar with surface coal mining operations) before you answer this letter.

In order to fully consider your views, we must have your response to this consultation by March 1, 1991. Please express your views on the enclosed form. The form is designed so you can respond individually for each separate parcel of land, and you may separate the parcels by legal descriptions if you desire. A sample is enclosed for your information.

If you have questions concerning consultation or any other aspect of the planning process, please contact Dave Taliaferro or Dan Grenard at our office (719) 275-0631. Our office hours are from 7:45 a.m. to 4:30 p.m.

We are looking forward to your views.

Sincerely yours,

/s/ Mac Berta

Area Manager

Enclosures

SURFACE OWNER CONSULTATION

(See step-by-step instructions on the reverse side)

① Legal Description				Ownership Status			④ Previous Consent Is there presently a valid surface lease agreement (signed by either yourself or a previous surface owner) for the mning of Federal coal under your land? (Indicate Yes or No. If Yes, indicate date of agreement, date of expiration if known, and name of lessee.)				⑤ Views (Please check only one per parcel.) Regarding the surface mining of Federal coal under my land, I am		
				② I have owned this land since		③ I (a) have my principal residence on this land, or (b) I personally farm or ranch on this land, or (c) I receive a significant portion of my income from farm or ranch operations on this land. (Indicate a, b, c, or appropriate combination. If none apply, write "N/A.")							
Township	Range	Section	Parcel	Month	Year		Yes/No	Date Leased	Expiration Date	Lessee	In Favor	Unsure	Opposed

LANDOWNER SIGNATURE _____ DATE _____

DIRECTIONS

(Numbers apply to circled numbers on form.)

1. Write in township, range, and section numbers, and under parcel indicate the subdivision of the section. If all of the section is included, write "all." The line to the right of the description you provide is for information pertaining only to that parcel. Do not list lands over nonfederal coal.

Example

Township	Range	Section	Parcel
28S.	70W.	8	SE1/4

2. Write in month and year land was acquired by you. If you are buying the land through a contract for deed, indicate when the contract was signed.

3. Some, all, or none of the categories (a, b, or c) apply to you. Write in the letter(s) for the category(s) that does apply.

4. If you or a previous owner signed an agreement or lease permitting surface mining of coal in the land described, and if that lease is still in effect, write "Yes," date of the lease, date lease expires, and name of the person or company holding the lease. (The lease might be called a "coal lease", even though it applies only to the surface - not to the federal coal, which can only be leased by the federal government.) If you or a previous surface owner have not leased the surface for coal mining, write "No".

5. What are your attitudes toward surface mining the federal coal under your land? Place an X in the column that applies: In Favor, Unsure, or Opposed. If none of the three categories exactly represents your position, please choose closest to your position.

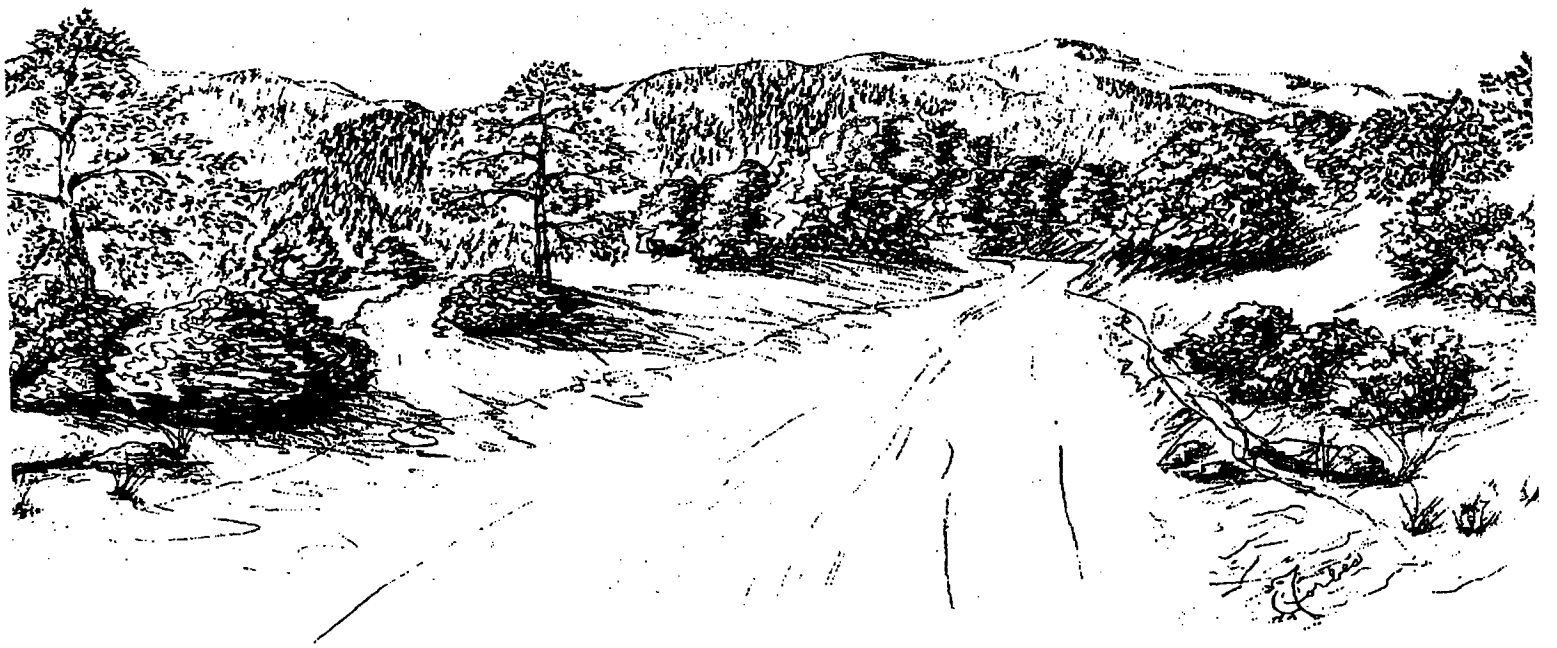
Remember, the views you express here are not legally binding.

If you have additional comments please make them in the space provided. If you have any questions concerning surface owner consultation, please contact the Bureau of Land Management at (719) 275-0631 or visit the Cañon City District Office, Royal Gorge Resource Area, 3170 E. Main St., Cañon City, Colorado.

COMMENTS

APPENDIX J

WATERPOWER/RESERVOIR RESOURCES



APPENDIX J
WATERPOWER RESERVOIR RESOURCES

The following general background information on waterpower and reservoir resources (WRR) will give the reader a basic understanding of these resources on the BLM-administered lands in the Royal Gorge planning area.

Historical Background

One of the many factors in the management and use of the remaining public lands within the United States is water supply. The extension of agriculture and grazing, the development of mineral industries, transportation, municipal water, and other varied activities, are directly dependent on the quantity and quality of the underground and surface water in basically an arid region.

In messages to Congress during 1908 and 1909, President Roosevelt called attention to the danger of an uncontrolled monopoly of a waterpower development and to the desirability of preventing powersites on the public domain from falling into the hands of speculators and monopolists. Quality potential reservoir and waterpower sites are limited in number, fixed in position, increasingly scarce, and irreplaceable. As early as February 26, 1908, in a message transmitting a report of the Inland Waterways Commission, he advocated legislation providing for the leasing of such sites rather than their alienation. The report of the Inland Waterways Commission contains the following statement:

> *"Whether water is now or will hereafter become the chief source of power, the monopolization of electricity from running streams involves monopoly of power for the transportation of freight and passengers, for manufacturing, and for supplying light, heat, and other domestic, agricultural, and municipal necessities to such extent that unless regulated it will entail monopolistic control of the daily life of our people in an unprecedented degree."*

Since that time, Congress has legislated requirements for retention of land with WRR values. Congress authorizes development by government agencies or allows development by others through leasing of the potential sites. This maintains public control in any possible development of potential sites.

During the 40-year period from 1879 to 1919, Congress passed several laws requiring the withdrawal of land valuable for WRR sites. Since 1888, the Federal government has been identifying and documenting potential reservoir sites. This function was accomplished by the U.S. Geological Survey (USGS) for the Secretary of the Interior, but in 1983, the authority was delegated to the Bureau of Land Management.

Resource Description

Reservoir sites are constructed to provide the operator with control of the distribution of the flows in a stream for a more dependable water supply. This control of the distribution is valuable to meet needs or demands for water. Reservoirs provide many local, regional, and national benefits. They can be used for:

- irrigation
- mining
- logging
- interbasin transfers
- off-stream storage
- flood control
- ground water recharge
- wetlands
- improving water quality
- enhanced fisheries
- additional water for wildlife, stock, and fire fighting

- domestic and industrial supplies
- transportation
- recreational opportunities
- scenic values
- hydroelectricity

Reservoirs are created by building a dam to hold water in a natural geographic basin. The purpose is to capture high streamflows, store water, and then relese it at a more desirable time, thereby controlling stream flow. Water diverted out of a stream generally creates a vertical distance or fall between the flows and the stream. This fall can be used to create waterpower (hydropower). The hydroelectric value is a function of demand and need; generally, the value has been recognized and given high priority by Congress.

Size of the potential reservoir depends on the amount of control desired, available financing, and political support. Sites are dependent on topography, geology, water supply, and water distribution. Waterpower and reservoir sites should be sized to provide the desired control without unnecessary expense of oversizing. Many times the physical topography will not allow the control and several dams are considered. When combined, these factors severely restrict reservoir locations.

Site selection is further complicated by the immediate and long-term effects of the reservoir. Resources at a site may potentially be affected at each phase of the reservoir development process:

During planning, access to the site, drilling, geophysical investigations (may involve blasting), and mapping may be required

Reservoir construction may require timber harvesting, soil and rock removal (with associated blasting), and a construction environment including workers and equipment.

After construction, timber, wildlife cover, forage, access, and historical and cultural resources may be affected by the presence of the reservoir; existing fish populations may change from stream to lake stock; and the number of visitors attracted for recreation purposes may increase. In addition, resources may be affected by reservoir operations, which control fluctuations of water in the reservoir, amount of water in the stream, and times that water is available.

Need for the Resource

The need for adequate supplies of pure water for human consumption and economic security is one of the next major resource management crisis predicted for the nation. The Arkansas and South Platte drainages produce an abundance of high quality water for which demands exceeds supply. Present demand includes irrigation, power, fisheries, esthetics, recreation, and domestic use. Nearly 90 percent of the 2.2 million people in Colorado live east of the Continental Divide in an area receiving an average annual precipitation of 15.7 inches. Ground water in eastern Colorado has been developed to a point where wells are running low and yields are of low quality for meeting the rapidly growing demand being imposed by urban population growth and intensified agricultural practices.

Future local, regional, and national needs in these basins include provision for irrigation, mining, interbasin transfers, off-stream storage, flood control, ground water recharge, wetlands, improving water quality, enhanced fisheries, additional water for wildlife, livestock, fire fighting, domestic and industrial supplies, recreation opportunities, scenic values, and hydroelectricity.

WRR Withdrawals

Congress has given WRR values a high priority and provided legislation for resource protective withdrawals for protection of this resource. The objective of the withdrawals is to identify lands with existing potential sites and to ensure their consideration. The purpose of these withdrawals is to prohibit the general public from obtaining control of these sites as well as to prohibit management practices from endangering the WRR resource.

These withdrawals (Table J-1) neither commit the government to construction nor prohibit private use for water resource development. The land may continue to be entered for other uses, but with the understanding that water development cannot be precluded by such entry. They are a form of long-range planning to impose constraints on land managers for protection of the waterpower and reservoir values.

TABLE J-1
Waterpower Withdrawals in Royal Gorge Resource Area[1/]

BLM Case Number	USGS Number	Acreage
	Above Cañon City - Arkansas R U CO	
C28319	Reservoir Site 6	80.00
C28319	Reservoir Site 9	174.48
C28319	Reservoir Site 51	275.20
C28584	Power Site Reserve 92	27,012.62
C28593	Power Site Reserve 186	2,226.40
C28606	Power Site Reserve 404	240.00
C28620	Power Site Classification 32	3,652.00
C28622	Power Site Classification 54	4,920.00
C28638	Power Site Classification 261	120.00
C28642	Power Site Classification 350	1,614.64
	Sub Total	40,315.34
	Below Cañon City - Arkansas R M CO	
C28319	Reservoir Site Reserve 11	480.00
C28612	Power Site Reserve 497	34.00
C28613	Power Site Reserve 539	2,838.30
	Sub Total	3,352.30
	Below Cañon City - Arkansas R L CO	
C28319	Reservoir Site 46	1,631.85
	Sub Total	1,631.85
	Below Cañon City - South Platte R U CO	
C28623	Power Site Classification 56	720.00
C28636	Power Site Classification 225	946.00
	Sub Total	1,666.00
	Total	46,965.49

[1/]Some of these sites are on U.S. Forest Service lands outside the Royal Gorge Planning Area.

When BLM-administered lands valuable for WRR sites are formally withdrawn, sites are protected through operation of the public land laws and regulations, and in some cases, through cooperative administrative procedures of the Federal Energy Regulatory Commission (FERC). The following considerations apply to WRR withdrawals:

a. The withdrawal will be for an indefinite period.

b. The purpose of the withdrawal is to retain WRR values in Federal ownership.

c. The withdrawal will have no effect on the use of waters.

d. The withdrawal will not affect or reduce existing land management responsibilities.

e. The effect of the withdrawal on resource management is a matter of law and is the same in all cases, and need not be stated.

WRR withdrawals were made after the original resource decision was made by the Secretary of the Interior, with concurrence of the management agency. The ruling was that it had the highest priority among a number of possible uses, but this priority must be revisited as other land values become apparent. Until then other uses will be managed in such a way as to protect the use of the site for waterpower or reservoir purposes. The term for this type of management is "intensive management of waterpower or reservoir sites."

Since 1983, BLM has had the responsibility for land management decisions concerning all Federal lands with potential waterpower and reservoir resource values. Recommendations to alter this resource decision requires concurrence by both the FERC, because of provisions of the Federal Power Act of 1920, and by congressional legislation.

Developmental Withdrawals

Congress provided for withdrawals to protect development interests of the Bureau of Reclamation (BOR), Corps of Engineers (COE), and the Federal Energy Regulatory Commission (FERC) applicants. These forms of withdrawals protecting development interest are distinctly different than withdrawals protecting WRR values, but they may occupy the same Federal lands. Withdrawals protecting BOR, COE or FERC development interests are more restrictive concerning other possible uses of the land. These restrictive management constraints need separate considerations before any management actions are taken and should be reviewed with the withdrawal agency.

Congress has provided various authorities for development of waterpower and reservoir sites. The BOR, COE, Soil Conservation Service, and the Tennessee Valley Authority are Federal agencies with given development authority. Non-Federal entities may develop hydroelectric dams under the provisions of the *Federal Power Act* of 1920, under the direction of FERC. This legislation provides for the leasing of sites rather than their alienation. Other developments are regulated by the land management agency, the State Engineers Office, and the COEs clean water permits.

BLM Delegated Authority

BLM now has the responsibility to provide a scientific classification of WRR values on Federal lands, regardless of which Federal department or agency administers the lands, and make recommendations to the Secretary of the Interior as to withdrawal status changes. This scientific classification is accomplished by resource inventory, monitoring, evaluation activities, and resulting land actions required by legislation, regulation, and policy.

Identification

The objective of the WRR inventory activity is identification of the potential sites, a professional assessment of their value, and retention of control of the sites. Site documentation of established resource values of a potential reservoir includes information on location, potential capability, extent, natural physical condition, historical need, effect, and potential of the reservoir. Information and inventories are collected from other governmental development agencies and private development agencies. The Secretary of the Interior, has given BLM full responsibility for performing independent engineering reservoir evaluations and for providing inventory information to other agencies and the public.

Sites listed in Table J-2 indicate developed and previous interest and the location of resources. The listed sites are those previously identified and may not reflect all possible sites. These 146 sites have been tracked by U.S. Geological Survey (presently function of BLM) since identification. Information pertaining to location, technical evaluation, monitoring, partial development, and the subsequent land actions on the WRR sites in these basins may be obtained from the BLM Colorado State Office.

TABLE J-2
Waterpower Sites in Royal Gorge Resource Area[1/]

Name	Type	Number	Location
Hydrologic Unit - 11020001 Arkansas Basin			
Sylvan Lakes	UR	11020001-005	T.8 S.,R.80 W., Sec. 21
St. Kiven	UD	11020001-010	T.9 S.,R.80 W., Sec. 16
Leadville Res	UR	11020001-015	T.9 S.,R.80 W., Sec. 10
Leadville Junction Res	UR	11020001-017	T.9 S.,R.80 W., Sec. 21
Sugarloaf Dam	DR	11020001-022	T.9 S.,R.80 W., Sec. 19
Elbert Powerplant	UH	11020001-022	T.9 S.,R.80 W., Sec. 19
Mt. Elbert Hydro Proj.	UH	11020001-022	T.9 S.,R.80 W., Sec. 19
Halfmoon Diversion	DR	11020001-025	T.10 S.,R.80 W., Sec. 18
Snowden Diversion	UH	11020001-030	T.10 S.,R.80 W., Sec.
Box Creek (Res. #3)	UR	11020001-045	T.11 S.,R.80 W., Sec. 11
Box Creek Alternative	UR	11020001-046	T.11 S.,R.80 W., Sec. 12
Willis Gulch	UH	11020001-054	T.12 S.,R.80 W., Sec. 2
Star Mountain	UR	11020001-055	T.11 S.,R.82 W., Sec. 25
Twin Peaks	UR	11020001-056	T.11 S.,R.81 W., Sec. 27
Twin Lakes Reservoir	DR	11020001-057	T.11 S.,R. 80 W., Sec.
Twin Lakes Reservoir	UR	11020001-057	T.11 S.,R. 80 W., Sec.
Mt Elbert Forebay	DR	11020001-057A	T.11 S.,R.80 W., Sec. 8
Mt Elbert Forebay	DP	11020001-057A	T.11 S.,R.80 W., Sec. 8
Cache Creek	UR	11020001-060	T.12 S.,R.79 W., Sec. 6
Clear Creek Reservoir	DR	11020001-065	T. 12 S.,R.80 W., Sec. 8
Otero Powerplant	UH	11020001-065A	T.12 S.,R.79 W., Sec. 8
Pine Creek	UR	11020001-067	T.12 S.,R.79 W., Sec. 31
Springs Hydro #2	UH	11020001-068	T.12 S.,R.79 W., Sec. 28
Granite Diversion	UH	11020001-070	T.12 S.,R.79 W., Sec. 22
Wapaco Powerplant	UH	11020001-080	T.12 S.,R.79 W., Sec. 8
Americus Power Project	UH	11020001-085	T.13 S.,R.79 W., Sec. 13
Mile 47.2 Diversion	UH	11020001-090	T.13 S.,R.79 W., Sec. 24
Elephant Rock	UR	11020001-095	T.13 S.,R.78 W., Sec. 31
Elephant Rock	UH	11020001-095	T.13 S.,R.78 W., Sec. 31
Elephant Rock Power	UH	11020001-100	T.13 S.,R.78 W., Sec. 30
Seven Mile	UR	11020001-102	T.13 S.,R.78 W., Sec. 32
South Cottonwood Div.	UH	11020001-110	T.14 S.,R.79 W., Sec. 13
Cottonwood	UR	11020001-120	T.14 S.,R.79 W., Sec. 21
Four Elk Creek	UH	11020001-130	T.14 S.,R.78 W., Sec. 16
Cottonwood Creek Div.	UH	11020001-140	T.15 S.,R.78 W., Sec. 13
Nathrop Diversion #1	UH	11020001-150	T.15 S.,R.78 W., Sec. 11
Princeton Powerplant	UH	11020001-160	T.13 S.,R.79 W., Sec. 2
Alpine Reservoir	DR	11020001-170	T.15 S.,R.79 W., Sec. 25
Alpine Reservoir	UR	11020001-170	T.15 S.,R.79 W., Sec. 25
Cascade Reservoir	UR	11020001-180	T.15 S.,R.79 W., Sec. 29
Browns Canyon Upper	UR	11020001-190	T.15 S.,R.78 W., Sec. 25
Salida Diversion	UH	11020001-200	T. 50 N.,R. 9 E., Sec. 22
Johnson Powerplant	UH	11020001-210A	T. N.,R. E., Sec.
Browns Canyon Lower	UR	11020001-230	T.51 N.,R. 8 E., Sec. 34
Chalk Creek Diversion	UH	11020001-235	T.50 N.,R. 8 E., Sec. 2
Salida Powerplant	UH	11020001-240A	T. N.,R. E., Sec.
Browns Canyon Div.	UH	11020001-255	T.49 N.,R. 9 E., Sec. 9
Garfield Dam	DR	11020001-265	T.50 N.,R. 6 E., Sec.
Poncha Creek Diversion	UH	11020001-267	T.49 N.,R. 9 E., Sec. 10
Salida No. 2	UH	11020001-269	T.49 N.,R. 7 E., Sec. 3
Foose Creek Dam	DR	11020001-270	T.50 N.,R. 6 E., Sec. 36

Table J-2 (Continued)

Name	Type	Number	Location
Salida No. 1	UH	11020001-275	T.49 N.,R. 7 E., Sec. 32
Wellsville Diversion	UH	11020001-280	T.49 N.,R.10 E., Sec. 28
Badger Diversion	UH	11020001-285	T. N.,R. E., Sec.
Taylor Gulch Reservoir	UR	11020001-290	T.9 N.,R.10 E., Sec. 29
Taylor Gulch Reservoir	UH	11020001-290	T.49 N.,R.10 E., Sec. 29
South Arkansas River	UH	11020001-295	T.49 N.,R.10 E., Sec. 27
Badger Creek Div.	UH	11020001-320	T. N.,R. E., Sec.
Pleasanton	UH	11020001-330	T. N.,R. E., Sec.
Parkdale Reservoir	UR	11020001-340	T.18 S.,R.71 W., Sec. 21
Texas Creek	UH	11020001-350	T.18 S.,R.71 W., Sec. 18
Reservoir Site No. 9	UR	11020001-355	T.20 S.,R.72 W., Sec. 2
DeWeese Reservoir	UR	11020001-365	T.19 S.,R.71 W., Sec. 20
DeWeese Reservoir	DR	11020001-367	T.21 S.,R.72 W., Sec. 2
DeWeese Reservoir	UH	11020001-367	T.21 S.,R.72 W., Sec. 20
DeWeese Reservoir Enl	UR	11020001-368	T.21 S.,R.72 W., Sec. 15
DeWeese Reservoir #6	UR	11020001-370	T.19 S.,R.71 W., Sec. 12
Grape Creek Res #2	UR	11020001-380	T.19 S.,R.71 W., Sec.
Webster Park Res	UR	11020001-390	T.19 S.,R.71 W., Sec. 19
Hydrologic Unit - 11020002 Arkansas Basin			
Parkdale Diversion	UH	11020002-002	T.18 S.,R.70 W., Sec. 31
Cañon City Diversion	UH	11020002-010	T. S.,R. W., Sec.
Cobb Reservoir	UR	11020002-020	T.15 S.,R.71 W., Sec. 9
West Oil Reservoir	UR	11020002-030	T.15 S.,R.71 W., Sec. 9
Wrights Reservoir	DR	11020002-040	T.14 S.,R.70 W., Sec. 31
Oak Creek Dam	UH	11020002-050	T. S.,R. W., Sec.
Coal Creek Dam	UH	11020002-060	T. S.,R. W., Sec.
Brush Hollow	UH	11020002-070	T. S.,R. W., Sec.
Colorado Springs #7	DR	11020002-080	T.14 S.,R.69 W., Sec. 24
Colorado Springs #8	DR	11020002-100	T.14 S.,R.69 W., Sec. 24
Bison Reservoir	DR	11020002-110	T.15 S.,R.69 W., Sec. 2
Cripple Creek #3	DR	11020002-120	T.14 S.,R.69 W., Sec. 34
Cripple Creek #2	DR	11020002-130	T.14 S.,R.69 W., Sec. 34
Colorado Springs #2	DR	11020002-140	T.14 S.,R.68 W., Sec. 30
Colorado Springs #4	DR	11020002-160	T.15 S.,R.68 W., Sec. 5
Colorado Springs #5	DR	11020002-170	T.15 S.,R.68 W., Sec. 4
Pringtime Reservoir	DR	11020002-180	T.15 S.,R.68 W., Sec. 20
Skagway Reservoir	DR	11020002-200	T.16 S.,R.69 W., Sec. 1
Skagway Reservoir	DH	11020002-200	T.16 S.,R.69 W., Sec. 1
Skagway Reservoir	UH	11020002-200	T.16 S.,R.69 W., Sec. 1
Rosemont Reservoir	DR	11020002-210	T.15 S.,R.68 W., Sec. 23
Pueblo Reservoir	DR	11020002-220	T.20 S.,R.66 W., Sec. 36
Pueblo Reservoir	UH	11020002-220	T.20 S.,R.66 W., Sec. 36
St. Charles Reservoir	UR	11020002-230	T.21 S.,R.65 W., Sec.
Lake Isabel	DR	11020002-240	T.24 S.,R.68 W., Sec. 6
Lake Isabel	UH	11020002-240	T.24 S.,R.68 W., Sec. 6
Graneros Reservoir	UR	11020002-250	T.24 S.,R.66 W., Sec. 29
Lower Graneros Dam	UR	11020002-260	T.24 S.,R.66 W., Sec. 21
Hydrologic Unit - 11020003 Arkansas Basin			
Ruxton Park	DR	11020003-010	T.14 S.,R.68 W., Sec. 11
Ruxton Park	DH	11020003-010	T.14 S.,R.68 W., Sec. 11
Manitou Springs	DR	11020003-020	T.14 S.,R.67 W., Sec. 6
Manitou Springs	DH	11020003-020	T.14 S.,R.67 W., Sec. 6

Table J-2 (Continued)

Name	Type	Number	Location
Rampart Reservoir	DR	11020003-040	T.12 S.,R.68 W., Sec. 26
Fountain Dam	UR	11020003-050	T. S.,R. W., Sec.
North Catamount	DR	11020003-060	T.13 S.,R.69 W., Sec. 13
South Catamount	DR	11020003-070	T.13 S.,R.69 W.,Sec. 13
Crystal Creek Reservoir	DR	11020003-080	T.13 S.,R.68 W., Sec. 17
Northfield Res. #4	DR	11020003-090	T.12 S.,R.68 W., Sec. 25
Northfield Res. #1	DR	11020003-100	T.12 S.,R.68 W., Sec. 25
Northfield Res. #2	DR	11020003-110	T.12 S.,R.68 W., Sec. 19
Northfield Hydro Project	UH	11020003-120	T.12 S.,R.67 W., Sec. 29
Monument Lake	DR	11020003-130	T.11 S.,R.67 W., Sec. 15
Aspen Lake	DR	11020003-140	T.12 S.,R.68 W., Sec. 15
Palmer Lake	DR	11020003-150	T.11 S.,R.67 W., Sec. 5
Glen Park Upper	DR	11020003-160	T.11 S.,R.67 W., Sec. 7
Lake Moraine	DR	11020003-170	T.14 S.,R.68 W., Sec. 22
Bigtooth	DR	11020003-180	T.14 S.,R.68 W., Sec. 14
Mesa #1	DR	11020003-190	T.14 S.,R.67 W., Sec. 26
Stratton	DR	11020003-200	T.15 S.,R.68 W., Sec. 3
Hydrologic Units - 11020005 thru 11020013 Arkansas Basin			
Lake Henry	DR	11020005-010	T.21 S.,R.56 W., Sec. 6
Cudahy Reservoir	DR	11020005-020	T.20 S.,R.58 W., Sec. 15
Crooked Arroyo Retard	DR	11020005-030	T. S.,R. W., Sec.
Cucharas Reservoir	DR	11020006-010	T.26 S.,R.64 W., Sec. 31
Apishapa	DR	11020007-010	T. S.,R. W., Sec.
Horse Creek Reservoir	DR	11020008-010	T.22 S.,R. 3 W., Sec.
Adobe Creek Reservoir	DR	11020009-010	T. 21 S.,R.52 W., Sec. 7
Muddy Creek Reservoir	DR	11020009-020	T.26 S.,R.52 W., Sec. 29
John Martin Dam	DR	11020009-030	T.23 S.,R.49 W., Sec. 8
John Martin Dam	UH	11020009-030	T.23 S.,R.49 W., Sec. 8
Willow Creek	UR	11020009-032	T.23 S.,R.46 W., Sec.
Great Plains Reservoir	DR	11020009-040	T. S.,R. W., Sec.
Wolf Creek	UR	11020009-050	T.23 S.,R.44 W., Sec.
Clay Creek	DR	11020009-060	T. S.,R. W., Sec.
Horse Creek	DR	11020009-070	T. S.,R. W., Sec.
Trinidad Lake	DR	11020010-010	T.33 S.,R.64 W., Sec. 27
Trinidad Lake	UH	11020010-010	T.33 S.,R.64 W., Sec. 27
Pinon Canyon Dam	DR	11020010-020	T.32 S.,R.64 W., Sec. 35
Model Reservoir	DR	11020010-030	T.31 S.,R.62 W., Sec. 19
Purgatoire	UR	11020010-040	T. 26 S.,R.54 W., Sec.
Monument Lake	DR	11020010-050	T.32 S.,R.68 W., Sec. 31
North Lake	DR	11020010-060	T.32 S.,R.68 W., Sec. 19
Two Buttes Reservoir	DR	11020013-010	T.28 S.,R.46 W., Sec. 1
Hydrologic Unit - 10190001 South Platte			
Antero Reservoir	DR	10190001-010	T.12 S.,R.76 W., Sec. 21
Antero Reservoir	UH	10190001-010	T.12 S.,R.76 W., Sec. 21
High Creek Reservoir	UR	10190001-020	T.11 S.,R.76 W., Sec. 20
Hartsel Reservoir	UH	10190001-030	T.12 S.,R.75 W., Sec. 8
Montgomery Reservoir	DR	10190001-040	T.8 S.,R 78 W., Sec. 14
Spinney Mountain	DR	10190001-050	T.12 S.,R.74 W., Sec. 36
Elevenmile Canyon Res.	DR	10190001-060	T.13 S.,R.72 W., Sec. 20
Elevenmile Canyon Res.	DH	10190001-060	T.13 S.,R.72 W., Sec. 20
Elevenmile Canyon Div.	DR	10190001-070	T.12 S.,R.71 W., Sec. 31
Lake George	DR	10190001-080	T.12 S.,R.71 W., Sec. 30

Table J-2 (Continued)

Name	Type	Number	Location
Crystal Creek Diversion	UH	10190001-090	T.12 S.,R.71 W., Sec. 4
American	DR	10190001-100	T.11 S.,R.71 W., Sec. 29
American	UH	10190001-100	T.11 S.,R.71 W., Sec. 29
Tarryall Diversion	UH	10190001-110	T.11 S.,R.71 W., Sec. 28
Northrup Reservoir	UH	10190001-120	T.11 S.,R.71 W., Sec. 16
Link-Slater	UR	10190001-130	T. 9 S.,R.75 W., Sec. 9
Jefferson Lake	DR	10190001-140	T. 7 S.,R.76 W., Sec. 11
Reclamation No 14	UR	10190001-150	T. 9 S.,R.75 W., Sec. 1
McKay Reservoir	UR	10190001-160	T. 9 S.,R.74 W., Sec. 27
Tarryall Reservoir	DR	10190001-170	T. 9 S.,R.74 W., Sec. 36
Reclamation No 9	UR	10190001-180	T.10 S.,R.73 W., Sec. 9
Tarryall	UR	10190001-190	T.11 S.,R.72 W., Sec. 4
Tarryall	UH	10190001-190	T.11 S.,R.72 W., Sec. 4
Bison	UR	10190001-200	T.11 S.,R.72 W., Sec. 24
Bison	UH	10190001-200	T.11 S.,R.72 W., Sec. 24
Tarryall Creek Div.	UH	10190001-210	T.11 S.,R.71 W., Sec. 16

1/Some of these sites are on U.S. Forest Service lands outside the Royal Gorge Planning Area.

Monitoring

The objective of resource monitoring activity is the collection of pertinent information, coordination with development proponents, and sharing the information with the land managers. This includes monitoring activities of the governmental development agencies and private development agencies. This information is furnished to land managers through the land use planning process.

WRR Planning Requirements

The following WRR determinations must be made for management areas during resource management planning:

All lands in the planning area determined by professional evaluation to have potential for WRR development must be assigned to one of three categories: Lands suitable for intensive management of WRR sites, lands suitable for restricted management as WRR sites, and lands unsuitable for management as WRR sites.

All Federal lands within the resource area currently withdrawn for WRR purposes must be assigned to one of two categories: Lands recommended for continuation of the withdrawal, and lands not recommended for continuation of the withdrawal. Lands not recommended for continuation need to include the WRR specialist professional evaluation report recommending cancellation of the withdrawal because of lack of technical value, congressional legislation, or other conflicting resource value.

Management direction for areas of potential development need to be assigned to one of four categories: excluded, restrictive, permitted, or preferred. This includes identification of other resource values that need protection, and constraints to be placed on WRR developments.

Resource Evaluation Activities

The objective of WRR evaluation activity is to identify resource management conflicts and opportunities through the land use planning process. This comparison helps set priorities, identify possibilities for reducing the effect on a resource or for enhancing an affected resource, determine alternative actions, and provide guidance for future actions.

Dams and reservoir resources have the potential to affect nearly every resource managed by BLM. Resource management can be quite complex, not only because of laws and regulations guiding management and protection, but also because of the number of groups involved in the process. For example, some resources are represented by specific bureaus such as the U.S. Fish and Wildlife Service; some have advocates within land management agencies; and still others have a public association of interested members. Reservoir resources are no exception. BLM partnerships in reservoir development

efforts, therefore, are extremely important and provide opportunities for a diversity of groups to become involved in the reservoir development process.

A partnership of resource specialists across agency boundaries can ensure development of a consistent approach for other resource protection. Partnerships in the land use planning process provide a structured, systematic opportunity to evaluate adverse effects, operational scenarios, and positive opportunities for specific resources prior to filing an application. This kind of approach alleviates time constraints and also assists dam developers in planning strategies if sites are identified with resource conflicts.

The BLM land manager's responsibility for identification of conflicts will involve WRR values. The importance and value of WRR will be established and compared to conflicting resources. When considering conflict resolution, the value of the potential WRR site must be weighed against the value of other existing resources. The WRR specialist must provide technical evaluation information for the conflict resolution exercise, and be included as a resource specialist in conflict resolution.

Land managers need to consider whether or not other specific resource values have a higher value only when the resources are in conflict. If the site is within a withdrawal, and the manager believes that higher resource values exist and are in conflict with the withdrawn resource, he has avenues to recommend changes. The responsibility rests on the manager to present facts and arguments to persuade Congress to affect change. The RMP should address this and contain analysis explaining why development of waterpower or reservoirs is recommended for exclusion. Statements of the potential for waterpower or reservoir sites and the relative values of the recommendation are to be included. The withdrawal may be removed if Congress has taken action to prohibit development of sites on the lands involved.

The *Regulations For Implementing The Procedural Provisions Of The National Environmental Policy Act* has a number of requirements to be considered during land use planning. If monitoring indicates organizational interest in WRR values in the planning area, that organization should be considered as a possible cooperating agency. The same involvement is required if such agencies, persons, or organizations apply for authorizations that may cause significant impact to the environment, such as development of a WRR site. It encourages reduction in duplication and paperwork allowing the consideration of WRR conflict resolution before an actual application requires such action. In the case of the possible right-of-way application for the development of a WRR site, the Act requires cooperation with state and local agencies to the fullest extent possible to reduce duplication. Proper consideration of WRR values and integrated planning will allow *National Environmental Policy Act* of 1969 (NEPA) compliance of future specific development applications to be tiered.

Agencies who are considering development should be invited as a cooperating agency in compliance with NEPA. The agency should be informed of all possible alternatives to the proposed site. They should be aware of conflicts with each site as a guide toward the best environmental and technical sites. This partnership in the land use planning process would provide a structured, systematic opportunity to evaluate adverse effects, operational scenarios, and positive opportunities for specific resources prior to development.

If an acceptable WRR site is located within this planning area, future construction applications and environmental statements of the agency would summarize this broader resource management plan.

WRR sites not withdrawn pose unique management challenges to the land manager, because the manager has resource protection and planning responsibilities and must consider multiple resource conflicts. The manager's responsibilities are to acknowledge these sites and restrictively manage them for WRR values. The land manager may allow interim use, provided the waterpower resource values are not endangered and then nominate the lands for a WRR withdrawal.

Land Activities

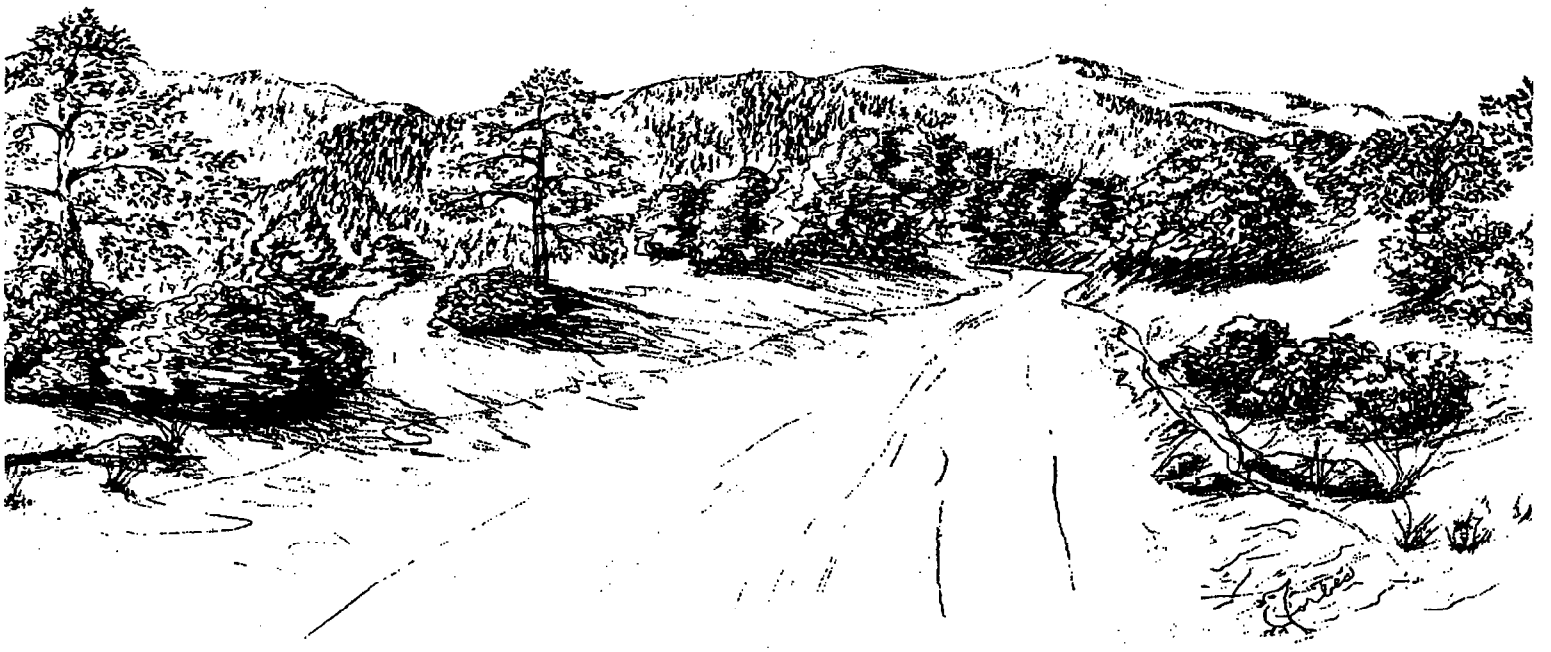
WRR withdrawals are based on technical evaluations of the potential development schemes. Information on which the withdrawals were made, is available from the the Colorado State Office.

In order to keep these withdrawals protecting WRR values to a minimum, BLM has been delegated authority for withdrawal review to evaluate water development potentials, and make recommendations for change to the Secretary of the Interior. The Secretary has the ultimate decision authority on withdrawals.

In cases where other uses may harm a WRR withdrawal, the BLM manager must consult with the Federal Energy Regulatory Commission (FERC), by provisions of the *Federal Power Act*, before allowing interim use action to occur.

APPENDIX K

ACEC ANALYSIS



APPENDIX K
ACEC ANALYSIS

Royal Gorge RMP Screened Listing of Potential Candidate ACECs

The list of potential areas of critical environmental concern (ACECs) are shown on Table K-1. Nominations were developed from in-house recommendations, public issue/concerns and planning criteria meetings, previous ACEC meetings, other agencies concerns, etc.

An ACEC workgroup applied the four criteria for relevance and the five criteria for importance to these sites. All sites were fully screened to determine eligibility to be carried into the RMP planning process. Various boundary changes were discussed during the screening process. Some sites clearly did not meet the criteria and were dropped. Other sites were placed on hold until development of further information or were screened and determined to meet one or more of the ACEC criteria.

The listing includes details on potential acreage within each of the nominated sites, recommendations and rationale for why sites do or do not meet the ACEC relevance and importance criteria, boundary realignment suggestions, and ownership status (state, Federal, and private).

The area manager accepted the recommendations of the work group with some modifications in acreage, mostly private and state land exclusions. The sites recommended in this listing will be considered in the development of the alternatives for the Royal Gorge Resource Management Plan (RMP). All sites recommended as meeting the criteria will be placed into one or more of the plan alternatives and carried into the BLM planning process.

TABLE K-1
Screened Listing of Potential Areas of Critical Environmental Concern

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
1. Browns Canyon	1BROWNCANY		9,663	This area includes all 6,614 acres of scenic river canyon within the wilderness study area (WSA) recommended to Congress as wilderness for its unique naturalness character and primitive recreation + water-related recreation + scenic and visual qualities + under consideration as an archaeological district. The bluffs in the area have been identified as having very significant raptor values, and the area has significant bighorn sheep habitat values. This area includes BLM, private, and state land considered very important to the integrity and management of this canyon environment. (Arkansas River will be analyzed for wild and scenic designation.)
	[Gunnison]	BLM	9,411	
		USFS	2	
		State	233	
		Private	17	

RECOMMENDED

The boundaries as proposed are acceptable; the buffer areas are important to maintaining the integrity of the canyon. Some variations could be used among the various plan alternatives; i.e., looking at just the recommended WSA acres. The acres recommended are 9,411 (252 acres of USFS, state, and private land are important in maintaining the integrity of the unit).

Comments: This ACEC has been expanded by 1,300 acres for a total of 10,963 recommended. All of the additional acres are CMA lands included in the Arkansas Headwaters Recreation Area (administered by BLM).

2. Beaver Creek	2BEAVERCRK		28,422	Wilderness study area with 20,750 acres recommended as wilderness and 5,400 acres not recommended as wilderness. The area has significant naturalness character, primitive recreation + water-related recreation + scenic and visual qualities. The bluffs in the area have been identified as having very significant raptor values, and significant bighorn sheep and mountain lion habitat values. This area includes BLM, private, and state land considered very important to the integrity and management of this canyon land environment. (Beaver Creek will be analyzed for wild and scenic designation.)
	2BEAVERCRKACQ	BLM	27,626	
		State	672	
	[Pikes Peak]	Private	124	
	[Colo. Springs]			

RECOMMENDED

Suggested that some areas be added to the unit in various plan alternatives. Various plan alternatives could address smaller boundaries also; i.e., consider just the WSA acres. The acres recommended are 27,626 (796 acres of private and state lands are important in maintaining the integrity of the unit). On 8/30/90 278 acres were acquired and included in the ACEC plus 23 acres of state land. These acreages are not included in the acreage shown above.

Comments: This ACEC was reduced to 13,734 acres. Acres included in the reduction are administered by BLM. The area was decreased in size from the original WSA acreage because the values identified in the ACEC process (peregrine habitat, riparian, scenic, bighorn sheep, lions) were not dominant throughout the entire WSA. The areas excluded may have some relationship to the specific values (most notably bighorn sheep and lions), but the "core area" for these values is currently within the ACEC boundary.

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
3. Grape Creek Corridor	3GRAPECREK [Cañon City]		24,674	Two wilderness study areas are included in this corridor (Upper and Lower Grape Creek WSA units 21,420 acres) and were not recommended as wilderness. This corridor has significant naturalness character and primitive recreation values + water-related recreation, riparian, (grazing practices and flash flooding are preventing the establishment of woody riparian species needed to improve aquatic habitat), scenic and visual qualities + significant wildlife values (bighorn sheep). It includes all BLM, some private lands from 2 miles south of DeWeese Reservoir down through Temple Canyon Park to the Arkansas River. (Grape Creek will be analyzed for wild and scenic designation.)1/
		BLM	24,577	
		USFS	21	
		State	16	
		Private	60	

RECOMMENDED WITH MAJOR MODIFICATIONS

Some portions of the unit do not meet relevance and importance criteria; other portions do. Recommend those portions of the unit visible from the main Grape Creek Canyon corridor viewshed. The acres recommended are about 24,674 (60 acres of USFS, state, and private land are important to the integrity of the unit). This acreage does not include the west wings of the WSA.

Comments: This ACEC has been reduced to 18,560 acres. Most of the acres included in the reduction are administered by BLM. Adjust boundaries to exclude USFS land; include only state parcel identified for acquisition. The "west wings" were deleted from this ACEC. Identified values within Grape Creek were not associated with these areas.

4. High Mesa Grassland	4HIGHMESAG [Pikes Peak] [Cañon City]		1,520	Naturalness character, undeveloped recreation, scenic and visual qualities, special status plants + the major portion of which is presently designated and managed by BLM as a research natural area. Additionally the state of Colorado has designated the area as a state natural area. There is potential for some OHV management conflict problems.
		BLM	1,514	
		Private	6	

RECOMMENDED WITH SOME MODIFICATIONS

Portions of the unit identified meet the criteria and other portions do not. The acres recommended are about 1,514 (6 acres of private land are important in maintaining the integrity of this unit).

5. Garden Park Paleo Area	5GARDNPARK [Pikes Peak]		3,757	Outstanding potential paleo resources and historic values + naturalness, undeveloped recreation + water-related recreation; in process of being a state natural area. Significant riparian and wildlife values. Shooting enthusiasts conflict with other values. There may be potential for an OHV management conflict. A portion of the area was designated as a national natural landmark. (Four Mile Creek will be analyzed for wild and scenic designation.)
		BLM	2,724	
		Private	1,033	

RECOMMENDED

This area meets the criteria. The acres recommended are approximately 2,724 (1,033 acres of private land are important in maintaining the integrity of this unit).

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
6. Big Game	6BGAMESP			All areas in PAB with critical winter or birthing range (product of GIS map intersection of all big game species maps). No acres nor actual areas identified yet.
		ON HOLD		
	(This area was dropped from consideration because of lack of GIS data.)			
7. Arkansas Headwaters Recreation Area (AHRA)	1BROWNCANYOLAP 7ARKARIVER [Gunnison] [Cañon City] [Leadville] [Pikes Peak]	 BLM	5,000 5,000	Areas along river with outstanding scenic, visual, recreation, wildlife, or cultural qualities. This area includes Arkansas Headwaters Recreation Area lands. Does not include lands already within other potential ACECs. (Arkansas River will be analyzed for wild and scenic designation.)
		NOT RECOMMENDED		
	The acres recommended for the Upper Arkansas Recreation area are about 5,000 acres. A portion of this unit is included in the Arkansas Canyonlands ACEC.			
	Comments: The original unit as described did not meet relevance and importance criteria; therefore, is not recommended. The significant portions are included in Browns Canyon and Arkansas Canyonlands.			
8. Phantom Canyon	8PHANCYN [Pikes Peak] [Cañon City]	 BLM State Private	6,253 5,538 15 700	Corridor along Phantom Canyon road with outstanding historical values, significant scenic, recreation, visual, archaeological, riparian (Eight Mile Creek shows damage from recreational use; possible conflicts between recreation and livestock grazing could occur with increased recreational use), wildlife, paleontological, and wildlife values. This area has been designated nationally as a portion of the Gold Belt National Back Country Byway and presently is a special recreation management area. (Four Mile Creek will be analyzed for wild and scenic designation.)
		RECOMMENDED WITH MINOR MODIFICATIONS		
	This unit meets relevance and importance criteria. One other small additional area to this unit is recommended; i.e., 166-acre Lower Phantom Canyon Paleo Site. The total acres recommended are 6,253 (715 acres of private and state land are important in maintaining the integrity of this unit).			
	Comments: Some private land in this area has already been acquired. Access from the Phantom Canyon Area onto Cooper Mountain would be desirable. This ACEC is now 7,200 acres. The increased acreage is administered by BLM.			
9. McIntyre Hills	9MCINTYRHL [Cañon City]	 BLM State Private	17,240 16,580 506 154	Area of visual and scenic quality along the Arkansas River includes 16,875 acres of the McIntyre Hills WSA. Outstanding scenic, historical, and national water-related values, notable raptor and bighorn sheep habitat; important sensitive plant community on High Mesa Grassland; portion is a research natural area, state natural area, and has some recreation user conflicts.
		RECOMMENDED		
	Only the river canyon portion of this unit really meets the relevance and importance ACEC criteria. The acres recommended are approximately 16,580 (660 acres of state and private land are important in maintaining the integrity of this unit).			
	Comments: The original unit as described did not meet relevance and importance criteria; therefore, it is not recommended. The most significant portions are included in the Arkansas Canyonlands ACEC.			

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
10. Big Hole Area	10BIGHOLEA		14,635	Key raptor area has been identified in BLM raptor management plan + high quality peregrine falcon habitat + unique naturalness, and other significant wildlife values (elk, bighorn sheep, and deer habitat) and primitive recreation values. Has considerable cultural (DeReemer Forts) significance. Includes portions of the Big Hole and Little Hole areas. Contains very significant visual and scenic values. (Arkansas River will be analyzed for wild and scenic designation.)
	[Pikes Peak]	BLM	13,760	
	[Cañon City]	Private	875	
				NOT RECOMMENDED Portions of this unit meet the criteria and portions do not. It is also important to include certain portions of the Arkansas Scenic River Corridor unit within this Big Hole/Little Hole unit. It is not feasible to combine this unit with the High Mesa Grasslands. The acres recommended are 13,760 (875 acres of private land are important in maintaining the integrity of this unit). Comments: The original unit as described did not meet relevance and importance criteria; therefore, it is not recommended. The most significant portions are included in the Arkansas Canyonlands ACEC.
11. Droney Gulch	11DRONYGUL		828	Location of best population of *Eriogonum brandegei* in the world. Presently on the Federal T&E list and is proposed as an ACEC by The Nature Conservancy. Includes some private lands for buffer to maintain the integrity of the plant community. The Nature Conservancy presently is attempting to buy some of these private lands. (Arkansas River will be analyzed for wild and scenic designation.)
	[Gunnison]	BLM	644	
		State	108	
		Private	76	
				RECOMMENDED WITH SOME MODIFICATIONS Expansion of this unit across the highway down to the river where there are also plants was discussed. The recommended acres are about 644 (184 acres of state and private land are important in maintaining the integrity of this unit).
12. Top of the World (Mosquito Pass)	12TOPOWRLD		3,414	Location of *Eutrema pendlandii,* a sensitive plant species that only occurs in the region. CNAP is investigating the area. It is the highest continuous road in the U.S. (Mosquito Pass); very scenic area. Potential for OHV management conflict. Four very scenic mountains over 13,000 feet in elevation with very significant visual and scenic values + public use management and access problems.
	[Leadville]	BLM	2,678	
		Private	736	
				RECOMMENDED This unit meets the relevance and importance criteria. The recommended acres are about 2,678 (736 acres of private land are important in maintaining the integrity of the unit). Comments: Correct acreage recommended for this unit is 5,440. Name changed to Mosquito Pass.

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
13. South Apache Creek	13APACHCRK [Walsenburg]		330	Only location in eastern half of Colorado (Cañon City District) with the T&E species, greenback cutthroat trout. Some private lands in the area of importance. (Apache Creek will be analyzed for wild and scenic designation.)
		BLM	330	

NOT RECOMMENDED

This unit meets the relevance and importance criteria. The recommended acres are 330.

Comments: This unit met relevance and importance criteria; however, because of an operational recovery program by DOW, the species is protected through isolation. Not recommended.

14.Cucharas Canyon	14CUCHRCYN [Walsenburg]		3,946	Location of significant archaeological sites within this canyon; significant recreation, riparian, and scenic values present. (Riparian conditions on public land are assumed to be poor like the areas on adjacent private land. Poor condition appears to be caused by grazing practices.) (Cucharas River will be analyzed for wild and scenic designation.)
		BLM	1,620	
		State	180	
		Private	2,146	

RECOMMENDED

This canyon meets the relevance and importance criteria. The site is a proposed high priority acquisition site by the Trust for Public Lands. The canyon is the location for over 40 rock structures; a substantial number are located on BLM-administered lands. The private and state lands within this unit are considered very essential to maintaining the integrity of the site and the significant values. There is also a substantial riparian area on about 12 miles of stream, 8 of which are on public lands. The acres recommended are approximately 1,620 (2,325 acres of state and private land along the stream with high potential cultural values are important in maintaining the integrity of this unit).

Comments: Acreage of this unit has been reduced to 3,160 acres. Reduced acreage is private land. Boundary was changed to include only those areas of private and state land essential to the unit. All remaining state and private land is directly involved in the steep, canyon country where cultural features are expected.

15. La Veta Pass Area	15LAVTAPAS [Blanca Peak]		3,431	Mt. Mestas scenic area and ridgetop from La Veta Pass along Colorado State Hwy. 160 to Sheep/Little Sheep Mtn. Very significant visual and scenic values present and very significant wildlife habitat values. This area includes the Sheep Mtn. area, Mt. Mestas area, and the La Veta Rock Glacier Field.[1/]
		BLM	3,419	
		Private	12	

RECOMMENDED WITH MAJOR MODIFICATIONS

The eastern, southern, and western portions of Mt. Mestas as seen from Highway 160 meet one or more of the relevance and importance criteria; but the northern two-thirds of the unit do not. This area would remove an estimated 19,000 acres and substantially change the boundary of this unit from the original nomination. It would still include some of the scenic/visual significant area, a big portion of the elk, deer, and sheep habitat, and the rock glacier. No state lands are now included. The acres recommended are about 3,419 (12 acres of private land are important to the integrity of the unit.)

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
16. Midland Hill Area	16MIDLNDHL [Gunnison]		6,070	This area includes the Midland Hill/Trout Creek areas along Colorado State Hwy. 285. This area has visual qualities, paleo, archaeological, and historical values, and is an area of outstanding national significance. (Arkansas River will be analyzed for wild and scenic designation.)
		BLM	6,016	
		USFS	4	
		Private	50	

NOT RECOMMENDED

Portions of this unit meet the relevance and importance criteria and other portions do not. Only the key areas along the river, along the highway, along the railroad corridor, and in the immediate vicinity of the scenic overlook/ picnic area appear to meet the criteria. The acres recommended are about 6,016 (54 acres of USFS and private land are important to the integrity of this unit).

Comments: Area has been evaluated for paleo, archaeological, and historical values. Although these values are present, they are not believed to be of national historic significance. Visual values are related to the distant view of the Collegiate Peaks and Arkansas Valley from the Midland Hill location, rather than visual values of the BLM parcel itself. This unit did not meet relevance and importance criteria. Not recommended

17. Crystal Falls Area	17CRYSTFAL [Blanca Peak]		159	Scenic mountain creek and waterfall bisected by the Rainbow Trail with significant public use management and access conflicts. Adjacent USFS wilderness area.
		BLM	157	
		Private	2	

NOT RECOMMENDED

Area meets the relevance criteria; however, does not meet importance criteria. Not recommended.

Comments: ACEC did not qualify during evaluation. A portion of this ACEC is in the area being proposed by a member of the congressional delegation for potential wilderness designation. The area is not in the current USFS wilderness proposal. There is no recommendation by USFS for specific management other than retention of the area. Not recommended.

18. Badger Creek Area	18BADGRCRK [Pikes Peak] [Cañon City]		23,804	Special management area for watershed and fisheries management improvements; contains riparian values (poor upland watershed conditions cause flash flooding with resulting poor riparian conditions) and significant cultural values. Interagency project with significant public interest. This whole interagency area includes about 107,103 acres. (Badger Creek and Arkansas River will be analyzed for wild and scenic designation.)
		BLM	23,804	

RECOMMENDED WITH SOME MODIFICATIONS

The unit meets relevance and importance criteria. The major block of BLM lands within the interagency project boundary is also recommended (approximately 23,804 acres total).

Comments: This ACEC has been expanded by 8,000 acres to include all BLM lands in the Badger Creek drainage; total acres recommended are 31,804.

19.Texas Creek	19TXRIP [Cañon City]		70	This riparian area along Texas Creek Gulch is a long-term study and demonstration area that shows effects of different grazing practices on the woody riparian plant community.
		BLM	70	

NOT RECOMMENDED

This area does not meet relevance and importance criteria. Not recommended as a separate ACEC.

Comments: The original unit as described does not meet relevance and importance criteria; therefore, is not recommended. This area is included in the Arkansas Canyonlands ACEC to enhance protection of riparian values. Area has been increased to include state land (160 acres) along the creek and BLM-administered land along the stream, but not currently in the demonstration area

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
20. Rocky Mt Terminal Moraine	20ROCKYMT [Leadville]	BLM	199 199	Area of a terminal moraine with some significant features (ridges, mounds, irregular masses of soil, etc.) transported by glacier.[1/]

NOT RECOMMENDED

Area does not meet relevance or importance criteria. Not recommended.

Comments: USFS analysis of the area indicates the moraine is a relatively common feature in the area. No plant communities are specific to the location.

21. St. Charles River Canyon	21STCHRCYN [Pueblo]	BLM	559 559	Steep rocky high bluff-walled canyon along the very scenic St. Charles River. Significant primitive rec/cul values; (significant rock art) significant public use management issues + OHV conflicts (USFS on two sides).

NOT RECOMMENDED

Area does not meet relevance and importance criteria. Not recommended.

Comments: Currently BLM has no substantiated evidence of significant recreation/cultural values.

22. Huerfano	22HUERFDVD [Alamosa] [Blanca Pk]	BLM	1,419 1,419	Scenic rugged rock ridge along the divide (Blanca) between Costilla and Huerfano Counties. Close proximity to a ski and winter play area with visual sensitivity.

NOT RECOMMENDED

Area has scenic values; however, does not meet importance criteria. Not recommended.

23. Lower Phantom Canyon Paleo Site	23LPHAMCYN [Cañon City]	BLM Private	166 134 32	Significant paleo site adjacent to Gold Belt National Back Country Byway (Phantom Canyon).

RECOMMENDED WITH MINOR MODIFICATIONS

This small unit meets the criteria, but should be added to the Phantom Canyon ACEC. The acres recommended are 134 (32 acres of private land are important to maintaining the integrity of the unit).

Comments: This area is included in the Phantom Canyon ACEC.

24. Twin Mtn. Geologic Study	24TWNMTGEO [Pikes Peak] [Cañon City]	BLM Private	3,091 3,037 54	Significant geologic structure complex; significant visual and scenic values. Public use complex management conflicts + significant educational values present + significant public access issues.

RECOMMENDED

This unit meets the relevance and importance criteria. The acres recommended are approximately 3,037 (54 acres of private land are important to maintaining the integrity of the unit).

Comments: This unit has been reduced to 1,060 acres. Reduction was made to limit the unit to the significant geologic features. Remaining private property is considered essential to management of the area.

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
25. Wellsville Geologic Study	25WLSVLGEO [Pikes Peak] [Cañon City]	BLM Private	812 746 66	Significant geologic structure complex and study area + has significant visual sensitivity complex and wildlife and scenic values of significance. (Arkansas River will be analyzed for wild and scenic river designation.)

RECOMMENDED

This site meets relevance and importance criteria. The acres recommended are approximately 746 (66 acres of private land are important in maintaining the integrity of the unit).

Comments: Private land is important in this unit; however, acquisition is not planned.

26. Indian Springs Fossil Site	26INDSPR [Pikes Peak]	Private	45 45	Significant trace fossil site structure adjacent to a national monument site.

NOT RECOMMENDED

Total area is private land. Not recommended.

27. Purgatoire River Canyon	27PURGTOC [Kim]	BLM	160 160	Small isolated eastern plains tract along the river canyon with riparian, cultural, and some primitive recreation available.

NOT RECOMMENDED

Area does not meet relevance and importantance criteria. Not recommended.

Comments: Inspection of the area provided no evidence of substantial cultural values.

28. Chacuaco Canyon	28CHACCO [Kim]	BLM	40 40]	Small isolated eastern plains site on Chacuaco Creek with primitive recreation.

NOT RECOMMENDED

Area does not meet relevance and importance criteria. Not recommended.

Comments: Inspection of the area provided no evidence of exceptional values.

29. Tallahassee Leafy Spurge Site	29TALASE [Pikes Peak]	BLM Private	253 225 28	Small isolated site with a substantial infestation of leafy spurge. Leafy spurge is proposed for Colorado Noxious Weed List (will have legal status).

NOT RECOMMENDED

Area does not meet relevance or importance criteria. Not recommended.

30. Bighorn	30BIGHORN [Cañon City] [Pikes Peak]	BLM State Private	8,688 8,064 618 6	Bighorn viewing area, significant cultural values (DeReemer Forts) significant scenic/visual resources, along Arkansas River with important recreation opportunities (i.e., fishing, picnicking, photography, wildlife observation, etc.)

NOT RECOMMENDED

This linear unit within the Arkansas River Canyon meets the criteria. The acres recommended are approximately 8,064 (624 acres of state and private land are important in maintaining the integrity of the unit).

Comments: The original unit as described does not meet relevance and importance criteria; therefore, is not recommended. The most significant portions are included in the Arkansas Canyonlands ACEC.

Table K-1 (Continued)

ACEC #/Name	GIS Map Name [100K map name]	Ownership (approximate acres)		General Description and Comments
31. Shelf Road Corridor (Name change from Shelf Road Climbing Area)	31SHLRDCLB [Pikes Peak] [Cañon City]		7,335	Area along shelf road with significant scenic and recreational values. Area has some visual and riparian values (along Four Mile creek). This area has been designated nationally as a portion of the "Gold Belt Scenic Byway" and presently is a special recreation management area. This area includes a significant rock climbing and repelling area with national/international recognition. (Four Mile Creek will be analyzed for wild and scenic designation.)
		BLM	7,302	
		State	19	
		Private	14	
		NOT RECOMMENDED		
		This area meets relevance and importance criteria; however, because only 50 percent of the land within the modified boundary is administered by BLM, the unit is not recommended.		
		Comments: The climbing area was removed from this ACEC (9,080 acres). Although unit meets both relevance and importance criteria, a decision was made to not recommend this as an ACEC because less than 50 percent of the land is administered by BLM. Land is fractured as a result of patented mining claims, and it would not be feasible to acquire land for manageability. Management of the area would not be enhanced by ACEC designation. Special management is ongoing in the area in relationship to the climbing area.		
32. McCoy Gulch	32MCCRIP [Cañon City]		30	This riparian area along McCoy Gulch is a long-term study and demonstration area that shows effects of different grazing practices on the woody riparian plant community.
		BLM	30	
		NOT RECOMMENDED		
		Area does not meet relevance and importance criteria. Not recommended.		
33. Arkansas Canyonlands			23,200	Scenic, historic, and cultural values; endangered peregrine falcons, key raptor habitat area, bighorn sheep, and fisheries. Accessibility to Arkansas River; rare cliffs suitable for peregrine habitat are fragile and vulnerable to recreation use.
		BLM	23,200	
		State	0	
		Private	0	
		RECOMMENDED		
		Area meets relevance and importance criteria. The acres recommended are 23,200.		
		Comments: This ACEC includes four originally nominated ACECs: McIntyre Hills, Big Hole Area, Texas Creek, and Bighorn, plus a portion of the Arkansas Headwaters Recreation Area. State land along Texas Creek (160 acres) is included in this ACEC. Other boundaries were reduced to include only those meeting relevance and importance criteria		

[1/]Identified by BLM as a part of the potential natural area program, January 5, 1962.

APPENDIX L

WILD AND SCENIC RIVER STUDY REPORT

SIGNATURE PAGE OF WORKGROUP MEMBERS

Mike Gaylord	Mike Gaylord	11/3/92
	Workgroup Coordinator/Writer/GIS Mapper	Date
John Wilson	(Transferred to Oregon)	
	Workgroup/Advisor	Date
Paul Trentzsch	Paul Trentzsch	11-5-92
	Workgroup Member/Managaement/Arkansas Study	Date
Dave Taliaferro	Dave Taliaferro	10-30-92
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Erik Brekke	Erik Brekke	11/3/92
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Dave Hallock	David L. Hallock.	11/3/92
	Workgroup Member/Lands and Realty	Date
Pete Zwaneveld	Pete Zwaneveld	11/3/92
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Eric Finstick	Eric Finstick	11/18/92
	Workgroup Member/CSO Coordinator	Date
Bob Wick	Robert M. Wick	11/3/92
	Workgroup Member/Recreation/Cultural	Date
Bev Neuben	Bev Neuben	10/30/92
	Workgroup Recorder/Editor	Date

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APPENDIX L
WILD AND SCENIC RIVER STUDY REPORT

INTRODUCTION

This study report describes the purpose, background, methods, personnel involved, and schedule for an assessment of streams/rivers in the Royal Gorge Planning Area. A total of 61 streams/rivers were analyzed for eligibility (complete listing is shown in Attachment 1). This document is the public record of the study for potential designation of two additions (portions of Beaver Creek and portions of the Arkansas River) to the National Wild and Scenic River System (NWSRS). The study was conducted between December 1989 and March 1991. This report includes basic physical and biological descriptions of each stream/river corridor, analysis of the potential for meeting wild and scenic eligibility criteria, classification of various segments, suitability determination, and an evaluation/recommendation by the study team.

Purpose

This report identifies portions of the Arkansas River and Beaver Creek (Map K-1) to be nominated for inclusion in the NWSRS (see Attachment 2 for acreage breakdown). The initial scoping and identification were completed as part of the planning process for the Royal Gorge Resource Management Plan (RGRMP), as required in the BLM planning regulations, and are documented in the management situation analysis (MSA). Impacts are included in the draft RMP/EIS and are not addressed in this study report.

Background

The *Wild and Scenic Rivers* (W&SR) *Act* requires a river or river segment to be free-flowing and, within its immediate environment, must have one or more outstandingly remarkable value. This section discusses eligibility determination, classification categories, and suitability criteria.

The boundaries of any river proposed for potential addition to the NWSRS, as specified in section 4(d) of the *Wild and Scenic Rivers Act*, are usually limited to that area measured within one-quarter mile of the ordinary high watermark on each side of the river. Within the Royal Gorge Planning Area, analysis has been limited to that boundary on all river segments.

After determining eligibility of a river for inclusion in the National Wild and Scenic River System, it must be tentatively classified according to the category (wild, scenic, or recreational) most appropriate for each eligible segment. For clarification, a "scenic" river may be designated for reasons other than scenery, and a "recreational" river may not necessarily have outstandingly remarkable recreational resources. Classification is based on the degree of naturalness and the extent of development of the river and adjacent lands as they exist at the time of the study. Classifying a study river as wild, scenic, or recreational does not segregate nor withdraw the subject lands, but rather recommends a level of interim management for Federal lands in the study area until a decision on designation is made by Congress. Guidance provided in the *1982 Final Revised Guidelines for Eligibility, Classification, and Management of River Areas* will be used for interim management. If Congress designates a river or river segment, management would be according to the classification. Congress may classify a river segment at or below the highest level for which it qualifies. Specific management strategies may vary according to classification, but would be designed to protect and enhance the outstandingly remarkable values of the river area. These specific management strategies are formulated during development of the management plan, which is required within 3 full fiscal years of designation (Section 3 (d)(1), *Wild and Scenic Rivers Act*).

Eligibility Criteria

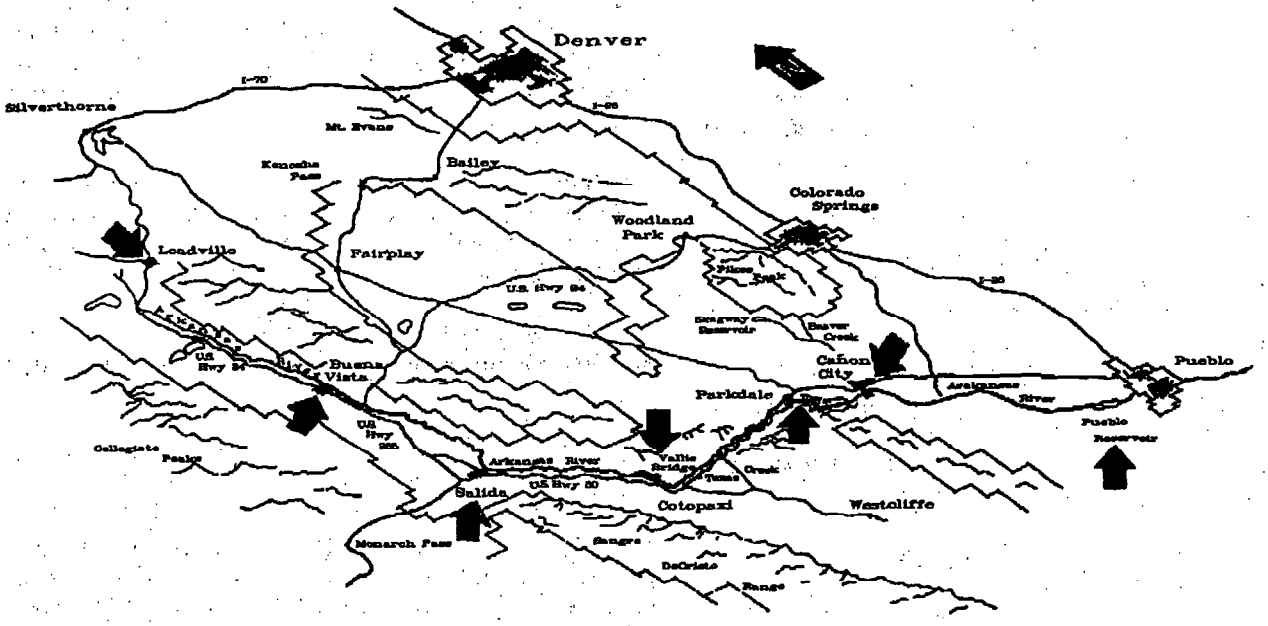
Free-Flowing

Free-flowing, as defined in section 16 (b) of the *Wild and Scenic Rivers Act*, means "existing or flowing in a natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway."

Free-flowing should not be confused with naturally flowing; i.e., flowing without any upstream human-influenced manipulation. The presence of impoundments above and below the segment, including the impoundments that influence the flow through the study segment, and existing minor dams and diversion structures within the study reach will not by themselves render a river ineligible. There are many segments within the NWSRS downstream from major dams, such as the Rogue River in Oregon and the lower Klamath River in California, or between dams, such as the Tuolommne River in California or the Rio Chama in New Mexico. Some components of the system, such as the Clackamas, Deschutes, and Snake Rivers in Oregon and the Trinity River in California, even derive their recreational values, at least in part, from the operation of upstream dams.

Map L-1

Beaver Creek and Arkansas River



USFS/BLM Boundary	Buena Vista	Salida	Vallie Bridge	Royal Gorge Park	Canon City	Pueblo Reservoir
Segment #1	Segment#2	Segment #3	Segment#4	Segment#5	Segment #6	

Outstandingly Remarkable Values

The second criteria a river must meet to be eligible for inclusion in the NWSRS is the presence of one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The term "outstandingly remarkable" is not precisely defined in the *Wild and Scenic Rivers Act*, consequently, the determination of whether or not a river area contains outstandingly remarkable values is based on professional judgment of the interdisciplinary team. The values must be river related and are considered outstandingly remarkable if they are unique or exemplary compared to similar values in other river areas in the region. Outstandingly remarkable features should be at least regionally significant. The region considered in this analysis was the state of Colorado.

Classification Categories

The three classification categories for eligible rivers are defined in section 2(b) of the 1968 *Wild and Scenic Rivers Act* as:

Wild river areas--Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic river areas--Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational river areas--Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

A wild river would be a very undeveloped river with limited access. A scenic classification would be applied to a river or river segment that is more developed than a wild river and less developed than a recreational river. A recreational classification would be appropriate in developed areas, such as where a river runs parallel to roads or railroads with adjacent lands that have agricultural, forestry, commercial, or other developments, provided the waterway remains generally natural and riverine in appearance.

Water quality, water resources development, shoreline development, and accessibility are the criteria considered when determining classification. Each criteria is important, but the collective significance is more important. Although each classification permits existing development, the criteria do not imply that future additional inconsistent development is permitted. New developments compatible with designation are allowed, provided they are accomplished in an environmentally sound manner. Attachment 2 describes the criteria of each classification category in greater detail.

Suitability Criteria

The Department of the Interior Guidelines for fulfilling requirements of the *Wild and Scenic Rivers Act*, dated August 1988, suggest the following eight factors for consideration in a suitability analysis. Those factors are:

1. Characteristics which do or do not make the area a worthy addition to the National Wild and Scenic Rivers System.

2. Current status of landownership, use in the area, including the amount of private land involved, and associated or conflicting uses.

3. Reasonably foreseeable potential uses of the land and related waters which would be enhanced, foreclosed, or curtailed if the area were included in the National Wild and Scenic Rivers System, and the values which could be foreclosed or diminished if the area is not protected as a part of the system.

4. Public, state, local, or Federal interest in designation of the river, including the extent to which the administration of the river, including the costs thereof, may be shared by state, local, or other agencies and individuals.

5. The estimated cost of acquiring necessary lands and interests in lands and of administering the area if it is added to the system.

6. Ability of the agency to manage the river area or segment as a wild and scenic river.

7. Historical or existing rights that would be adversely affected as to foreclose, extinguish, curtail, infringe, or constitute a taking, which would entitle the owner to just compensation if the area were included in the National Wild and Scenic Rivers System. In the suitability analysis, adequate consideration will be given to rights held by owners, applicants, lessees, or claimants.

8. Other issues and concerns identified in the land-use planning process.

Methods Used for the River Study Report

Eligibility and classification analyses were completed by a BLM interdisciplinary team according to criteria included in the *Wild and Scenic Rivers Act* and the Department of the Interior Guidelines for fulfilling the requirements of the W&SR Act. A competent suitability analysis is dependent on comprehensive identification of the issues involved. The process requires extensive involvement of various affected river users, rights holders, protective organizations, and regulatory agencies.

Wild and Scenic River Study

A study group was formed in 1989 to analyze all potential wild and scenic streams/rivers within the planning area as part of the current RMP process and determine eligibility for wild, scenic, or recreational designation. A user group was formed consisting of representatives from different entities. Initially, the group represented the following 12 groups/organizations: Those involved with the group included:

Southeastern Colorado Water Conservancy District
City of Colorado Springs
The Sierra Club
Colorado Environmental Coalition
Arkansas River Outfitters Association
City of Pueblo
Upper Arkansas Water Conservancy District
State Water Engineer, Division II
Bureau of Reclamation
Trout Unlimited
Colorado White Water Association
Colorado Wildlife Federation
Arkansas Headwaters Recreation Area (AHRA)

As the process progressed, additional people were identified and representatives of the following groups were added:

Denver-Rio Grande Western Railway
Chaffee County Commissioners
Colorado State Water Conservation Board
Department of the Interior, Regional Solicitor

In addition, several private citizens participated in some or all of the discussions.

The workgroup met four times from October 1990 through February 1991. Written comments were requested twice from the workgroup. Each meeting was recorded and minutes were distributed to the group members. The group developed a working relationship and was very helpful in addressing the issues involved.

Although many issues were identified, those of the greatest concern were the following;

Water rights: The effect of designation on existing rights holders, the effect on water management in the basin, and the need and, perhaps, options in relation to a Federal reserved water right to protect the identified outstandingly remarkable values in the study segments.

Valid, existing rights: Private property rights and continuation of existing land uses in the corridors. Future development plans within the study segments and valid, existing rights established prior to the wild and scenic river analysis. Condemnation of private property in terms of acquisition and development rights.

River recreation: River access needs, future land acquisition needs. Whether or not designation was necessary and what impact designation would have on the existing Arkansas Headwaters Recreation Area.

Water quality: The effect of a wild and scenic designation on the existing water quality, the opportunities for additional development in the corridors, and the effect of designation on that future development.

Briefings, on request, were provided for various groups, including Colorado Springs City Council, American Rivers Alliance, Arkansas Headwaters Recreation Area Citizens Task Force, and Southeastern Colorado Water Conservancy District. Workshops and briefings also involved the Cañon City District Advisory Council.

Study Report Team Members

Workgroup Coordinator/Writer/ GIS mapper	Mike Gaylord
Workgroup Recorder/Editor	Bev Neuben
Workgroup Member/Recreation/ Cultural	Bob Wick
Workgroup Member/Recreation	Pete Zwaneveld
Workgroup Member/Wildlife/ Riparian	Erik Brekke
Workgroup Member/Lands and realty	Dave Hallock
Workgroup Member/Management/ Arkansas study	Paul Trentzsch
Workgroup Member/ RMP interface work	Dave Taliaferro
Workgroup Member/Advisor	John Wilson
Workgroup Member/ CSO coordinator	Eric Finstick

Study Report Schedule

October and November 1989 - Collect examples of assessments and review legal requirements of assessment and analysis

November 1989 - Organize process of assessment, select study team, and make needed assignments

December 1989 - Solicit and contact potential participants for user group

April 1990 - Study team tour of Arkansas River segments

April 1990 through March 1991 - User group meetings

May, August, and November 1991 - Meetings/workshops with district advisory council

November 1991 through July 1992 - Preparation of wild and scenic river study report

INELIGIBLE STREAMS/RIVERS

Three rivers, Cucharas, Huerfano, and Purgatoire, do not cross any significant acreage of BLM-administered lands;

therefore, BLM will not study these rivers for possible inclusion within the National Wild and Scenic Rivers System. Segments 5 and 6 of the Arkansas River were not analyzed beyond eligibility because of insufficient BLM-administered land within these segments. Five of the initial 61 streams (Attachment 1) needed additional analysis to determine eligibility.

Arkansas River - Segment 5

Segment 5 begins at the western boundary of the Royal Gorge Park (T.81S., R.70W., sec. 32, 6th PM) and ends in Cañon City. The segment is 6.27 miles in length. Land ownership within the corridor consists of the following:

Bureau of Land Management	13 percent
State of Colorado	14 percent
Royal Gorge Park (City of Cañon City)	55 percent
Private Lands	18 percent
	100 percent

The Bureau of Land management administers only 13 percent of the land within Segment 5. The majority of BLM-administered land does not have legal access and is not adjacent to the river, although it is within the corridor. The city of Cañon City considered including the Royal Gorge Park within the BLM-administered land base for purposes of this study; however, the city requested that their property not be included. BLM does not manage enough percentage of property to be considered a significant manager within the area; therefore, this segment will not be carried forward in our analysis.

Arkansas River - Segment 6

Segment 6 begins at Cañon City (T.18S., R.70W., sec. 32, 6th PM) and continues downstream to the tailwaters of Pueblo Reservoir (T.20S., R.67W., sec. 24, 6th PM). The segment is approximately 23 miles in length. Lands within the corridor are either private or administered by the state of Colorado. There are no lands administered by BLM within the segment. It is, therefore, inappropriate for BLM to conduct further analysis of this study segment. There is provision for state involvement in the wild and scenic river study process. The *Wild and Scenic Rivers Act* includes a provision (sec. 2 ii) for study and designation of eligible rivers by the affected state government. The provision was included to provide for those rivers without a significant portion of land under Federal management. On January 29, 1991, BLM contacted the Colorado Water Conservation Board and requested the board consider either a concurrent or joint study of the segments downstream from Segment 4. No response has been received.

Badger Creek

The study segment is that portion of Badger Creek immediately downstream from the U.S. Forest Service boundary in T.49N., R.10E., sec. 3, NMPM, to the confluence with the Arkansas River in T.49N., R.10E., sec. 28, NMPM.

The entire study segment is free-flowing. There are no known diversions, small head dams, nor other water control structures along the creek.

Prominent values in the area are cultural, visual, and a brown trout fishery. Remains of archaeological activity are common in this area. Most of the sites consist of scatters of flakes of stone material, with diagnostics dating to the earliest occupation of the Rocky Mountains. BLM is not currently aware of any cultural features in the study area that could be considered "outstandingly remarkable."

Visual values of Badger Creek are common to the region. From within the river canyon, piñon-juniper woodlands dominate the view. The riparian area is in poor condition because of the unstable nature of the upstream watershed and frequent flooding that occurs in the drainage.

There is a small resident trout fishery common to Badger Creek. Brown trout migrate upstream to spawn and receive some fishing pressure during this time. The fishery is common to most perennial tributaries of the Arkansas River.

Based on the lack of an outstandingly remarkable value, Badger Creek has been determined not eligible for further study under the *Wild and Scenic Rivers Act*. This is consistent with the U.S. Forest Service determination within the Pike San Isabel Forest Land Use Plan completed in 1984. Badger Creek has potential for large scale improvement in the riparian area and the fishery. The watershed is currently involved in a large scale improvement plan

Fourmile Creek

The study segment is that portion downstream from T.16S., R.70W., sec. 6, 6th PM to the BLM boundary in T.17S., R.70W., sec. 34, 6th PM.

In T.17W., R.70W., sec. 34, 6th PM, the Cañon Heights Irrigation Company has an existing diversion across the creek. The entire streamflow for all periods except the highest flows, is diverted into an irrigation ditch for a distance of 660 feet. At that point, a headgate diverts irrigation water from surplus flow. The surplus is then returned to the original stream channel. Because of this diversion, Fourmile Creek cannot be considered to be free-flowing. The Carlton Tunnel, a mine drainage system for the mines in the Cripple Creek area, diverts ground water into Fourmile Creek above the study segment. The water is of poor quality as a result of acid mine drainage.

The most significant features are scenic values and numerous species of dinosaur remains. Known deposits, which are not considered to be river related, are split between BLM-administered and private lands.

Because the stream is not free-flowing and there are no outstandingly remarkable characteristics attendant to the stream, Fourmile Creek has been determined not eligible for further study under the *Wild and Scenic Rivers Act.*

Eightmile Creek

The study segment is that portion downstream from the Colorado State Section in T.16S., R.69W., sec. 16, 6th PM to where the stream leaves BLM lands in T.18S., R.69W., sec. 4, 6th PM.

There are no diversions nor dams on Eightmile Creek, and the stream is considered free-flowing. At the turn of the century, Eightmile Creek was affected by the efforts to drain the mines in the Cripple Creek Mining District. The Carlton Tunnel was drilled under the mines and the Eightmile Creek drainage to assist in draining the mines. There is evidence that the creek was perennial prior to completion of the tunnel; however, since completion, the creek has had only intermittent flows.

The most distinctive features of the Eightmile Creek area are its visual qualities. The stream corridor is within a recently designated national back country byway; however, the stream is only a minor component of the overall scenic values of the byway. The stream, although intermittent and usually dry during the period most people visit the area, is a minor component of the scenery in the area. Attention focuses on the very rugged upland areas. The historic railroad grade and mining activity from the gold boom of the Cripple Creek area at the northern end of the scenic drive are also of considerable interest.

Recent inventories in the Phantom Canyon area have confirmed the presence of Mexican spotted owls (*Strix occidentalis lucida*) in the canyon. Suitable habitat is available especially in the upper half of the canyon. Currently, it is expected that the species may be listed as threatened. Inventory for this species will continue in the future. The owl is not considered to be a river related species; therefore, was not considered to be an outstandingly remarkable associated-stream value.

Based on the lack of any outstandingly remarkable values, Eightmile Creek is determined not eligible for further study under the *Wild and Scenic Rivers Act.*

Grape Creek

The study segment is that portion from T.21S., R.72W., sec. 14, 6th PM to the confluence with the Arkansas River in T.19S., R.70W., sec. 6, 6th PM. The study segment is approximately 19 miles in length and is dominated by BLM-administered land.

Grape Creek is used as a transmission conduit for irrigation water used in the Cañon City area and stored in DeWeese Reservoir in the Wet Mountain Valley. The entire streamflow is adjudicated to the irrigation companies involved. As a result, the stream has periods of extreme flow as well as very low flow periods based on irrigation needs. The DeWeese-Dye Irrigation Company has a diversion in the creek approximately 1 mile above the Arkansas River confluence. The diversion consists of a low head dam with no impoundment. The stream flow is entirely manipulated for irrigation purposes and is not considered natural flowing. The stream is, however, considered to be a free-flowing stream within the definition of the *Wild and Scenic Rivers Act.*

The study segment flows through both the Upper and Lower Grape Creek Wilderness Study Areas (WSAs), neither of which has been recommended by BLM for wilderness designation. As a feature of the WSAs, the creek and its immediate environments were described as providing outstanding opportunities for solitude and primitive and unconfined recreation. Several factors detracted from the overall wilderness qualities of the area. These factors included the irrigation water management previously described, poor condition of the riparian zone along the creek, and limited fishery in the stream. The area is considered marginal habitat for peregrine falcons. There is no historic record of peregrine use in the area. The visual qualities of the canyon and associated dry gulches met minimum wilderness characteristics as defined by the WSA review process. The Upper Grape Creek Wilderness Study Report describes those features as ". . . very common to lands throughout Southern Colorado."

The outstandingly remarkable criteria is not met in this stream segment. There are some notable features within the study segment but none that are not available elsewhere in the Royal Gorge Resource Area or Southern Colorado. The fact that the entire streamflow is regulated year around for irrigation purposes also detracts from the naturalness or outstanding characteristics of the area. Grape Creek is, therefore, determined not eligible for further study under the *Wild and Scenic Rivers Act.*

South Apache Creek

The study segment is .25 mile in length and is contained entirely within T.25S., R.68W., sec. 35 of 6th PM.

South Apache Creek is a free-flowing stream, and there are no existing diversions within the .25-mile study segment.

The greenback cutthroat trout, currently listed as a state threatened species, is present within the study segment. The greenback is currently the subject of a recovery effort by the Colorado Division of Wildlife. Populations across the state of Colorado have increased as a result of this management. The Division of Wildlife has estimated the species will be

subject to gamefish status within the next 10 years. Populations within South Apache Creek have been isolated by construction of a log-rock barrier. Existence of the species in South Apache Creek, although significant and the subject of management by both the Colorado Division of Wildlife and BLM, cannot be considered an outstandingly remarkable characteristic.

South Apache Creek does not contain an outstandingly remarkable value and is not eligible for further study under the *Wild and Scenic Rivers Act*.

ELIGIBLE STREAMS/RIVERS

Beaver Creek

The Beaver Creek study segment begins at Skagway Dam in T.16S., R.69W., sec. 22, 6th PM and runs downstream to the south boundary of the Beaver Creek State Wildlife Area in sec. 33 in T.17S., R.68W., 6th PM and includes the east fork of Beaver Creek to the Fremont/Teller county line in sec. 22 in T.16S., R.68W., 6th PM (Map L-2). Land ownership of the 20-mile segment is as follows:

Bureau of Land Management	49 percent
State of Colorado	37 percent
Private Lands	14 percent
	100 percent

Eligibility Determination

Free-Flowing Determination

One diversion in Beaver Creek, associated with the penstock for the Skagway Powerplant, was constructed around the turn of the century at the existing Skagway Dam. It has been abandoned for 20 or more years. The penstock diverts water from the creek to the powerplant to maintain sufficient hydraulic head for power generation. Because of the steep creek gradient, the majority of the penstock is well above the creek. The maximum vertical separation between the penstock and the creek is 1,100 vertical feet. The entire Skagway Powerplant complex has been inoperable and has not affected the streamflow in Beaver Creek since 1965. There are only minor diversions associated with the downstream agricultural practices within the remainder of the study segment.

Outstandingly Remarkable Characteristics

Visual Resources (eligibility criteria):

Scenic or visual quality measures the visual appeal of an area. The scenic quality of the Beaver Creek corridor was determined using the BLM visual resource inventory process as a framework. This process focuses on seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. Each of these factors is rated on a comparative basis with similar features within the same physiographic province. For Beaver Creek, the physiographic province was the Southern Rocky Mountains.

The most outstanding characteristics expressed by each rating factor are described as follows:

Landform: High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops; severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers.

Vegetation: A variety of vegetative types as expressed in interesting forms, textures, and patterns.

Water: Clear and clean appearing, still or cascading whitewater, any of which is a dominant factor in the landscape.

Color: Rich color combinations, variety of vivid color, or pleasing contrasts in the soil, rock, vegetation, water or snowfields.

Adjacent scenery: Adjacent scenery that greatly enhances visual quality.

Scarcity: One of a kind, or unusually memorable, or very rare within a region. Consistent chance for exceptional wildlife or wildflower viewing, etc.

Cultural modifications: Modifications that add favorably to visual variety and also prompt visual harmony.

In general, the more visual variety and harmonious composition expressed through these factors, the more scenic the landscape. To be considered as outstandingly remarkable, the scenic values need to be either highly unusual for the region, or to express an especially good example of a landscape typical to the region.

Visual Resources (general analysis): The following factors describe the scenic values of the Beaver Creek Corridor.

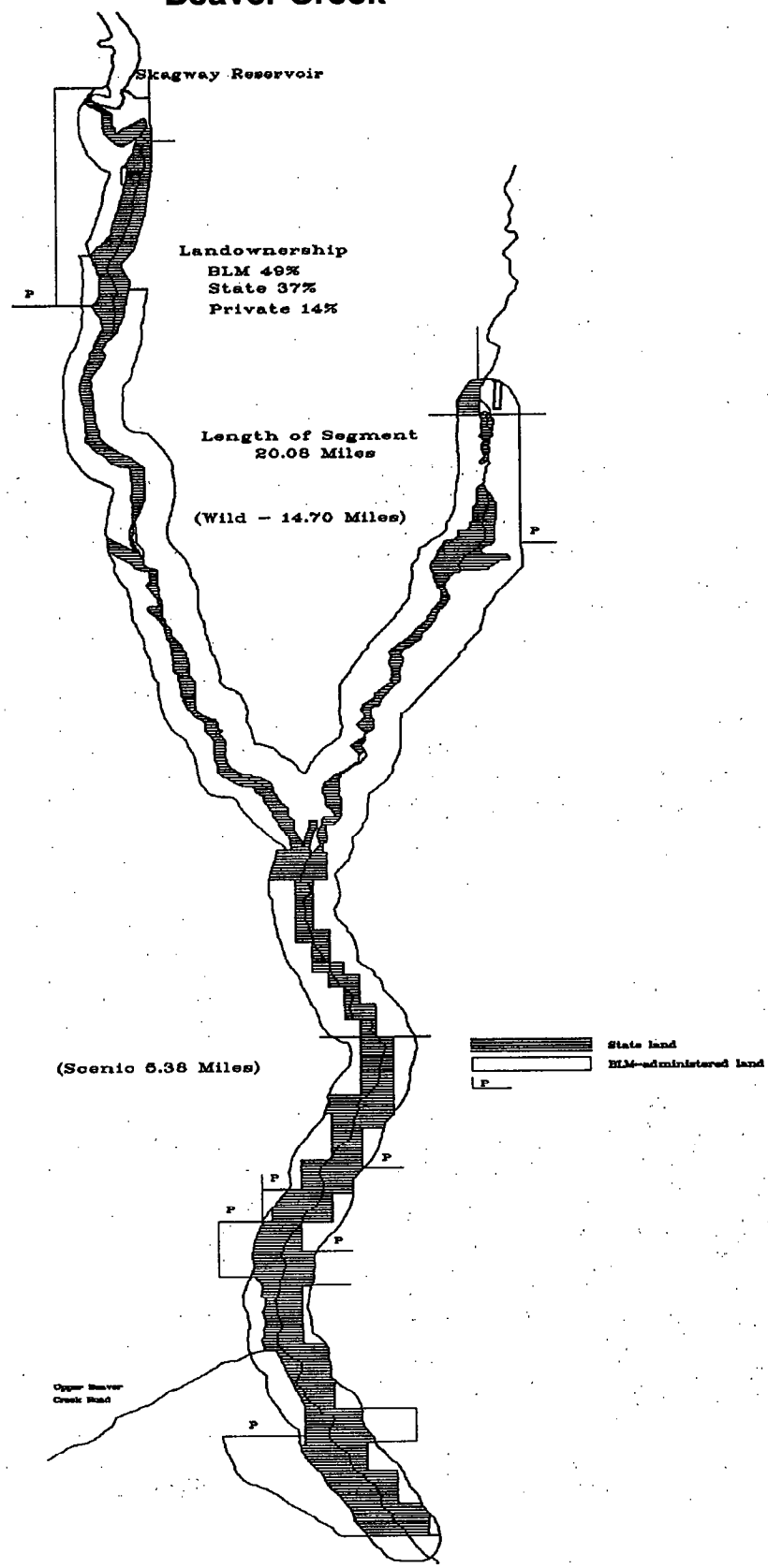
Landform: The Beaver Creek corridor has very diverse topography ranging from steep mountain peaks in the upper segment (wild segment) to rocky rolling hills extending into the plains in the lower segment (scenic segment). Both the east and west branches of Beaver Creek flow through canyons more than a thousand feet deep, with massive granite walls and spires rising above the stream bed.

Vegetation: The vegetation ranges from cactus in the semi-arid lowlands to subalpine species including Englemann spruce and bristlecone pine in the upper portion of the corridor. The stark contrasts between the canyon walls and the willows and cottonwoods in the riparian zone along Beaver Creek highlight the vegetation. A variety of patterns are expressed by groupings of aspen and Gambel oak, which are particularly scenic in the fall.

Water: Both branches of Beaver Creek are a focal point of the landscape. Several falls and numerous pools and rapids

Map L-2

Beaver Creek



strewn with huge boulders characterize the stream. The water appears to be clean and clear.

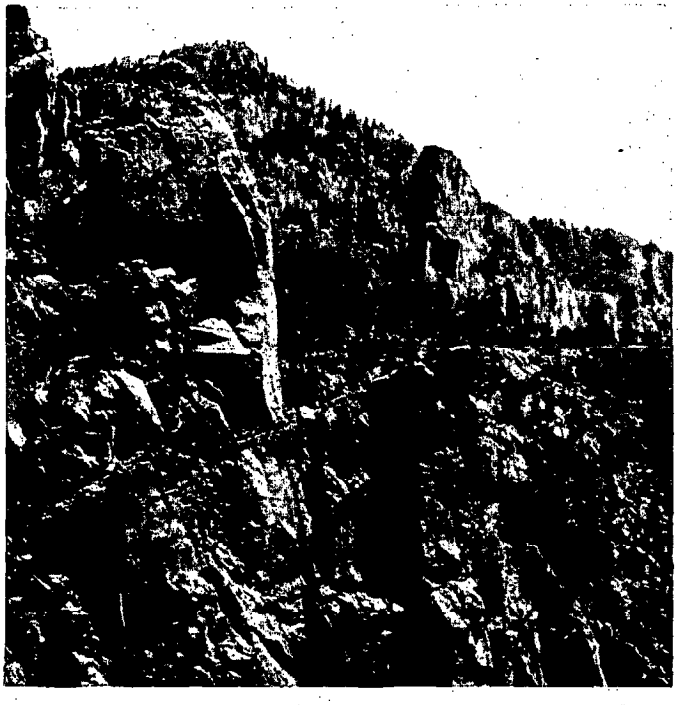
Color: The steep mountain slopes and canyons are a mosaic of dark green conifer forests, grey-black rock spires and yellow-green riparian areas, creating a variety in color with stark contrast.

Adjacent Scenery: Because of the rugged topography of the Beaver Creek corridor, scenery outside the canyon is often not visible. Where it is visible, however, the visual quality of the corridor is greatly enhanced. Views to the north are dominated by Pikes Peak; to the west and south are the Wet Mountains and the rugged Sangre de Cristo Range; to the east, the vast great plains extend to the horizon.

Scarcity: The corridor contains individual landscape features also present in other parts of the region; however, the combination of features makes the corridor an outstanding example of this type of landscape.

Cultural modifications: The only major cultural modification within the upper segment is the Skagway Powerplant. Although the plant does not add to the scenic values, it is not considered to be a major deterrent because of its small scale relative to the natural features as well as its historic character. Irrigated hayfields within the lower segment of the Beaver Creek State Wildlife Area enhances the pastoral setting.

The Beaver Creek corridor combines the outstanding characteristics of each scenic quality rating factor. Beaver Creek represents an "outstandingly remarkable" example of a stream and canyon landscape within the southern Rocky Mountains.



Wildlife Resources (eligibility criteria):

Criteria were developed for both wildlife populations and their habitat.

Populations: The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique or populations of Federally listed or candidate threatened and endangered species.

Habitat: The river or area within the river corridor provides exceptionally high quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for Federally listed or candidate threatened and endangered species. Contiguous habitat conditions are such that biological needs of the species are met.

Wildlife Resources (general analysis):

The outstandingly remarkable wildlife values in Beaver Creek center on the endangered peregrine falcon. The Peregrine Fund and BLM established a hack site in Beaver Creek in 1987, and young birds were reintroduced for 3 years. In 1989 a pair of peregrines nested on their own in the Beaver Creek canyon and fledged three young. The canyon was again occupied in 1990 and 1991 by a pair of peregrines, but nesting status is unknown. Peregrine habitat within the Beaver Creek area is considered some of the best in the state by both the Colorado Division of Wildlife and the Peregrine Fund. A historical eyrie has been identified in the canyon. The canyon was identified in 1985 as a key raptor area by BLM because of available habitat and number of species (including peregrines) in the area. The Mexican spotted owl (*Strix occidentalis lucida*), which is proposed for listing as a threatened species, has been confirmed in Beaver Creek and in Phantom Canyon, west of Beaver Creek. Occurrence in other areas is also very likely. Although in itself not outstandingly remarkable, it is significant that Beaver Creek supports four species of trout (brook, rainbow, brown, and native cutthroat). It is one of the few places where this occurs.

The Beaver Creek study segment clearly meets the eligibility criteria for both wildlife populations and habitat, which is evidenced by nesting peregrine falcons within the canyon. It is also very likely that the Mexican spotted owl is present in the area, which is expected to be listed as threatened in the near future.

Conclusion of Eligibility Determination

Because 20 miles of Beaver Creek are free-flowing as defined in the *Wild and Scenic Rivers Act* and because values exist within the study segments that must be considered "outstandingly remarkable" as defined by the Act, Beaver Creek is eligible for wild and scenic designation.

Classification Analysis

Upper Segment

This segment of Beaver Creek extends from the north study segment boundary, downstream to the south boundary of T.17S., R.68W., sec. 9. Water quality is excellent. Currently, the water quality standards for this segment are:

Aquatic Life Cold 2
Recreation 2
Agriculture

There are no impoundments on this segment. The only road within this segment is a short, unimproved two-track road extending south from Skagway Dam. The road is unimproved, receives little use, and is a minor intrusion within the segment. There are no residences within the segment, although at least one cabin does exist. The penstock from Skagway Dam downstream to the old powerplant parallels the creek but diverts water from the creek up to 1,100 feet vertically. Vehicles cannot traverse the old penstock route, and the cut is also a minor intrusion. There have been no forest harvest activities within the segment, although some post and pole harvest has occurred. No livestock grazing occurs within the segment.

Although the area has had some intrusion in the past, the segment meets the requirements for a wild river segment (Attachment 3).

Lower Segment

The north boundary of this segment is the south boundary of T.17S., R.68W., sec. 9 and extends downstream to the south boundary of T.17S., R.768W., sec. 33. Water quality is good. Current water quality standards are the same as those listed for the upper segment of Beaver Creek.

There are no impoundments within the segment. Several minor irrigation diversions occur, and one existing road crosses the creek. The road is public and receives periodic maintenance. A second road exists within the segment and receives some use as administrative access within the state wildlife area. There is agricultural use including hay production and livestock grazing.

The segment meets the requirements for a scenic river segment (Attachment 4).

Conclusion of Classification Analysis

The upper segment meets requirements for tentative classification as wild; the lower segment meets requirements for tentative classification as scenic.

Suitability Determination

Analysis Factors

1. WORTHY ADDITION: Both Beaver Creek segments are worthy additions to a national system. The *Wild and Scenic Rivers Act* sets no minimum criteria for either physical size or length of a designated segment. Some streams shorter in length and streams with substantially less annual flow than the Beaver Creek segment were specifically designated by Congress and are currently in the national system. Beaver Creek is unique in that it is one of the very few remaining streams on the Colorado Front Range that still qualifies as a "wild" segment. Beaver Creek is also unique in that it provides some of the most outstanding examples of peregrine falcon habitat in the entire state according to the Colorado Division of Wildlife.

2. LAND OWNERSHIP: Currently more than 86 percent of the study segment is in public ownership. The current status is: Bureau of Land Management 49 percent, the Colorado Division of Wildlife 37 percent and private ownership 14 percent. The potential exists to add to the percentage of BLM-administered lands. There are currently two property exchange proposals that would add private land to the acreage administered by BLM within the wild segment. It is also possible that other affected landowners may choose to exchange or add their properties to the wild segment. Most private lands within the scenic segment, almost without exception, are not directly adjacent to the stream. Potential opportunities exist to add public property to this segment through willing sale or exchange.

The entire wild segment is accessible to the public through the Beaver Creek State Wildlife Area or the BLM Beaver Creek Wilderness Study Area. Access is currently limited to foot traffic and equestrian use because of WSA status. There is a public road to the dam at Skagway and a private two-track road down the stream for approximately one-half mile. The scenic segment is also accessible through the Beaver Creek Wildlife Area. The state property is limited to a narrow corridor along the stream. A public road provides access to a parking area within the state wildlife area. There is no BLM-administered land within this segment. Numerous private property parcels exist within the scenic segment; however, access is not limited along the creek as none of the private parcels cross the entire study segment. As a result, public access through the state wildlife area is excellent. No additional access nor acquisition is needed within this segment. If additional private parcels within the corridor should become available, acquisition would be desirable. Condemnation of private properties within either of the Beaver Creek segments is not needed nor desirable. Section 6(a) of the Act specifically prohibits the Secretary of Interior from acquiring fee title to any lands by condemnation if more that 50 percent of the acreage within the bounds of a federally administered river ". . . is owned by the United States, by the State or States within which it lies, or by political subdivisions of those States."

3. POTENTIAL USES OF THE LAND: Reasonable foreseeable uses of the land are limited to current uses. The Federal lands will be retained in perpetuity. The state lands were acquired for a specific purpose (wildlife management). Changes in use are unlikely. Private properties are widely scattered along the length of the scenic segment. The physical location of private properties limits the effect of use on a suitable segment of the river.

Existing uses of these properties are compatible with those desired in a national system property. It would be desirable to limit subdivision of those properties within the corridor to a size that would maintain the existing agricultural character of the area.

4. PUBLIC, STATE, LOCAL,FEDERAL INTEREST: Public or local interest in the Beaver Creek segments can probably best be termed "moderate." There was some response from interested parties during the analysis when BLM raised the question of the "worthiness" of Beaver Creek of national protection. The response was almost entirely in support of Federal protection for this segment. The responses enumerated the same outstandingly remarkable qualities that were detailed during the eligibility process. Included were outstanding wildlife habitat and some of the finest visual and scenic qualities in this region of Colorado. Beaver Creek is also among the very last Front Range Streams without extensive development and can still qualify as a wild stream.

State interest for designation is supportive. The Colorado Division of Wildlife has indicated a designation would be compatible with both current activities and planned activities within the area. The existing cooperative agreement provides for exchange of properties should the Beaver Creek WSA be designated wilderness. There is Federal interest in maintaining both the free-flowing values and the outstandingly remarkable values of Beaver Creek.

5. ESTIMATED COST: No additional costs are foreseen for acquisition of lands within the Beaver Creek segments. Some additional costs may be incurred if purchase of sufficient water is necessary to ensure perpetuation of the stream. Water is owned by the Division of Wildlife for the Beaver Creek State Wildlife Area. Some additional minor costs would be incurred for administration of a designated stream. An estimated two work months per year would cover the cost of administration.

6. ABILITY OF THE AGENCY TO MANAGE: The area is currently managed for public use by both the BLM and the Colorado Division of Wildlife. The Act provides in Section 10(e) for cooperative management agreements with state or local governments to administer components of the national system. The Beaver Creek area could be managed effectively by either BLM or DOW or a combination of both agencies.

7. HISTORICAL OR EXISTING USES: Colorado Springs depends on the upper Beaver Creek watershed for a significant portion of its domestic water supply. Colorado Springs has developed two watersheds above the Beaver Creek study segments. The South Slope watershed yields an average of 2,400 acre-feet of water each year. The Rosemont watershed yields approximately 1,200 acre-feet per year. These historic water rights are diverted above the Beaver Creek study segment. In addition, a June 16, 1987, Transmountain Return Flow Exchange Decree provides for exchanges from the Arkansas River System up to storage facilities and direct diversions in these watersheds during those times when the native water rights may not be in priority. Anticipated yield from these exchanges is expected to be between 600 and 1,000 acre-feet per year. Many of the diversion and storage facilities for the South Slope and Rosemont systems are nearing a century in age. Colorado Springs asserts that major rehabilitation or replacement work will be necessary in the future to ensure continued use of their adjudicated water rights. The most significant impact in terms of this required maintenance will be on water quality through the study segment. That issue will be more fully described within the discussion of suitability factor number 8.

The City of Colorado Springs has, through the Colorado State Forest Service, completed a Pikes Peak Watershed Forest Management Plan. The plan details activities to be conducted to properly protect and preserve the watershed resources. The city is concerned that wild and scenic river designation constraints could unnecessarily complicate watershed management practices on both city and U.S. Forest Service land. These concerns relate, primarily, to water quality and will be more fully discussed under suitability factor number 8.

The Beaver Creek watershed is also the source of supply for the Beaver Park Water District. Beaver Park serves the Penrose area with both irrigation and domestic water. Penrose is an area experiencing some growth because of its proximity to Pueblo, Colorado Springs, and Cañon City. Water use in this area has been largely agricultural. In 1989 and in 1990, however, there have been attempts to increase domestic use of Beaver Park water over irrigation needs. As the area grows, there will probably be more and more water converted to domestic use. The city of Colorado Springs maintains that "Existing operation of Skagway Reservoir, above the study segment, owned by the State Division of Wildlife, provides for water releases to downstream water users on Beaver Creek (the Beaver Park Water District) in such a manner as to protect the aquatic habitat through the proposed wild and scenic segment." This arrangement, together with the joint management agreement between DOW and BLM to protect Beaver Creek is sufficient to meet any protective requirements of the *Wild and Scenic Rivers Act*; therefore, no Federal reserved water right is warranted.

8. OTHER ISSUES: There has been considerable concern that a wild and scenic river designation would severely disrupt existing water project operations and possibly prohibit future development of the area. The concern is that the *Wild and Scenic Rivers Act* will require more stringent water quality regulations be observed in administration of the designated river. *Colorado Water Quality Regulations* (Section 3.1.8) require that waters shall be designated by the Commission (Colorado Water Quality Commission) high quality 2 if ". . .the waters are part of a designated wild river under the Federal Wild and Scenic Rivers Act." The regulations further require (Section 3.1.8 (b) (1) that "The antidegradation review requirements in section 3.1.8(3) are applicable to all waters designated pursuant to section 3.1.8 (2)(b)." See Attachment 7 for more details.

The required antidegradation review for the wild segment of Beaver Creek is significant since Colorado Springs has stated that major work for rehabilitation and or new development will be necessary for the facilities serving the South Slope and Rosemont watersheds. Water quality deterioration is expected to be principally short term in nature. Deterioration would involve increased turbidity from construction activities. The required activity would be for maintenance of existing and possibly new diversions, not for any alternative that would provide a continuous or long-term degraded water quality discharge to the creek.

Degradation to Beaver Creek as a result of maintenance or construction activities on the two developed upstream watersheds would be short term. Those short-term impacts would not have a significant adverse impact with respect to the specific reasons for designating the segment high quality 2.

According to the Colorado Springs Department of Utilities, the South Slope and Rosemont watersheds currently provide approximately 5 percent of Colorado Springs domestic needs. These are important economic and social development projects, which have been in existence for approximately 100 years and probably provide the city with the most affordable water it currently has. Any alternatives Colorado Springs has for replacing the South Slope and Rosemont flows would be prohibitively expensive.

The city of Colorado Springs contends that "The Wild and Scenic Rivers designation would automatically trigger the antidegradation review process administered by the State Water Quality Control Division at such time when the City initiates any rehabilitation/replacement activity. Thus, the City would be subjected to extensive regulatory processes to justify necessary maintenance and continued operation of facilities which have been providing service for 100 years. Water quality could also become an issue in any future adjudication involving the City's water rights." Designation of Beaver Creek as a wild river would trigger the antidegradation review process. The process has protective language included that would ensure that Colorado Springs could continue, rehabilitate, and replace those facilities that enable it to use effectively its adjudicated water right.

Conclusion of Suitability Determination

Sufficient water will flow perpetually through the Beaver Creek study segments. Existing water rights owned by the Division of Wildlife and other entities are sufficient to maintain the existing outstandingly remarkable values. A specific Federal reserved water right is not needed on Beaver Creek, although the creek should be provided an instream flow right owned by the Colorado State Water Conservation Board. Water quality issues on Beaver Creek are manageable, and state law provides sufficient protection for existing rights. When both Beaver Creek segments are considered, condemnation of private property is specifically prohibited. Additional acquisition is not needed, although sale and exchange by willing sellers should be considered.

Summary of Analysis

Both segments of Beaver Creek are free-flowing and have outstandingly remarkable visual and wildlife values. Tentative classification for the upper segment is wild; for the lower segment scenic. Beaver Creek is suitable for wild and scenic designation.

Arkansas River

A portion of the Arkansas River included in this study is currently being managed as part of the Arkansas Headwaters Recreation Area (AHRA). The AHRA, a cooperative venture between the Bureau of Land Management (BLM) and the State of Colorado Division of Parks and Outdoor Recreation (DPOR) was established in October 1989. The intent of the partnership is to provide improved management of the Arkansas River and adjacent public lands for recreation.

Eligibility Determination

Eligibility of the Arkansas River will be analyzed by segment for the free-flowing determination; then the outstandingly remarkable characteristics will be analyzed by segment.

Free-flowing Determination

The Arkansas River was analyzed from the U.S. Forest Service/Bureau of Land Management boundary north of the town of Leadville, Colorado, to the tailwaters of Pueblo Reservoir downstream from Cañon City, Colorado. The total length of this river section is approximately 156 miles.

The river study corridor was established at one-quarter mile in width each side of the river centerline. Total corridor width is one-half mile. The river was broken into six segments to facilitate the analysis, which are similar to the segments used in 1988 for completion of the Arkansas River Recreation Area Management Plan for the Arkansas Headwaters Recreation Area. The same segments were used primarily because the publics were familiar with these from the previous planning effort and because they suited the physical characteristics of the river satisfactorily for the purposes of this analysis.

Segment 1

Segment 1 (Map L-3) begins at the U.S. Forest Service/ Bureau of Land Management boundary north of the town of Leadville, Colorado (T.8S., R.79W., secs. 15 and 16, NMPM) and ends at the town of Buena Vista, Colorado (T.14S., R.78W., sec. 8, NMPM). The segment is approximately 47 miles in length. Land status within the corridor consists of the following:

Bureau of Land Management	34 percent
U.S. Forest Service	8 percent
State of Colorado	4 percent
Private	54 percent
	100 percent

Free-flowing Determination

Stream flow in Segment 1 of the Arkansas River fluctuates daily, as well as seasonally. Western slope water is added to the Arkansas River drainage by way of diversion tunnels to Turquoise Lake and Twin Lakes. Much of the western slope water is removed from the river at the Otero Pump Station, but some portion of that water continues on to Pueblo Reservoir.

An outlet structure is built into the new Twin Lakes Dam that will eventually convey Homestake Project and Twin Lakes Project water to the Otero Pump Station in a pressurized conduit to save approximately 350 feet of lift at the pump station. This water will not be transmitted through the Arkansas River channel. There are at least two minor diversions within Segment 1 that do not affect the free-flowing values of the river. There are no existing dams within the segment.

Segment 2

This segment (Map L-4) begins at Buena Vista, Colorado, (T.14S., R.78W., sec. 8, NMPM) and continues downstream to Salida, Colorado, (T.50N., R.9E., sec. 5, 6th PM). Length of the segment is approximately 29 miles. Land ownership within the corridor consists of the following:

Bureau of Land Management	39 percent
State of Colorado	1 percent
Private	60 percent
	100 percent

Free-flowing Determination

Stream flow within the segment fluctuates regularly as a result of the intensive water management activities that occur on the river. There are no additional sources of transmountain water added to the channel within this segment.
The upper Arkansas Valley is heavily irrigated for the production of hay. There are numerous minor diversions for irrigation within this segment.

Downstream from Buena Vista, the Denver-Rio Grande Western Railway railbed parallels the river closely through Browns Canyon area. The railbed construction and maintenance have modified the river corridor to some degree. The railbed did not, however, constitute a major modification and has not affected the free-flowing quality of the river.

There is one low head dam across the river upstream from Salida at Smeltertown. The dam creates no impoundment, and in 1990 the city of Salida modified the dam for use by recreational boaters by constructing a boat chute in the dam. Water flows freely over this structure. There are no other known dams existing within the segment.

There is some rather extensive, localized riprapping of the channel in the vicinity of Smeltertown and within the city limits of Salida. The modifications are considered very minor within the scope of the segment.

Segment 3

Segment 3 (Map L-5) begins at Salida, Colorado (T.50N., R.9E., sec. 5, 6th PM), and continues downstream to Vallie Bridge (T.19S., R.75W., sec. 20, 6th PM). The segment is approximately 20 miles in length. Land ownership within the corridor consists of the following:

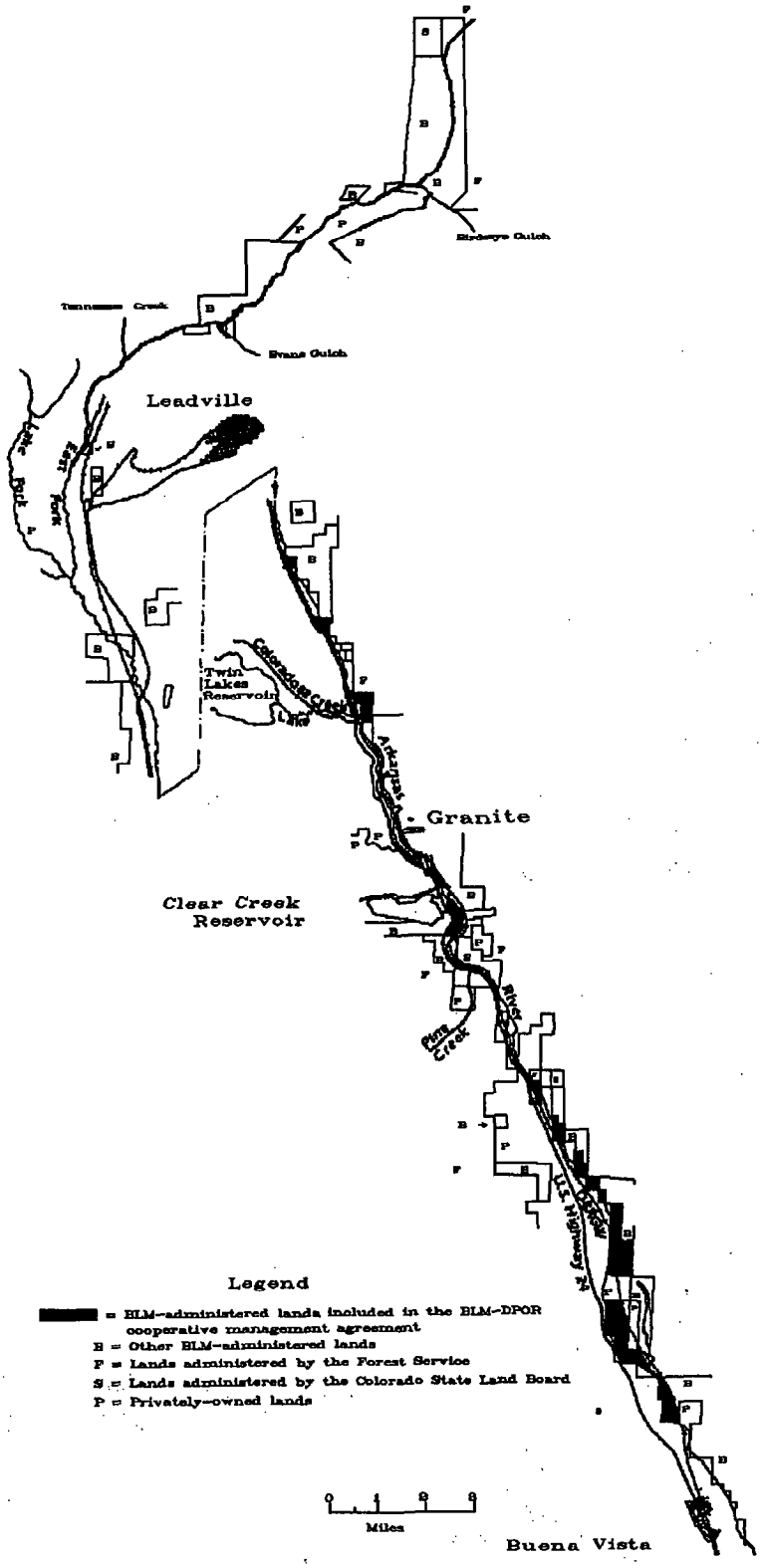
Bureau of Land Management	41 percent
Private Lands	59 percent
	100 percent

Free-flowing Determination

Segment 3 flows from Salida into Pleasant Valley, which is mostly private lands with extensive irrigation for hay production. Several

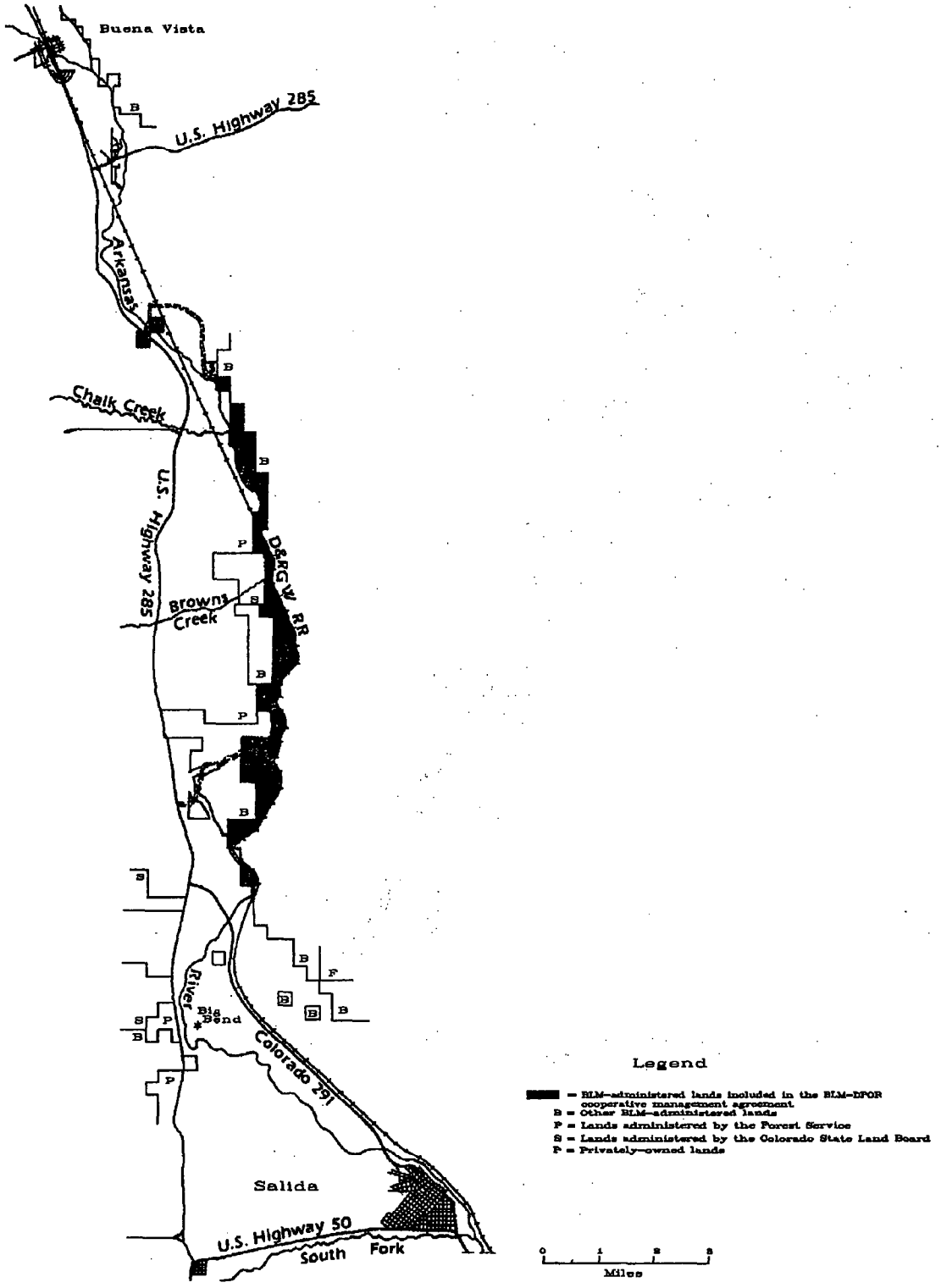
Map L-3

Segment #1 - USFS/BLM Boundary North of Leadville to Buena Vista



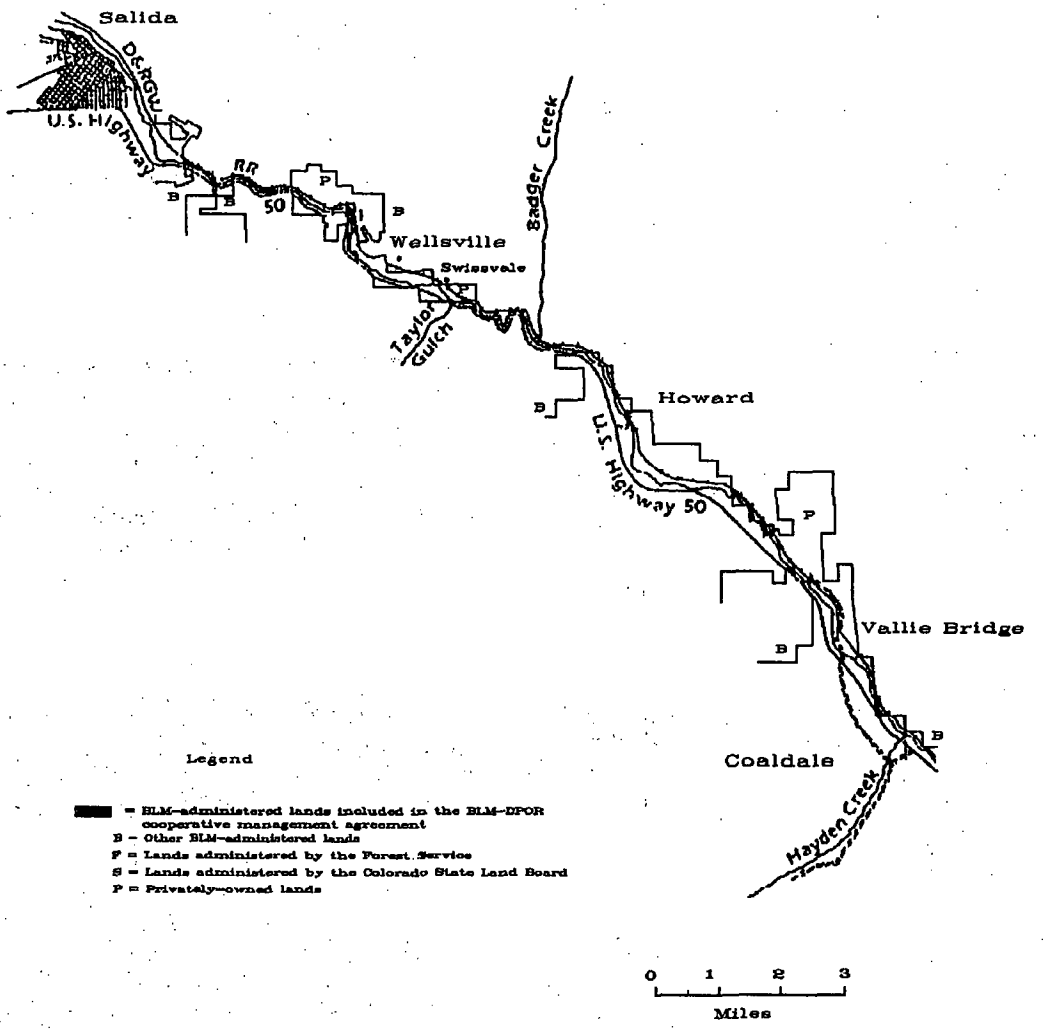
Map L-4

Segment #2 - Buena Vista to Salida



Map L-5

Segment #3 - Salida to Vallie Bridge



small diversions within the segment do not affect the free-flowing qualities of the river. There are no dams within the segment.

Segment 4

Segment 4 (Map L-6) begins at Vallie Bridge (T.19S., R.75W., sec. 20, 6th PM) and continues downstream to the western boundary of the Royal Gorge Park (T.18S., R.71W., secs. 20, 21, 6th PM). The segment is approximately 31.25 miles in length. Land ownership within the corridor consists of the following:

Bureau of Land Management	67 percent
State of Colorado	3 percent
Private Lands	30 percent
	100 percent

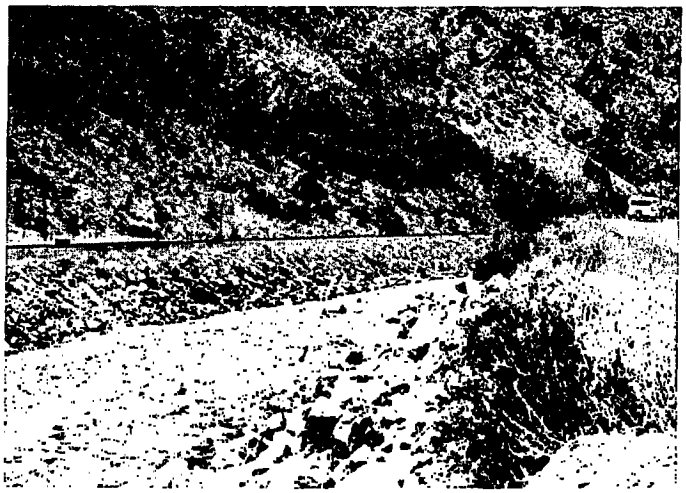
Free-Flowing Determination

Minor agricultural diversions are within this segment, below Vallie Bridge and in the Cotopaxi vicinity. They do not affect the free-flowing river qualities.

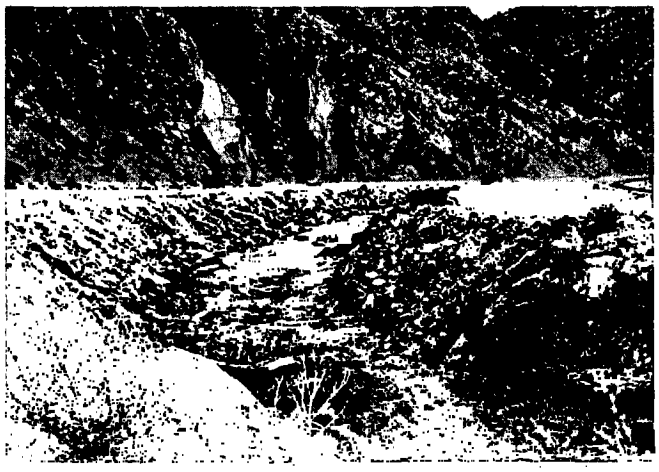
For approximately 80 percent of the segment length, the Arkansas River is closely paralleled by U.S. Highway 50 on one side and the Denver-Rio Grande Western Railway railbed on the other. Development of these transportation routes has had considerable effect on the river in terms of riprapping the river shoreline, channelization of the streambed and, in some cases, creation of whitewater areas involved in the outstandingly remarkable characteristics, which will be discussed later. In an effort to determine the impact of this development, the segment was mapped according to three criteria:

Major (unacceptable) Alteration. Extensively riprapped areas from the transportation corridor to the shoreline and below. These areas have been filled with unnatural, obviously imported materials such as concrete or rock. Shoreline vegetation is absent. There is a probability that fishery habitat is minimized because of man-caused disturbance.

Minor (acceptable) Alteration. Areas modified by development activities, but with less effects than the Major Alteration criteria either in degree or scope. In these areas riprap was not continuous from the transportation route to the shoreline and below. Even imported materials were natural rock that blended with the native rock. Shoreline vegetation was used as an indication that soil pockets existed and some screening of the transportation routes existed at the waterline. The indication was that fishery habitat, although affected by human activities, had not been eliminated.

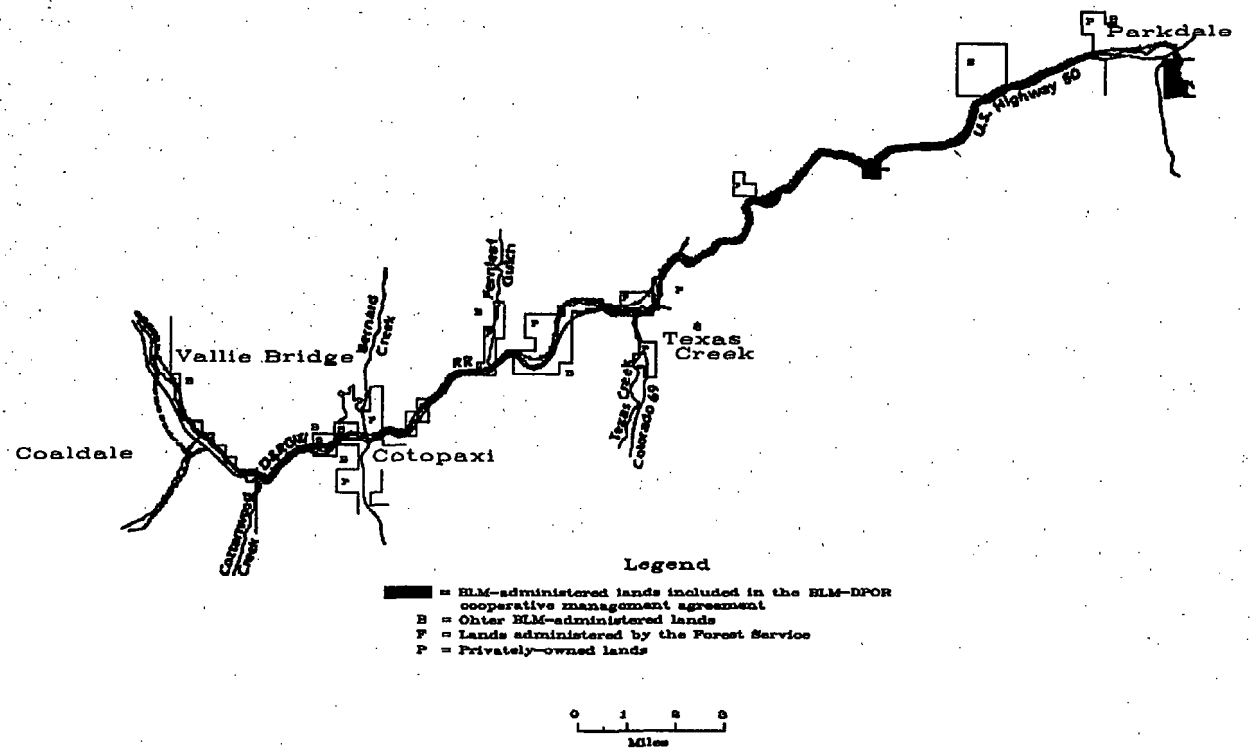


Essentially Natural State. Areas viewed as being in a natural state even if some minor modification had occurred. Riprap was minor in extent and blended well with natural rock. Shoreline vegetation was extensive. Screening (or naturalization) of the transportation routes from the waterline was substantial. Fisheries habitat had not been affected by the effects of human disturbance.



Map L-6

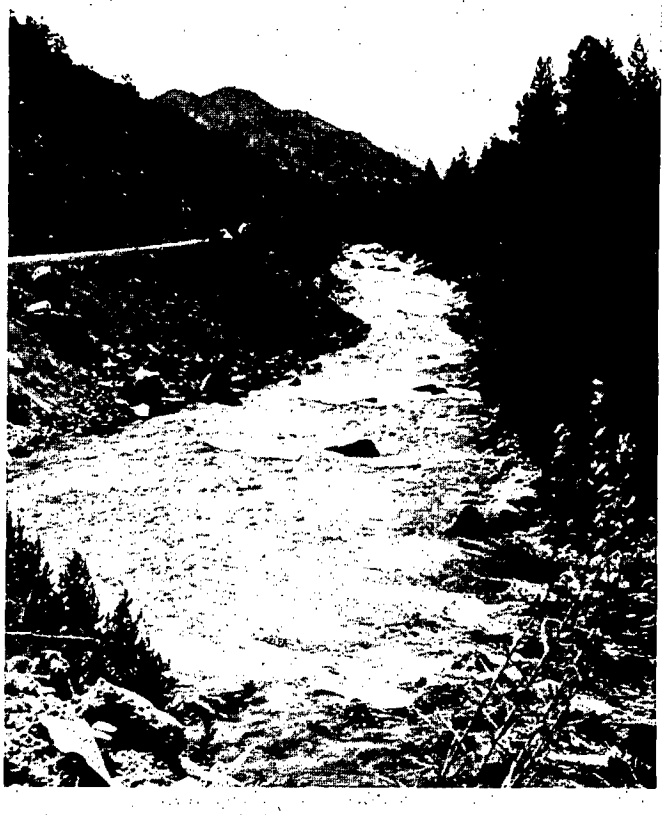
Segment #4 - Vallie Bridge to Parkdale



Because both shorelines need to be addressed and could have been affected by transportation routes, each bank of the river was treated separately. As a result, the total miles of river in the segment have been doubled and the tabulated results were as follows:

Major (unacceptable) Alteration	11.34 percent (7.09 miles)
Minor (acceptable) Alteration	25.45 percent (15.91 miles)
Essentially Natural State	63.20 percent (39.50 miles)
	100.00 percent (62.50 miles)

The Arkansas River has been modified in the last 150 years. Development of the two transportation corridors, U.S. Highway 50 and the Denver-Rio Grande Western Railroad, has changed the character of the river shoreline. The river study corridor is still, however, in an essentially natural state. The river is managed as a water conduit for downstream water rights owners and is manipulated daily to provide water storage and flow for downstream need. The *Wild and Scenic Rivers Act* criteria requires that a river be in a free-flowing, not naturally flowing state. The Arkansas River clearly meets the free-flowing criteria through Segment 4.



Outstandingly Remarkable Characteristics

Recreation Resources (eligibility criteria)

Recreational opportunities are or have the potential to be unique enough to attract visitors from outside the geographic region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities include, but are not limited to, sightseeing, wildlife observation, photography, hiking, fishing, hunting, and boating (i.e., canoeing, rafting, and kayaking). Interpretative opportunities are exceptional and attract or have the potential to attract visitors from outside the geographic region. The river provides settings for national or regional commercial usage or competitive events.

Recreation Resources (general analysis)

The Arkansas River is the most heavily boated whitewater river in the continental United States as determined by the American River Management Society, a professional organization of Federal, state, and local river managers and American Outdoors, a professional organization of eastern and western river outfitters. All six whitewater river classes are present within the Arkansas River study corridor.

Whitewater Rating System

Class I is easily run whitewater consisting of moving water with riffles and small waves. Passages are clear with few or no obstructions, and little maneuvering is required.

Class II consists of rapids of moderate difficulty with waves up to three feet. The river channel has wide, clear passages and occassional obstructions requiring some maneuvering. Scouting usually is not required.

Class III is difficult whitewater containing numerous high and irregular channels with narrow passages and numerous obstructions (rocks and eddies) may require complex maneuvering. Scouting is usually needed.

Class IV is very difficult whitewater consisting of long, continuous rapids with powerful and irregular waves. The river channel is obstructed with dangerous rocks and boiling eddies obstructions, and passages are constricted, requiring powerful and precise maneuvering. Scouting is mandatory.

Class V rapids are extremely difficult whitewater, consisting of short but very steep falls or very long and violent rapids following each other almost without interruption. The channel is highly obstructed with big waves, drops, rocks, and large chaotic waves, requiring very precise maneuvering. Scouting and close study is essential but often difficult, and the consequences of an unsuccessful run may be severe.

Class VI whitewater, considered unrunnable by most standards, is extraordinarily difficult rapids or falls - Class V water carried to extremes of navigability that would involve substantial hazard to life and limb.

In 1991 there were 70 permitted commercial outfitters providing trips on the river from above Buena Vista downstream to Cañon City. The commercial outfitters guided 163,000 paying customers on trips down the Arkansas River.

Almost 18,000 private boaters use the Arkansas River, boating the same sections as the commercial users. Total boater use of the Arkansas River in 1990 was 169,748 people. Surveys show that anglers spent approximately 23,000 days fishing the river. Efforts of tabulating use on the Arkansas River have always focused most heavily on boaters. Anglers often concentrate in locations other than those most heavily used by boaters, and fishing occurs year around. As a result, angling pressure is considerably heavier than is reflected in formal counts. Fishing activity occurs from the community of Granite, north of Buena Vista, downstream to Cañon City. Most fishing is concentrated from the middle of Segment 2, at the Big Bend area, downstream to approximately Vallie Bridge. Segment 4 receives some angling pressure because of the proximity to U.S. Highway 50, but use is not as extensive as portions of the river in Segments 2 and 3.

Segment 1

Recreational values on Segment 1 of the Arkansas River are outstandingly remarkable in the quality and variety of whitewater boating. In 1991 the use figures for this segment showed approximately 8,700 users. These were principally commercial rafters (78 percent); the remainder were primarily private kayakers.

The stretch from Granite Bridge to Buena Vista is ideally suited for technical, private boating. This segment offers Class I (easy) through Class VI (unrunnable) rapids and vertical drops from 26 to 66 feet per mile.

The section known as "The Numbers," above Buena Vista is regularly used as a training ground for competitors in the World Cup Competition and has been the site of the World Cup Kayaking Competition. The area has served as the site of the Colorado Cup competition for several years.

Designation of the Arkansas Headwaters Recreation Area has resulted in increased use in this area. The Colorado Division of Parks and Outdoor Recreation (DPOR) monitors levels of use.

Segment 2

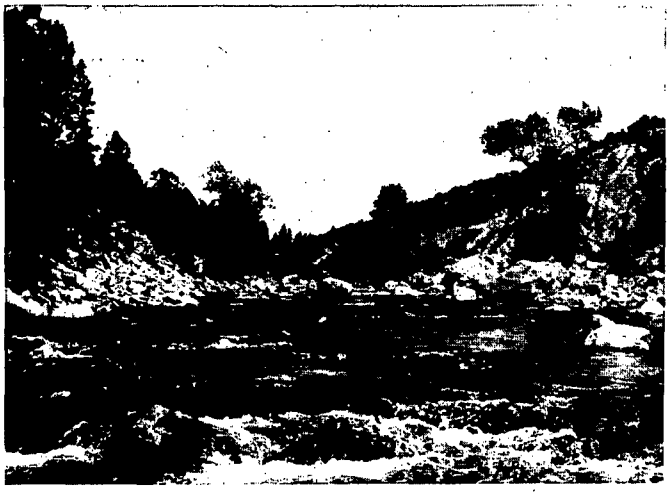
This segment contains the most heavily used portion of the river for commercial rafting. In 1991 the use figures for this segment showed approximately 99,000 users. Of that number, approximately 91,000 (90 percent) were commercial boaters; approximately 7,600 were private.

The segment offers Class III and IV rapids and a vertical drop of 30 feet per mile. In the development plan for the Arkansas Headwaters Recreation Area, Hecla Junction, the most heavily used takeout for this stretch, is a primary area for increased services and facilities.

The river below Browns Canyon in the "big bend" area receives heavy use by fishermen. Although most of the river is private from below Browns Canyon to Salida, much of the shoreline is publicly accessible for fishing as a result of easements purchased by the Colorado DOW as part of mitigation for the Frying Pan-Arkansas Water Development Project. This fishing use is the heaviest on the river and is considered "outstandingly remarkable" through Segment 2.

Segment 3

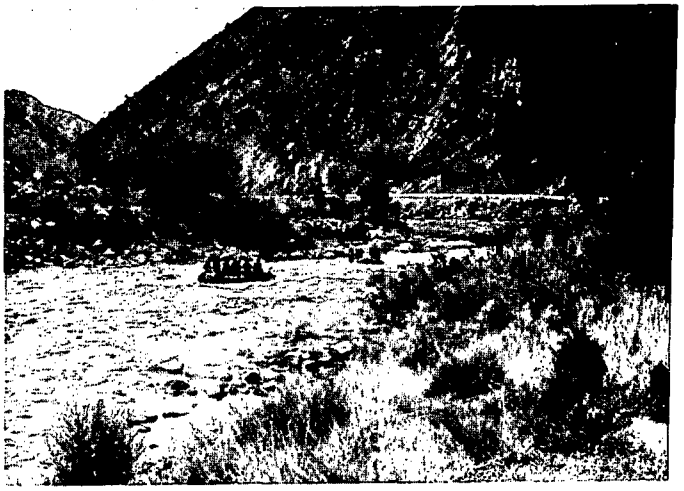
Segment 3 offers less whitewater than other segments of the river. Canoes and slow water raft trips dominate the stretch although the annual FIBARK kayak race occurs here also. Annual visits are around 3,400 and increasing. Fishing is a primary use on this portion of the Arkansas River. Easy access is afforded by U.S. Highway 50, and a large amount of BLM-administered land is available. Some private land is also available through fishing easements purchased by the DOW as mitigation for the Frying Pan-Arkansas project.



Segment 4

This segment is very heavily used for commercial boaters. In 1991, the use figures for this segment showed approximately 69,000 users; 94 percent were commercial. Rapids up to Class IV and a vertical drop of 30 feet per mile occurs within this segment. Numerous roadside picnicking, viewing, and fishing pullouts occur along U.S. Highway 50. Use of the area is very heavy, both during the summer and other seasons. The most heavily used areas are Pinnacle Rock, Five Points, Salt Lick, and Parkdale. In 1990 the site at Pinnacle Rock was improved as part of the Arkansas Headwaters Recreation Area plan. New rest rooms and a changing area for boaters were installed. The parking area was enlarged and improved, and boat ramps were installed.

The area at the Five Points site north of the highway and adjacent to the river is used primarily for BLM interpretive displays, including watchable wildlife and whitewater boating observation structures, and picnicking.



Historical Resources (eligibility criteria)

The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a type of architecture that was rare, unusual, or one of a kind in the region or has the potential to yield important information about the past. Historic site(s) and/or feature(s) must be 50 or more years old. Of particular significance are sites listed on or eligible for the National Register of Historic Places.

Historical Resources (general analysis):

Historic values occur in all segments of the river corridor. Various examples of early water diversion dams and canals are evident along the entire length of the river from Leadville to the Royal Gorge Park. Many miles of existing railroad beds, trestles, tunnels, and rock work along the river corridor date back to the late 1800s. The Leadville Stageline roadway extending below Leadville downriver to Princeton is visible and is well preserved in many sections. In the Buena Vista area, the Midland Railroad bed, trestle remnants, and rock work are also evident. Many examples of early white settlements and developments (cabins, foundations, wagon/pack trails, waterwheels, etc.) are still present along the river corridor. In many stretches there are early-day mining developments present (shafts, tunnels, digs, waste piles, etc.) that add to the user's experience.

Other historical features along the river corridor are physical remnants of the "Royal Gorge War." Prior to construction of the railway through the "Grand Canyon of the Arkansas" in 1878 through 1880, the Denver and Rio Grande and Atchison, Topeka, and Santa Fe Railroads had a lengthy dispute over which railroad owned the track rights through the Royal Gorge. Both sides hired small "armies" to protect their interests. The railroads constructed numerous

forts of rock on both sides of the river and posted sentries to prevent activity by the other side. These DeReemer Forts were named after the Denver and Rio Grande engineer who proposed construction. The dispute was carried to the U.S. Supreme Court and resulted in a decision laying the basis for track ownership decisions in the future. The forts are still present along both sides of the river canyon and are well preserved. An iventory is currently being conducted, and the forts have been determined to be eligible for the National Register of Historic Places.

Conclusion of Eligibility Determination (Segments 1, 2, 3, and 4)

More extensive recreation occurs along the Arkansas River than any other river in the state of Colorado. Its proximity to the major front range population centers of Denver, Colorado Springs, and Pueblo are just part of the reason for the levels of use. Much of the summer use is by people from other states. The 1987 boater survey showed an estimated 133,400 visits for boating and approximately 23,300 fishing days. Both types of recreation are increasing. The river is paralleled by U.S. Highway 50 and Colorado Highway 24 for almost the entire length from Cañon City to the headwaters in Lake County. Thousands of vehicles travel these routes monthly at least in part because of the recreational aspects of automobile touring.

The river extends for over 126 miles within the four segments. The entire length is navigable by boaters although several minor low head dams and diversions are present. Metropolitan areas, including Buena Vista, Salida, and Cañon City, have completed boating chutes to allow boaters to safely navigate the few existing low head dam hazards. A boat chute is also planned for the CF&I low head dam on the river above Florence.

Because these segments are free-flowing as defined within the *Wild and Scenic Rivers Act*, and because values exist within the study segments that must be considered "outstandingly remarkable" as defined within the Act, Segments 1, 2, 3, and 4 are eligible for wild and scenic river designation.

Classification Analysis

Segment 1

The headwaters of the Arkansas River provide excellent quality water to the stream. As the river progresses south, polluted waters enter the river from several sources. The primary pollution source is the extensive mining operations in the Leadville area. The main contributors are the YAK tunnel by way of California Gulch and the Leadville Drain tunnel. Current water quality conditions for this segment are Aquatic Life Cold 1, Recreation 2, Water Supply (only that portion of the East Fork immediately above confluence of Birdseye Gulch downstream to a point immediately above the Leadville Drain) and Agriculture.

The river (10 to 12 miles) is biologically dead because of heavy metal contamination from California Gulch to somewhere above Granite. Dilution by tributary streams is sufficient at this point to sustain fish and other aquatic life in the river. Sources of pollution are currently the focus for water treatment (removal of heavy metals) in both the two main contributors previously mentioned. A cooperative effort by the Environmental Protection Agency, the Bureau of Reclamation, and private industry is addressing water quality.

Segment 2

Water quality is generally good. Current state water quality conditions for this segment are Aquatic Life, Cold 1, Recreation 2, Water Supply, and Agriculture.

Enough dilution has occurred for the river to support a good population of trout and other aquatic life. The water developments in the segment consist of a low head dam with no impoundment immediately above Salida. The river easily flows over this dam, even at low flow periods. The town of Salida and the Division of Wildlife recently constructed a boat chute around the dam for increased boater access and safety. The dam is visible and detracts from the general appearance of the river. Some small, rock irrigation diversions also exist; however, they blend well with the river, are unobtrusive, and are minor in scope.

The shoreline development in this segment varies greatly. On the north end, development is visible from the town of Buena Vista to Johnson Village (5 miles). From Johnson Village to below Hecla Junction (approximately 15 miles) there is a very minor amount of development in terms of structures. The Denver and Rio Grande Railroad closely parallels this entire stretch; however, immediately east of the railroad (and river) is the Browns Canyon Wilderness Study Area. The railroad bed is immediately above the waterline and is very conspicuous for a distance of 7 to 8 miles. At this point, the canyon opens on the south end and the railroad diverges from the river. Below Browns Canyon the river slows as the surroundings open into a gentle, open valley floor. The area is dominated by agriculture with hay production and associated livestock grazing the prevalent uses. Development, in terms of structures, increases, and residences and small ranches are frequently visible. Roads access and occasionally cross the river. Generally, however, the river is not paralleled closely by either roads or the railroad. Above Salida, at the remains of Smeltertown, development again increases. Some riprapping has occurred, and slag piles from the smelting of Leadville ores are visible. The length of this development is minor in terms of the segment length.

Segment 3

The water quality in the Arkansas River through Segment 3 is good. Currently, the water quality conditions for this segment of the river are Aquatic Life Cold 1, Recreation 2, Water Supply, Agriculture.

The only water developments on this segment are minor irrigation diversions. There are no impoundments. Shoreline development consists of the railroad on the north side and U.S. Highway 50 on the south. Structures are limited to occasional residences along the channel, most of which are well elevated above the river by the shallow canyon through which the river flows. There are three small communities along this segment of the river.

Segment 4

Water quality is good. The current state water quality conditions are Aquatic Life Cold 1, Recreation 2, Water Supply, Agriculture.

The only known diversions are minor irrigation structures. This segment is paralleled very closely by both the railroad and U.S. Highway 50. Two small communities also line the banks of the river in this segment.

Conclusion of Classification Analysis

Segments 1 through 4 of the Arkansas River meet the criteria for a tentative recreational classification (Attachment 6).

Suitability Determination

Analysis Factors

1. WORTHY ADDITION: Segments 1 through 4 of the Arkansas River would be worthy additions to the National Wild and Scenic Rivers System. Recreational use is extensive in all four segments.

Segment 1 (USFS/BLM boundary south to Buena Vista) is heavily used by private boaters and is increasingly popular with commercial users. Primary use occurs through "The Numbers" section, north of Buena Vista. This section is a series of rapids, one immediately after another, very technical in nature. This series of rapids is used annually as a training ground for the U.S. National Kayak Team and has been the site of state, national, and international championship events.

Segment 2 (Buena Vista to Salida) is the most heavily used segment of the river in terms of numbers of boaters. The primary attraction is the Browns Canyon area, downstream from Buena Vista. The most heavily used access points are on BLM-administered lands, although there are private sites available also. The largest use is for commercial boaters. There is also significant private boater activity for both kayaks and rafts.

As a result of the reduced stream gradient, the river is wider and slower through the lower end of Segment 2 than is typical for much of the river. Primary use of this portion of the river is for angling, particularly by fly fishermen, and it is the most extensively fished segment of the river. Most of this area is legally accessible to anglers through purchased easements across what is primarily private land. There is increasing activity on this stretch by both canoers and private rafters who desire a less exciting trip than the Browns Canyon area provides.

Segment 3 (Salida to Vallie Bridge) is the segment least used by boaters. The area is primarily private land (59 percent), and access is limited. There is considerable use by anglers on this piece of river. The public access is heavily used and much of the private land is accessible to any angler who will take the time to locate the private landowner and ask permission. Some purchased easements also exist in this segment of the river. This segment receives considerable use for recreational gold panning, and there is currently a proposal to provide an area specifically for that purpose.

Segment 4 (Vallie Bridge to the Royal Gorge) has more BLM-administered land than any other study segment (67 percent). Access for all recreational users is excellent. This segment is the second highest use area for commercial rafters. It is also the second most popular area for private boaters. The fishing use in this segment is less than in either Segment 2 or Segment 3 but is still considerable, probably because of its proximity to U.S. Highway 50. The Arkansas Headwaters Recreation Area (AHRA) has many small turnout sites as well as several larger pulloffs available for day use activities. These are commonly occupied by tourists and locals for picnics, wildlife viewing, gold panning, and numerous other activities.

2. LAND OWNERSHIP: Although each segment is different in terms of landownership and public access to the river, it is apparent that access to the Arkansas River is sufficient for it to be one of the most significant rivers in the entire nation in terms of public use. Segment uses differ from predominately boating to predominately fishing to a mixture of these and other activities. Private property ownership is a complication to public river recreation management on the river. Conflicts occur between recreation users and private property owners. AHRA was, in part, an attempt to improve the existing situation in terms of trespass.

Current access along the entire study corridor is good, and in some places, excellent. The AHRA has identified a number of places where public access improvement is a priority. New access acquisition is ongoing for these areas through exchange or from willing sellers.

The current land ownership pattern has provided sufficient access to accommodate growth of recreation use on the river, and existing access is good. It has improved since AHRA was established because of recent land purchases from willing sellers. Condemnation of easements or any private property within the Arkansas River eligible segments is unnecessary. Although it may be desirable to acquire some easements and property along the corridor in the future, acquisition should only be accomplished through exchange or from willing sellers.

The four study segments on the Arkansas River are suitable, in terms of land ownership, for inclusion in the National Wild and Scenic Rivers System. Potential inclusion in the national system may actually improve the situation on the river between private property owners and recreational users. Increased emphasis on the river in terms of recreational opportunities and use could justify increased levels of law enforcement by both county governments, AHRA, and the Bureau of Land Management.

Segment 1

Federal	42 percent
State of Colorado	4 percent
Private	54 percent

Access to the river in this segment is considered adequate utilizing the current land pattern. There are some areas of private land that have been leased or are otherwise available for either commercial or private boater use.

AHRA is currently working to improve the public access within the segment, primarily for boater use.

Segment 2

Federal	39 percent
State of Colorado	1 percent
Private	60 percent

Access in this segment is considered adequate utilizing the current public land ownership pattern. The most heavily used portion of this segment, Browns Canyon, currently has good access. There is a desire within AHRA to improve the current Browns Canyon access both upstream and downstream to better accommodate the growing public use. This need is also being pursued by AHRA managers.

Segment 3

Federal	41 percent
Private	59 percent

As previously noted in the "worthy addition" analysis, this segment receives less use for boating than any other segment. This is, in part, a result of the current restricted access because of the extensive amount of private lands. The river also changes character as it enters the Howard and Coaldale areas. The gradient is less in this area so the river is slower with fewer areas of rapid water. Fishing access in the segment is good. Public lands are heavily used, and some fishing easements exist on private lands in the segment.

Segment 4

Federal	67 percent
State of Colorado	3 percent
Private	30 percent

Public access to the river in this segment is excellent. U.S. Highway 50 is adjacent and south of the river through most of this segment. The railroad is also immediately parallel to the river, but on the north side of the highway. Public use in this segment is very heavy. Commercial river outfitters use the area extensively along with private boaters, fishermen, picnickers, and many other users. The proximity of the highway is the largest reason for this extensive use.

The Denver-Rio Grande and Western Railroad has a railbed along almost the entire length of the Arkansas River study segments. Railroad ownership figures are not included in the private land totals tabulated above. There is some question between BLM and the railroad as to exactly how much of the railbed is actually owned by the railroad and how much may be involved in an extensive right-of-way agreement with the Federal government. Because the Denver-Rio Grande Railroad had some obvious concerns with public use in regard to their track and because of the uncertain status of railbed ownership, BLM will consider railroad concerns under suitability analysis factor 7, Historical or Existing Uses.

3. POTENTIAL USES OF THE LAND: Federal lands along the Arkansas River corridor will be retained in Federal ownership in perpetuity. The existing Arkansas Headwaters Recreation Area was established in 1989 to address the need, in part, for additional recreation management along the Arkansas River corridor. Management within the AHRA currently provides a very workable system of public access points and boater put-in and take-out areas to address current need. Angler access is currently good, although additional easements may be pursued in the future. AHRA has additional plans for development along the river, some of which are on BLM-administered lands. Both BLM and DPOR have also aggressively pursued the acquisition of properties from willing sellers needed to improve their management.

Existing uses of private lands within the study corridor are compatible with a recreational classification. The current dominant use of private land along the river is agriculture. Much of the private lands are involved in hay production with the assistance of river irrigation, and almost all private lands are extensively grazed by livestock. These activities are likely to continue into the foreseeable future and are entirely compatible with a recreational river.

Residential properties are increasing along the river corridor. These are often on small lots and consist of a single residence. Some subdivisions have been platted within the river corridor. In the future this type of use will increase. Residential use of the river corridor by small lot subdivisions will likely increase in the foreseeable future, which is also compatible with a recreational river. The outstandingly remarkable values do not include scenic values. Currently, there are numerous examples of residential structures downstream from Fisherman's Bridge, a major Browns Canyon put-in. Browns Canyon is the section of river most undisturbed by human activities. Users do not currently complain that such a use is out of character or affects the Arkansas River experience significantly. Chaffee County is currently re-evaluating its current zoning policy in terms of use of the river area for residential use. This re-evaluation

is being conducted independently of the BLM wild and scenic river study. It is very likely that future county zoning will be entirely compatible with a designated recreational river.

Commercial properties within the corridor are limited with the exception of the few cities and towns. Most are agricultural and have been previously discussed. Some service type establishments exist and are likely to grow in size and number as the valley population increases. Much of the commercial use, generally small businesses scattered along the highway corridor, is related to either the tourism or white-water industries. These uses are also compatible with a recreational river.

Growth in tourism is expected to increase, partly because of the AHRA, and some additional growth could probably be expected if the river, or portions thereof were designated under the W&SR Act. Since 1980, commercial related boating use has grown from 40,800 to 163,000 user days in 1991. Recreational use has increased approximately 14 percent annually since 1980.

The *Arkansas River Recreation Activity Management Plan*, approved in 1989 establishes parameters in terms of the maximum use (carrying capacity) that could be sustained by the Arkansas River without significant degradation of the river experience or the environment. The plan set carrying capacities for both private and commercial boaters. According to the plan, when the carrying capacity of the river is reached, use will be rationed in accordance with BLM policy.

In 1992, the water treatment plants associated with mining contamination in the Leadville area began operation. These plants are designed to remove current elevated levels of heavy metals from tributaries to the Arkansas River. Water quality in the upper portion of the river will improve significantly.

The Colorado Division of Wildlife is optimistic that fish habitat on the Arkansas River will improve significantly in the near future. Fishing may become a more significant component of the Arkansas River recreation.

The Arkansas River is extensively managed as a transport system for appropriated water, which is used downstream for agriculture, municipalities, and industry. The entire native flow of the river is fully appropriated. River flow is heavily augmented by transmountain diversion water. This water is also fully appropriated by those who expended the time, money, and effort to bring these waters to this side of the Continental Divide. Proposed additional transmountain diversion projects could bring additional flows to the Arkansas River drainage. These have not been approved and likely will not be for a long period of time.

It is probable that the Arkansas River will remain a water transfer system through the foreseeable future. The cities of Cañon City and Pueblo, as well as many smaller municipalities, are dependent on the river for delivery of domestic water supplies. The city of Colorado Springs has invested heavily in the Arkansas River for domestic water from both native flows and transmountain waters. Long-term development plans for Colorado Springs include the Arkansas River in some form for every viable alternative they have developed. The agricultural industry of the lower Arkansas Valley depends entirely on delivery of adjudicated water to water rights owners at appropriate times. It is imperative that adjudicated water rights and the necessary flexibility to manage those rights be accorded appropriate significance in this analysis. The options regarding water rights and management of adjudicated water are considered more fully in the Historical or Existing Uses section of this analysis.

4. PUBLIC, STATE, LOCAL AND FEDERAL INTEREST: Public interest in the Arkansas River is high. This is based on attendance at open houses (approximately 100 people) held for the resource management plan, attendance at a meeting held in Buena Vista at which time the Colorado Springs water development options were explained (attendance of 200-250 people), the demand for newspaper and radio spots, and requests to present public information regarding the BLM wild and scenic river analysis. Interest in the Arkansas River, not specifically related to the wild and scenic study, has generated a local support group committed to maintaining the Arkansas River in its present free-flowing condition. This group attracted approximately 60 people for its organizational meeting. There is state interest in this analysis, which is indicated by the presence of representatives of three independent state agencies in the wild and scenic river workgroup. There is Federal interest in maintaining the free-flowing and outstandingly remarkable values associated with the Arkansas River.

5. ESTIMATED COST: Additional cost to the Federal government will be incurred if the Arkansas River is designated under the *Wild and Scenic Rivers Act*. Jurisdictional exchanges with the Colorado State Land Board, the United States Forest Service, and the Bureau of Land Management are probable.

There may be some land acquisition from willing sellers. Even though the cooperative agreement between BLM and DPOR is expected to continue, BLM activity in relation to interpretation of historical features, wildlife, recreation opportunity, etc., will likely increase. Monitoring and management of public lands within and adjacent to AHRA are also likely to increase. There are also hidden costs associated with a designation. Costs to county government may increase in terms of necessary road maintenance and other county functions. There could also be increased costs for schools, police, and fire services. It is not the intent of this study to attempt to address these costs, which are associated with any type of growth in an area and are normally funded by the increased property and use taxes collected in that same area. There may be costs associated with the resolution of the water issues along the Arkansas River. The Federal government may be involved in either the purchase or long-term lease of existing water rights to protect both

the free-flowing and resource values of the river. Costs attributed to litigation in an attempt to resolve the water issues are also possible.

6. ABILITY OF THE AGENCY TO MANAGE: The area is currently managed for public recreational use as a result of a cooperative agreement between the Bureau of Land Management and the Colorado Division of Parks and Outdoor Recreation. This agreement is expected to continue and is specifically provided for in Sec. 10 (e) of the *Wild and Scenic Rivers Act*. Additionally, BLM would be capable of more intensive management along the river corridor if the river or portions of it are designated under the Act.

7. HISTORICAL OR EXISTING RIGHTS

Water: The Arkansas River is one of the most intensively managed rivers in the entire United States. There is no dispute that the entire native flow of the river is more than fully appropriated. Existing uses are further complicated by the existence of large volumes of transmountain water in the channel. The appropriated water is used intensively in the lower Arkansas Valley for irrigation assisted agriculture. The rights to the water date from the late 1850s to recent times. Large volumes of water are also used for municipal purposes. The river provides the major source of domestic water for Pueblo, Cañon City, and numerous other smaller areas. Colorado Springs and Aurora use the Arkansas River intensively, primarily as a conduit or transmission line for transmountain water delivery for municipal use. The result of this intensive use is that in all likelihood no unappropriated water is available within the basin from which to develop a Federal reserved water right to perpetuate the outstandingly remarkable features of the Arkansas River.

A minimum flow study was commissioned by the Colorado Water Conservation Board (CWCB) and completed by the Colorado DOW to determine flows necessary to perpetuate the biological requirements. These volumes should be reserved.

There is an existing threat to the Arkansas River native flows within the BLM study segment in the current water exchange program. The city of Colorado Springs removes transmountain water from the Arkansas River at the Otero Pump Station north of Buena Vista. As this imported water is used for municipal purposes, a portion of it is returned after treatment to the Arkansas River via Fountain Creek. The city receives a "credit" for this returned water and is entitled to remove an equal volume of native water from the river at the Otero site. The effect of this is to remove water from the stretch of river below the Otero site and return it at Fountain Creek. The river is, therefore "whole." The river is, in reality, dewatered to some degree within the stretch from the Otero site to Fountain Creek.

Reservation of water by the CWCB and/or the Federal government would serve to preserve the existing flows in the channel. Existing rights would be served; they have senior appropriation dates to any pending reservation. The Colorado Springs exchange would be protected at current exchange levels to the date of the minimum flow reservation. Future development would also be permitted as long as it did not infringe on the biological reservation. An existing water rights holder wanting to consummate an exchange opportunity would, however, have to deal with an additional new rights holder.

The outstandingly remarkable values on the Arkansas River are recreational opportunities. The most significant part of those opportunities are whitewater boating. Within the last 15 years, a viable commercial whitewater industry has developed in the Upper Arkansas River Valley on water that, in the State of Colorado, is a privately held property right. The commercial industry has had remarkably good years and a few less prosperous seasons. The industry has developed and prospered on whatever water was in the channel during their operating season. A key factor on the Arkansas River is that the industry has prospered on native flows and the transmountain flows brought to the Arkansas River drainage for other purposes. Private boating is also quite popular on the river with total use estimated at about 10 percent of commercial use.

For the 1990 whitewater season, an agreement was reached between the Arkansas Headwaters Recreation Area and the Bureau of Reclamation for Arkansas River flow augmentation for recreational use. The agreement was not accepted by everyone involved and created some unforeseen significant problems, such as the reduced lake levels at both Turquoise and Twin Lakes. The agreement did maintain flows for 1990 at prescribed levels for both the whitewater season and the annual low water period through August 15. As a spin-off from this agreement, the Southeastern Colorado Water Conservancy District kept detailed records of water losses from evaporation that resulted from this flow management. For the 1991 season, a second agreement was reached by the Bureau of Reclamation, the Colorado State Department of Natural Resources (DNR), and the Southeastern Colorado Water Conservancy District. During 1991, 10,000 acre-feet of water were available for flow augmentation for recreational use. The water was controlled by the Bureau of Reclamation. The most significant change for 1991 from the 1990 agreement was that the augmentation water would only be available if evaporative losses were replaced with "wet water" obtained by the Department of Natural Resources of the State of Colorado. That is, DNR must acquire legal rights to water in the drainage to replace evaporative loss.

The economy of the Upper Arkansas River is dependent, to some extent, on the whitewater industry as well as the fishery resource. Recreational use of the Arkansas River will increase over time. Reservation of waters in volume sufficient for good to optimum whitewater recreation on the river is not feasible. A Federal reservation of waters is likely only on native waters of the drainage. Although the amount of imported water used for recreation is still an unanswered question, it is evident that transmountain waters are a significant portion of the waters used by boaters.

Powersite and Water Storage Withdrawals: The city of Colorado Springs is evaluating construction of the Elephant Rock Dam north of Buena Vista for storage of transmountain water. They are also evaluating construction of the Princeton Diversion Dam north of Buena Vista. These dams are two of eight domestic water alternatives for the city. The dams are involved in separate alternatives; one or the other may be involved in the selected alternative, but both will not be constructed.

According to correspondence dated March 7, 1991, the city asserts that: "We have valid, existing prior rights to operate exchanges throughout the entire reach of the Upper Arkansas River above Pueblo Reservoir as detailed in our decree which was entered June 16, 1987, ... Furthermore, we assert that we have existing water rights for future storage and diversion facilities in the upper basin as detailed in our water rights filing dated December 31, 1990, ... The conditional decree, when entered, will confirm our appropriative rights with an appropriation date of 1987, when the intent to appropriate the future diversions was first evidenced via the stipulation attached to the exchange decrees."

The Elephant Rock Dam site is covered by three Federal reservations: Reservoir Site 51 (SO 8/18/1894), Powersite Reservation 92 (EO 7/2/1910 and Classification Powersite 32 (SO 4/29/1922). The BLM Interim Management Prescription for the Arkansas River included that portion of the river that would be involved in the dam and reservoir because BLM has not been able to determine categorically whether or not Colorado Springs has a valid and existing right to the location. If a recommendation for wild and scenic river designation is made, the appropriate determination can be made at the congressional level.

Additional specific sites along the river have been reserved for powersite and water storage site development. If the Arkansas River is recommended for designation, those reservations will be examined along the appropriate segment of river, and a recommendation for termination or revocation of incompatible reservations will be made.

Private Lands: Private land rights are not expected to be adversely affected by a BLM determination of suitability or a possible recommendation. The Act clearly provides for valid and existing uses, and these uses will continue. The current valid and existing uses include residential property, commercial properties, agricultural use, and the operations of the Denver and Rio Grande Western Railroad. Sec. 6(c) of the Act prohibits the government from using condemnation to acquire lands within the incorporated limits of any city, village, or borough which has a valid and operating zoning ordinance conforming with the purposes of the Act. The purposes of the Act in relation to the Arkansas River is to maintain the free-flowing values and the outstandingly remarkable recreational values identified in the eligibility phase of this analysis. The river was tentatively classified as a "recreational" river; i.e., one that contains extensive shoreline development in the form of communities and access and transportation routes. The area contains extensive areas of private lands. The waters of the river are entirely appropriated.

Condemnation of private lands has been raised repeatedly as a specific concern to private landowners. The W&SR Act does allow the Federal government some condemnation rights; however, the Act also contains some specific prohibitions regarding condemnation of private property.

The current access situation for recreational use on the Arkansas River is good. Some improvement of the existing situation would be desirable, and acquisition through purchase or exchange with willing sellers has been and is the tool of choice for acquisition of property. There are no access needs for a wild and scenic river to be pursued through condemnation of property. The Act also allows the government to condemn property rights in the form of a conservation or scenic easement to perpetuate outstandingly remarkable values. On the Arkansas River the outstandingly remarkable values are recreational opportunities, rather than visual values. Condemnation of conservation or scenic easements is not anticipated nor considered desirable for the purposes of a wild and scenic designation on the Arkansas River.

8. OTHER ISSUES: Two additional issues have been identified by the affected interest workgroup.

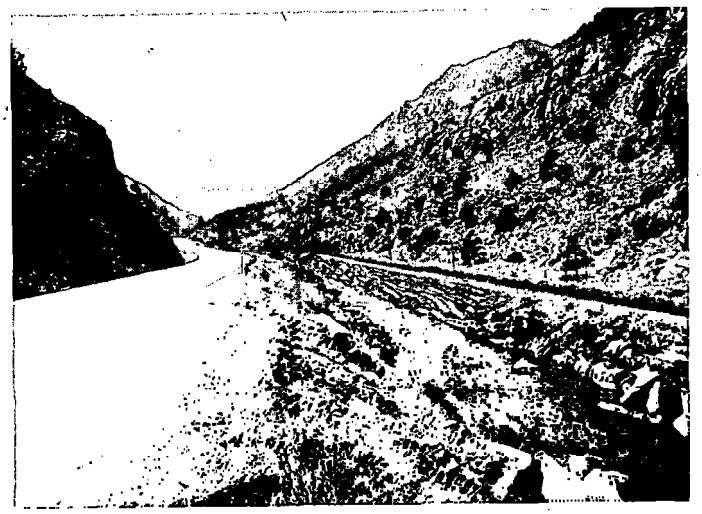
Water Quality: The concern over water quality within a designated segment of river was raised as a result of Oklahoma vs. EPA. The Upper Arkansas Conservancy District commented in a letter dated March 18, 1991: "We have already witnessed the tip of the proverbial iceberg as expressed by the federal court in consideration of discharges into the Illinois River when measured by the standards set forth by the Tenth Circuit Court in Oklahoma vs. EPA, 908 F.2d 595. If the Arkansas River is designated Wild and Scenic and if the decision set down in Oklahoma vs. EPA stands, a stake shall have been driven into the heart of all future development in the Arkansas River basin, including, of course, recreational development."

The *Wild and Scenic Rivers Act* has no specific criteria for water quality for rivers with a "recreational" classification. Water meeting Federally approved state standards for water quality is acceptable within a recreational river segment. Additional corridor development, including river discharges, is not threatened if the discharge continues to meet the Federally approved state water quality standards. The Colorado Water Quality Commission Antidegradation Review procedure does not apply to a recreational river. The issues raised by the Oklahoma vs. EPA case relate to the *Clean Water Act*. They may have bearing on the development of the Arkansas Valley if the decision stands. That bearing is not, however, related to the W&SR Act.

The Arkansas River Study corridor, including the Denver-Rio Grande Western railroad bed and U.S. Highway 50, is currently utilized for hauling certain restricted substances. The highway activity is regulated by the Colorado State

Patrol. The patrol has an action plan detailing what substances can be hauled in what amounts, how the loads must be posted, and what actions will be taken in the case of a spill. Counties affected by hauling restricted materials can petition to have designated highways removed from the system based on supportable rationale. If the Arkansas River is recommended for inclusion within the national system, the W&SR Act may provide a supportable rationale for removing U.S. Highway 50 from the system, if the affected counties determined that a public hazard existed. The railroad also hauls restricted materials on a regular basis. Their actions are not the responsibility of the state patrol but are regulated by the Interstate Commerce Commission. In case of a spill, an action plan also exists. These regulated activities have occurred in the corridor for a number of years. The situation is common to many highways and railroad beds across the state.

Current use on the highway and railroad is compatible with the current recreational activities and such use should not make the river corridor unsuitable.



Water Rights: Volumes determined necessary for biologic perpetuation of the river ecosystem should be reserved. Ownership by the Colorado Water Conservation Board would be most appropriate. There is also a possibility that ownership could be held in partnership by both the CWCB and the Federal government. The necessary flows could also be held exclusively by the Federal government. Reservation of biologic flow minimums is necessary to perpetuate those outstandingly remarkable values resulting from existing flows. These include the Arkansas River fishery and existing wildlife habitat.

The high flow concern could be resolved by a contractual arrangement between the users. Whitewater seasonal limits should be guided by biological needs of the river. The Colorado Division of Wildlife can provide detailed information on when high flows can and cannot be tolerated by aquatic life. This information should be used to establish beginning season dates as well as the more critical ending season dates.

An interagency water needs assessment is being completed on the Arkansas River to determine water levels necessary for continuance of a variety of uses and values. Although currently the study format and major issues are still in the development stage, it is hoped that the study can be a cooperative effort by all involved in an effort to determine the recreational needs and how they can be accommodated within water management activities on the Arkansas River. Currently, water is managed annually for the adjudicated rights holders. Water is brought from higher elevation storage sites as needed for low elevation storage or use. Current recreational use of the resource will continue. Because of the AHRA and growth of a tourism oriented economy in the upper valley, this use will become stronger politically. Colorado Water Law is in a time of change. Recreational use is now recognized on the Taylor River as a beneficial use, with an adjudicated water right held by the local conservancy.

It is timely to include recreational use in the water management plan for the Arkansas River and to obtain compensation from the recreational users. Evaporative loss could be mitigated by long-term lease of water for replacement of those losses. Purchasing water for replacement of these losses would be another option. It is possible to recoup the lease or purchase cost through a charge to those who benefit from the Arkansas Headwaters Recreation Area. A contractual arrangement for water users to provide for recreation needs with compensation for losses in terms of replacement water instead of simple payment at Frying Pan Arkansas project water rates deserves to be considered. Major players in such an agreement should include AHRA (DPOR and BLM), Bureau of Reclamation, Colorado State Water Engineer, Southeastern Colorado Water Conservancy, Upper Arkansas Water Conservancy, USFS, and Division of Wildlife. Some owners of large shares of Arkansas River native flow water such as Pueblo and Cañon City should perhaps also be involved. Such an agreement could be framed to provide for recreation use in most years. An agreement could diffuse the need for a Federal reserved water right to protect recreational values.

Private Lands: Federal and state lands within the corridor currently total 50 percent of the study area. The Federal government is prohibited by the Act from condemnation of private lands in any corridor with 50 percent or more Federal and state lands. Condemnation cannot be used within the Arkansas River corridor as it now exists.

The Denver and Rio Grande Western Railroad has track along almost the entire study segment of river. The railroad has valid concerns regarding access to their right-of-way and the liability they may incur as a result of recreational use. BLM believes the railroad concerns can be addressed adequately to provide for recreational use and limit unlawful trespass on their private lands and rights-of-way.

Access is currently good for recreational use along the Arkansas River. Needed access has been purchased from willing sellers exclusively in the past. Additional access needs, regardless of recommendation for wild and scenic river designation, should only be acquired through exchange or from willing sellers.

Conclusion of Suitability Determination

Segments 1 through 4 meet all suitability criteria as defined in the *Wild and Scenic Rivers Act*. Current land ownership provides sufficient access for existing uses. Federal and state lands within the corridor presently total 50 percent. The Act prohibits condemnation of private land where public lands total 50 percent or more in the corridor. Additional acquisition would be accomplished only through exchange or from willing sellers. Present uses are compatible with the tentative recreational classification, and private landowner rights are not expected to be adversely affected. A minimum flow study, commissioned by the Colorado Water Conservation Board, was completed by the Colorado DOW. Volumes necessary to perpetuate the biological requirements should be reserved. In accordance with current state law, any reserved water right should reside with the Colorado Water Conservation Board.

Summary of Analysis

Segments 1, 2, 3, and 4 of the Arkansas River are eligible and suitable for wild and scenic designation with a tentative classification of recreational river.

MANAGEMENT GUIDELINES FOR ELIGIBLE RIVERS

The *Wild and Scenic Rivers Act* provides some guidance for management of study rivers until designated by Congress or released to multiple use. The Act states "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its esthetic, scenic, historic, archeological, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area." (Sec. 10(a) *Wild and Scenic Rivers Act.*)

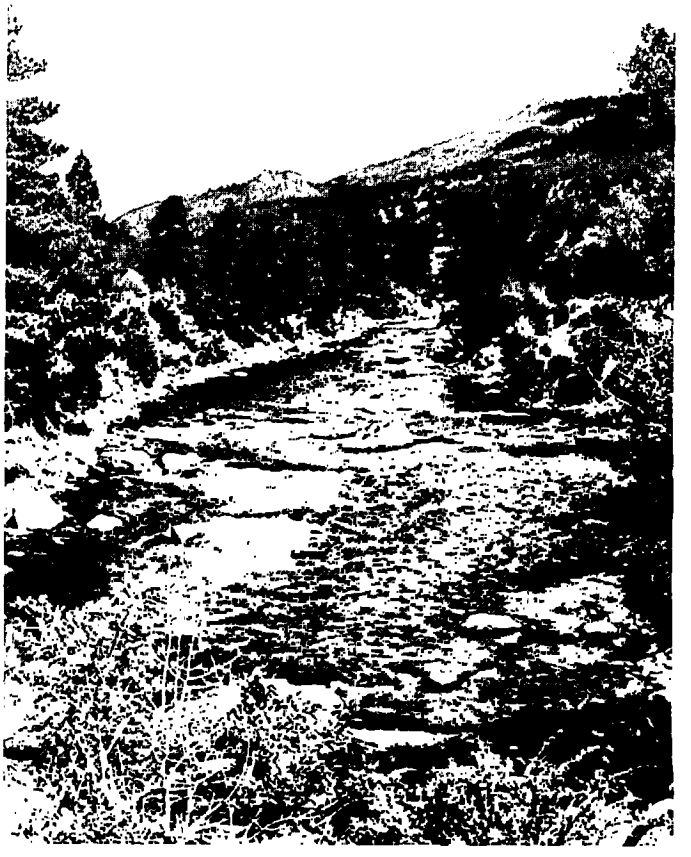
Attachment 8 provides a management goal for each river classification. Under each classification specific guidelines for interim management of each study section are detailed. Rivers recommended for designation must ultimately be designated by Congress to be added to the National Wild and Scenic Rivers System.

Once a river is determined eligible and classified as wild, scenic, or recreational, it must be afforded adequate protection until a decision of designation is made by Congress. In general, management prescriptions for river corridors identified for study should provide protection in the following ways:

Free-flowing characteristics of identified river segments cannot be modified to allow stream impoundments, diversions, channelization, and/or riprapping (to the extent that Federal agencies are authorized under law to prohibit such actions).

Outstandingly remarkable values of the identified river segment or area must be protected (subject to valid existing rights) and, to the extent practicable, enhanced.

Management and development of the identified river and corridor cannot be modified, subject to valid existing rights, to the degree that eligibility or classification would be affected (i.e., classification cannot be changed from wild to scenic to recreational).



ATTACHMENT 1

TABLE L-1
River Segments Analyzed for Eligibility in the RGPA

River Segment	Length (Miles)	Free-Flowing	Outstandingly Remarkable Values	Determination
Arkansas River-Seg 1	47.00	Yes	Yes	Eligible[1/]
Arkansas River-Seg 2	29.00	Yes	Yes	Eligible[1/]
Arkansas River-Seg 3	20.00	Yes	Yes	Eligible[1/]
Arkansas River-Seg 4	31.00	Yes	Yes	Eligible[1/]
Arkansas River-Seg 5	6.00	Possibly	Possibly	In-depth analysis[1/]
Arkansas River-Seg 6	23.00	Possibly	Possibly	In-depth analysis[1/]
Birdseye Gulch	2.00	Yes	No	Not eligible
Indiana Gulch	3.50	Yes	No	Not eligible
Iowa Gulch	4.25	Yes	No	Not eligible
Low Pass Gulch	1.00	Yes	No	Not eligible
Hayden Gulch	1.00	Yes	No	Not eligible
Sevenmile Creek	1.25	Yes	No	Not eligible
Little Cottonwood Creek	1.25	Yes	No	Not eligible
Middle Cottonwood Creek	2.50	Yes	No	Not eligible
Cottonwood Creek (Nathrop)	2.25	Yes	No	Not eligible
Pass Creek	2.00	Yes	No	Not eligible
Poncha Creek	1.25	Yes	No	Not eligible
Badger Creek	6.00	Yes	Possibly	NRI stream[1/]
Bills Creek	2.00	Yes	No	Not eligible
Little Badger Creek	2.00	Yes	No	Not eligible
Kerr Gulch	3.50	Yes	No	Not eligible
Hamilton Creek	2.50	Yes	No	Not eligible
Cedar Springs Gulch	3.00	Yes	No	Not eligible
Butter Creek	1.00	Yes	No	Not eligible
Falls Gulch	2.50	Yes	No	Not eligible
Sullivan Creek	1.75	Yes	No	Not eligible
Henthorn Gulch	1.50	Yes	No	Not eligible
Arkansas Gulch	1.75	Yes	No	Not eligible
Red Gulch	1.75	Yes	No	Not eligible
Fernleaf Gulch	4.50	Yes	No	Not eligible
McCoy Gulch	1.75	Yes	No	Not eligible
Reese Gulch	3.00	Yes	No	Not eligible
Texas Creek Gulch	5.00	Yes	No	Not eligible
Texas Creek	3.25	Yes	No	Not eligible
Road Gulch	4.00	Yes	No	Not eligible
Turkey Gulch				

Table L-1 (Continued)

River Segment	Length (Miles)	Free-Flowing	Outstandingly Remarkable Values	Determination
Heck Gulch	2.75	Yes	No	Not eligible
Five Points Gulch	6.50	Yes	No	Not eligible
East Gulch	6.00	Yes	No	Not eligible
Grape Creek	19.00	Yes	Possibly	In-depth analysis
Temple Canyon	3.25	Yes	No	Not eligible
Currant Creek	4.25	Yes	No	Not eligible
Cottonwood Creek	6.25	Yes	No	Not eligible
Tallahassee Creek	3.25	Yes	No	Not eligible
Fourmile Creek	6.00	Possibly	Possibly	In-depth analysis
Barnard Creek	3.25	Yes	No	Not eligible
Little High Creek	1.25	Yes	No	Not eligible
High Creek	1.00	Yes	No	Not eligible
Long Hungry Gulch	1.75	Yes	No	Not eligible
Pony Gulch	1.50	Yes	No	Not eligible
Cripple Creek	1.00	Yes	No	Not eligible
Wilson Creek	5.00	Yes	No	Not eligible
Oil Creek	1.5	Yes	No	Not eligible
Eightmile Creek	7.00	Possibly	Possibly	In-depth analysis
Mack Gulch	3.75	Yes	No	Not eligible
Beaver Creek	12.00	Yes	Yes	Eligible
East Fork Beaver Creek	6.00	Yes	Yes	Eligible
Crooked Creek	1.25	Unknown	No	Not eligible
Threemile Creek	6.00	Yes	No	Not eligible
Devils Gulch	1.25	Unknown	No	Not eligible
Muddy Gulch	1.25	Yes	No	Not eligible
Pantleon Creek	1.00	Unknown	No	Not eligible
Palo Duro Creek	1.50	Unknown	No	Not eligible
South Fork Yellowstone Creek	1.00	Unknown	No	Not eligible
Greasewood Creek	1.25	Unknown	No	Not eligible
South Apache Creek	0.25	Yes	No	Not eligible
Cucharas River	0.00	N/A	N/A	No analysis
Huerfano River	0.00	N/A	N/A	No analysis
Purgatoire River	0.00	N/A	N/A	No analysis

[1/]National River Inventory

ATTACHMENT 2

TABLE L-2
Eligible Stream Segments
(Land Ownership within Study Corridors)

Stream/ River	Acres					Percentage				
	BLM	USFS	Colorado	Private	Total	BLM	USFS	Colorado	Private	Total
Beaver Creek	2,534		2,169	885	5,588	45		39	16	100
Arkansas River Segments 1 - 4[1/]	17,762	1,194	1,006	20,219	40,181	44	3	3	50	100
Segment 1	5,177	1,194	611	8,295	15,278	34	8	4	54	100
Segment 2	3,673		69	5,600	9,343	39		1	60	100
Segment 3	2,324			3,383	5,707	41			59	100
Segment 4	6,587		326	2,941	9,845	67		3	30	100

[1/]Acreage figures were derived from the Geographic Information System database as of August 29, 1991. Figures do not reflect the acreage of new acquisitions in the Big Bend (Seg. 2) or the Parkdale (Seg. 4) area.

ATTACHMENT 3

TABLE L-3
River Classification Criteria

Attribute	Wild	Scenic	Recreational
Water Qualtiy	Meets or exceeds Federal criteria or federally approved state standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the river, and for primary contact recreation (swimming) except where exceeded by natural conditions.	No criteria prescribed by the Wild and Scenic Rivers Act. The Clean Water Act of 1977 made it a national goal that all waters of the United States be made fishable and swimmable. Rivers, therefore, will not be precluded from scenic or recreational classification because of poor water quality at the time of their study, provided a water quality improvement plan exists or is being developed in compliance with applicable Federal and state laws.	
Water Resources Development	Free of impoundment	Free of impoundment	Some previous impoundments or diversion. The existence of low head dams, diversions, or other modifications of the waterway is acceptable, provided the water-way remains generally natural and riverine in appearance
Shoreline Development	Essentially primitive. Little or no evidence of human activity.	Largely primitive and unde-veloped. No substantial evidence of human activity.	Some development. Substantial evidence of human activity.
	The presence of a few inconspicuous structures, particulary those of historic or cultural values, is acceptable.	The presence of small communities or dispersed dwellings or farm structures is acceptable.	The presence of extensive residential development and a few commercial structures is acceptable.
	A limited amount of domestic livestock grazing or hay production is acceptable.	The presence of grazing, hay production, or row crops is acceptable.	Lands may have been developed for the full range of agriculture and forestry uses.
	Little or no evidence of past timber harvest. No ongoing timber harvest.	Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.	May show evidence of past and ongoing timber harvest.
Accessibility	Generally inaccessible except by trail.	Accessible in places by road.	Readily accessible by road or trail. The existence of parallel roads or railroads on one or both banks as well bridge crossings and other river access points is acceptable.
	No roads, railroads, for vehicular travel or other provisions within the river area. A few existing roads leading to the boundary of the river area is acceptable.	Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable.	

ATTACHMENT 4

TABLE L-4
Classification Criteria for Wild Designation

Wild	Beaver Creek		Arkansas River			
	Upper	Lower	Seg 1	Seg 2	Seg 3	Seg 4
Water quality meets or exceeds Federal or state approved standards	Yes	Yes	No	Yes	Yes	Yes
Free of impoundment	Yes	Yes	Yes	Yes	Yes	Yes
Shoreline development essentially primitive with little no evidence of human activity	No	Yes	No	No	No	No
A few inconspicuous structures	Yes	Yes	No	No	No	No
Limited grazing or hay production	Yes	Yes	Yes	Yes	Yes	Yes
Little evidence of timber harvestz	Yes	Yes	Yes	Yes	Yes	Yes
Ongoing harvest	No	No	No	No	No	No

ATTACHMENT 5

TABLE L-5
Classification Criteria for Scenic Designation

Scenic	Beaver Creek		Arkansas River			
	Upper	Lower	Seg 1	Seg 2	Seg 3	Seg 4
Water quality criteria in NSRA[1/]	N/A	N/A	N/A	N/A	N/A	N/A
Free of impoundment	Yes	Yes	Yes	Yes	Yes	Yes
Shoreline development largely primitive and undeveloped	Yes	Yes	No	Yes	No	No
Presence of small communities and dispersed dwellings	No	Yes	Yes	Yes	Yes	Yes
Livestock grazing or hay production	Yes	Yes	Yes	Yes	Yes	Yes
Evidence of timber harvest	No	No	No	No	No	No
Accessible only in places by roads	Yes	Yes	No	Yes	No	No
Roads may only occasionally reach or bridge river	Yes	Yes	No	Yes	No	No
Existence of only short sections of conspicuous road or railroad or longer sections of inconspicuous road or railroad	Yes	Yes	No	No	No	No

[1/]No water quality criteria for scenic designation

ATTACHMENT 6

TABLE L-6
Classification Criteria for Recreational Designation

Recreational	Beaver Creek		Arkansas River			
	Upper	Lower	Seg 1	Seg 2	Seg 3	Seg 4
Water quality criteria in NWSRA[1/]	N/A	N/A	N/A	N/A	N/A	N/A
Some previously existing impoundments	No	Yes	Yes	Yes	Yes	Yes
Low dam diversions or waterway modifications, provided the waterway remains generally natural and riverine in appearance	No	Yes	Yes	Yes	Yes	Yes
Some shoreline development and substantial evidence of human activity	No	Yes	Yes	Yes	Yes	Yes
Presence of extensive residential development and a few commercial structures	No	No	Yes	Yes	Yes	Yes
Developed for agriculture/ forestry	Yes	Yes	Yes	Yes	Yes	Yes
Readily accessible by road or railroad	No	No	Yes	Yes	Yes	Yes
Parallel roads or railroads on one or both banks as well as bridge crossings and other access points	No	No	Yes	Yes	Yes	Yes

[1/]No water quality for scenic designation

ATTACHMENT 7

ANTIDEGRADATION REVIEW

The first step in the required antidegradation review involves a Significance Determination.

"The initial step in an antidegradation review shall be a determination whether the activity in question is likely to result in significant degradation of reviewable waters, with respect to adopted narrative or numeric standards. This significance determination shall be made with respect to the net effect of the new or increased water quality impacts of the proposed activity. The activity shall be considered not to result in significant degradation, as measured in the reviewable waters segment, if:

"The activity will result in only temporary or short-term changes in water quality. In addition, for waters designated high quality 2 because exceptional reasons are present to warrant the extra protection of uses provided by this designation, the activity shall be considered not to result in significant degradation if the new or increased water quality impacts of the activity are demonstrated not to have an adverse impact with respect to the specific reasons for designating the segment high quality."

The second step in the antidegradation review involves a Necessity of Degradation Determination:

"If a determination had been made in accordance with subsection 3.1.8(3)(c) that a proposed activity is likely to result in significant degradation of reviewable waters, a determination shall be made pursuant to this subsection whether the degradation is necessary to accommodate important economic or social development in the area in which the waters are located. The following provisions shall apply to this determination:

"(i) The "area in which the waters are located" shall be determined from the facts on a case-by-case basis. The area shall include all areas directly impacted by the proposed activity.

"(ii) A determination shall be made from the facts on a case-by-case basis whether the proposed activity is important economic or social development. If the activity proponent submits evidence that the activity is important development, it shall be presumed important unless information to the contrary is submitted in the public review process. The determination shall take into account information received during the public comment period and shall give substantial weight to any applicable determinations by local governments or land use planning authorities.

"(iii) If the proposed activity is determined to be important economic or social development, a determination shall be made whether the degradation that would result from such activity is necessary to accommodate that development. The degradation shall be considered necessary if there are no water quality control alternatives available that (A) would result in no degradation or less degradation of the State waters and (B) are determined to be economically, environmentally, and technologically reasonable.

"This determination shall be based on an assessment of whether such alternatives are available, based upon a reasonable level of analysis by the project proponent, consistent with accepted engineering practice, and any information submitted by the public or which is otherwise available. The assessment shall address practical water quality control technologies, the feasibility and availability of which has been demonstrated under field conditions similar to those of the activity under review.

"In determining the economic reasonableness of any less-degrading water quality control alternatives, the Division may take into consideration any relevant factors, including but not limited to the following, if applicable:

"(A) Whether the costs of the alternative significantly exceed the costs of the proposal;

"(B) For publicly owned treatment works (POTWs) or public water supply projects, whether user charges resulting from the alternative would significantly exceed user charges for similarly situated POTWs or public water supply projects."

ATTACHMENT 8

TABLE L-8
Management Goals for Each Classification

Land Use Practices	Wild River Classification	Scenic River Classification	Recreational River Classification
Forestry Practices	Cutting of trees will not be permitted except when needed in association with a primitive recreation experience (such as clearing for trail and for visitor safety) or to protect the environment (such as control of fire). Timber outside the boundary but within the visual corridors will be managed and harvested in a manner to provide special emphasis on visual quality.	Forestry practices including timber harvesting could be allowed provided that such practices are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment. The river area should be maintained in its near natural environment. Timber outside the boundary but within the visual area should be managed and harvested in a manner that provides special emphasis on visual quality.	Forestry practices including timber harvesting would be allowed under standard restrictions to protect the river environment and its associated values.
Agricultural Practices and Livestock Grazing	Agricultural use is restricted to a limited amount of domestic livestock grazing and hay production to the extent currently practiced. Row crops are prohibited.	A wider range of agricultural and livestock grazing uses is permitted to the extent currently practiced. Row crops are not considered as an intrusion on the "largely primitive" nature of scenic corridors as long as there is not a substantial adverse effect on the natural appearance of the river.	Lands may be managed for a full range of agricultural and livestock grazing use to the extent currently practiced.
Road and Trail Construction	No new roads nor other provisions for overland motorized travel would be permitted within a narrow incised river valley, of if the river valley is broad, within .25 mile of the river corridor. A few inconspicuous roads leading to the boundary of the river area and unobtrusive trail bridges may be permitted. New trails may be constructed provided they do not detract from the essentially primitive character of the area.	Roads may occasionally bridge the river area, and short stretches of conspicuous or longer stretches of inconspicuous and well-screened roads or screened railroads could be allowed. Maintenance of existing roads and any new roads will be based on the type of use for which the roads are constructed and the type of use that will occur in the river area. New trails may be constructed to enhance the values for which the river was designated.	Parallel roads or railroads could be constructed on one or both river banks. There can be several bridge crossings and numerous river access points. New trails may be constructed as long as there is no conflict with other river values.

Table L-8 (Continued)

Land Use Practices	Wild River Classification	Scenic River Classification	Recreational River Classification
Minerals	New mining claims and mineral leases are prohibited within .25 mile of the river. Valid existing claims would not be abrogated and, subject to existing regulations (43 CFR 3809) that the Secretary of Interior may prescribe to protect the river included in the national system, existing mining activity would be allowed to continue. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims beyond .25 mile of the river, but within the wild river area boundary, and perfected after the effective date of the wild river designation can be patented only as to the mineral estate and not the surface estate.	Subject to existing regulations (43 CFR 3809) and any future regulations that the Secretary of Interior may prescribe to protect the values of rivers included in the national system, new mining claims and mineral leases could be allowed and existing operations allowed to continue. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation and pollution, and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims perfected after the effective date of the scenic river designation can be patented only as to the mineral estate and not the surface estate.	Subject to existing regulations (43 CFR 3809) and any future regulations that the Secretary of Interior may prescribe to protect the values of rivers in the national system, new mining claims and mineral leases could be allowed and existing operations allowed to continue. All mineral activity must be conducted in a manner that minimizes surface disturbance, sedimentation and pollution and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims perfected after the effective date of the recreational river designation can be patented only as to the mineral estate and not the surface estate.
Water Quality	Water quality will be maintained or improved to meet Federal criteria or federally approved state standards. River management plans shall prescribe a process for monitoring water quality on a continuing basis.	Same as for a wild segment.	Same as for a wild segment.
Water Supply	Water supply dams and major diversions are prohibited.	Water supply dams and major diversions are prohibited. Maintenance of existing facilities and construction of some minor new diversion structures would be permitted provided the area remains natural in appearance and the activities or structures harmonize with the surrounding environment.	New major water structures are prohibited. Existing low dams, diversion works, riprap, and other minor structures may be maintained provided the waterway remains generally natural in apperance. New minor diversion structures or management practices; e.g., water bars, diversion ditches, etc., may be allowed provided the area remains generally natural in appearance and the structures harmonize with the surrounding environment.

Table L-8 (Continued)

Land Use Practices	Wild River Classification	Scenic River Classification	Recreational River Classification
Flood Control	No new flood control dams, levees, or other works are allowed in the channel or river corridor. The natural appearance and essential primitive character of the river must be maintained.	Flood control dams and levees are prohibited. Existing structures protecting major improvement, homes, bridges, highways, etc., may be maintained.	Existing flood control and protection works may be maintained. New structures to provide bank stabilization such as rock or log placement, must not affect free-flowing characteristics nor conflict with outstandingly remarkable values. In addition, new structures must be compatible with classification and the area must remain natural in appearance with structures harmonizing with the environment.
Hydroelectric Power	No development of hydroelectric power facilities would be permitted.	Same as for a wild segment.	Same as for a wild segment.
Ground Water	Federal agency groundwater development for range, wildlife, recreation, or administrative facilities may be permitted if there are no adverse effects on outstandingly remarkable values.	Same as for a wild segment.	Same as for a wild segment.
Protection: (Fire Protection and Suppression)	Management and suppression of fires within a designated river area will be accomplished in a manner compatible with contiguous Federal lands. On wildfires, methods will be utilized to minimize suppression activities that cause long-term impacts on the river and river area. Presuppresion and prevention activities will be conducted in a manner that reflects management objectives for the specific river segment. Prescribed fire may be utilized to maintain or restore ecological condition or to meet objectives specified in the river management plan.	Same as for a wild segment.	Same as for a wild segment.
Insects, Disease, and Noxious Weeds	The control of forest and rangeland pests, diseases, and noxious weed infestations will be accomplished in a manner compatible with the intent of the Act and management objectives of contiguous Federal lands.	Same as for a wild segment.	Same as for a wild segment.

Table L-8 (Continued)

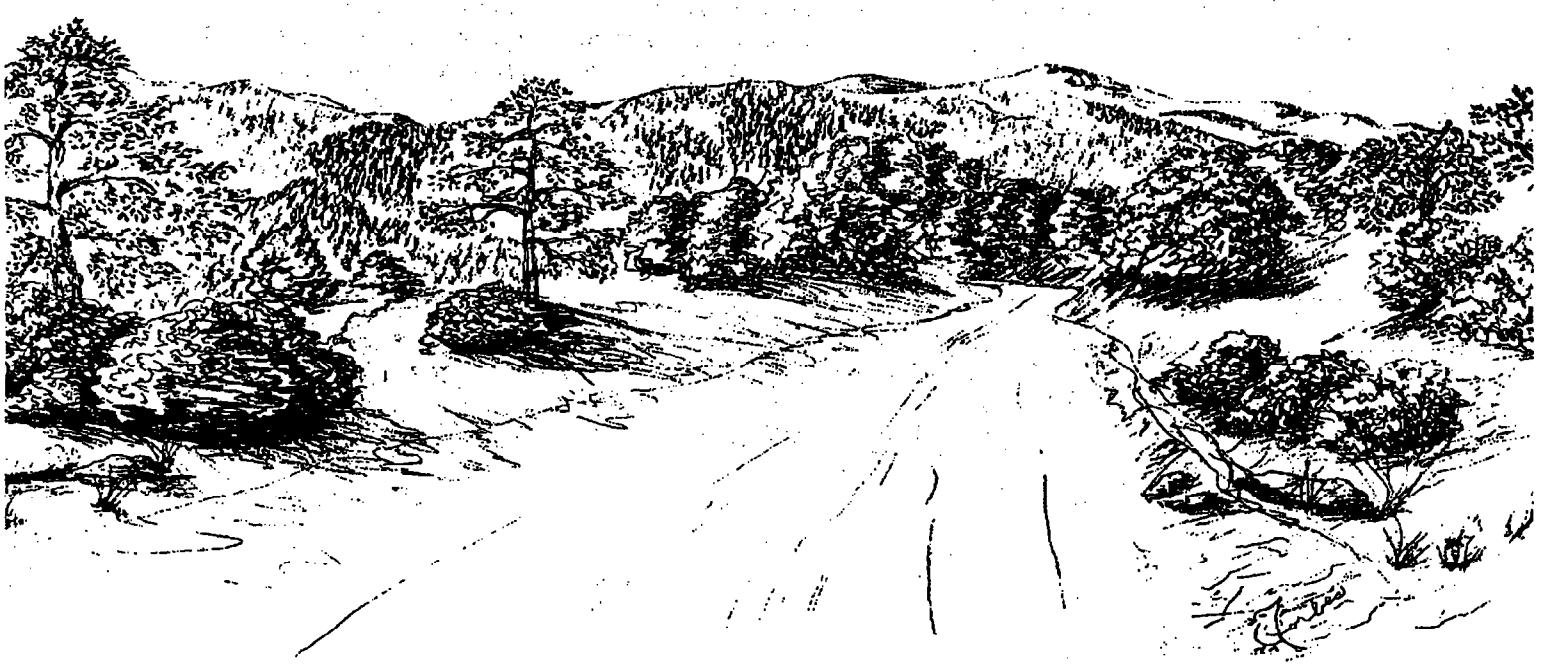
Land Use Practices	Wild River Classification	Scenic River Classification	Recreational River Classification
Cultural Resources	Historic and prehistoric resource sites will be identified, evaluated, and protected in a manner compatible with the management objectives of the river and in accordance with applicable regulations and policies. Where appropriate, historic or prehistoric sites will be stabilized, enhanced, and interpreted.	Same as for a wild segment.	Same as for a wild segment.
Fish and Wildlife Habitat Improvement	The construction and maintenance of minor structures for protection, conservation, rehabilitation, or enhancement of fish and wildlife habitat are acceptable in wild river areas provided they do not affect the free-flowing characteristics of the river, or conflict with the outstandingly remarkable values. In addition, structures and practices should be compatible with the classification, ensure the area remains natural in appearance, and harmonize with the surrounding environment.	Same as for a wild segment.	Same as for a wild segment.
Wilderness Study Areas	Management of river areas that overlap designated wilderness or wilderness study areas will meet whichever standard is highest. If an area is released from wilderness study area status and the associated interim management policy, the applicable river classification guidelines and standards would apply.	Same as for a wild segment.	Same as for a wild segment.
Visual Resources	Preservation of existing landscape character through natural ecological change is the objective. Limited management activities are not precluded, provided any change to the characteristic landscape is low and does not attract attention.	Retention of the existing landscape character is the objective. Management activities can occur, provided the change to the characteristic landscape is low and does not attract the attention of the casual observer.	Partial retention of the existing landscape character is the objective. Management activities can occur, provided the change to the characteristic landscape is no more than moderate and does not dominate the view of the casual observer.

Table L-8 (Continued)

Land Use Practices	Wild River Classification	Scenic River Classification	Recreational River Classification
Public Access and Use	Recreation use including but not limited to hiking, fishing, hunting, and boating is encouraged in river areas to the extent consistent with the protection of the river environment and the outstandingly remark-able values. Public use and access may be regulated and distributed where necessary to protect and enhance river values.	Same as for a wild segment.	Same as for a wild segment.
Motorized Travel	Motorized travel on land or water could be permitted, but is generally not compatible with this classification. Normally, motorized use will be prohibited in a wild river area. Prescriptions for management of motorized use may allow for search and rescue and other emergency situations.	Motorized travel on land or water may be permitted, prohibited, or restricted to protect the river values. Prescriptions for management of motorized use may allow for search and rescue and other emergency situations.	Motorized travel on land will generally be permitted on existing roads. Controls will usually be similar to that of surrounding lands. Motorized travel on water will be in accordance with existing regulations or restrictions.
Rights-of-Way, Utilities	New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically prohibited outright by other plans, orders, or laws. Where no reasonable alternative exists, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavailable, locations, and construction techniques will be selected to minimize adverse effects on river area related values and fully evaluated during the site selection process.	Same as for a wild segment.	Same as for a wild segment.

APPENDIX M

RECREATION OPPORTUNITY SPECTRUM CRITERIA



APPENDIX M
RECREATION OPPORTUNITY SPECTRUM CRITERIA

TABLE M-1
Associated Experience Opportunity Classes and Associated Physical, Social, and Managerial Settings Requirements.

Opportunity Class	Experience Opportunity	Physical, Social, and Managerial Setting
Primitive (P)	Opportunity for isolation, to feel a part of the natural environment, to have a high degree of challenge and risk, and to use outdoor skills.	Area is characterized by essentially unmodified natural environment of fairly large size. Concentration of users is very low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of man-induced restrictions and controls. Only essential facilities for resource protection are used and are constructed of onsite materials. No facilities for comfort or convenience of the user are provided. Spacing of groups is informal and dispersed to minimize contacts with other groups or individuals. Motorized use within the area is not permitted.
Semi-Primitive Non-motorized (SPNM)	Some opportunity for isolation from the sight and sounds of man, but not as important as for primitive opportunities. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills.	Area is characterized by a predominately unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that mini-mum onsite controls and restrictions may be present, but are subtle. Facilities are primarily provided for the pro-tection of resource values and safety of users. Onsite materials are used where possible. Spacing of groups may be formalized to disperse use and provide low-to-moderate contacts with other groups or individuals. Motorized use is not permitted.
Semi-Primitive Motorized (SPM)	Some opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Explicit opportunity to use motorized equipment while in the area.	Area is characterized by a predominately unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but are subtle. Facilities are primarily provided for the protection of resource values and safety of users. Onsite materials are used where possible. Spacing of groups may be formalized to disperse use and provide low to moderate contacts with other groups or individuals. Motorized use is permitted.
Roaded Natural (RN)	About equal opportunities for affiliation with user groups and opportunities for isolation from sights and sounds of man. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities are not very important. Practices and testing of outdoor skills may be important. Opportunities for both motorized and non-motorized forms of recreation are possible.	Area is characterized by generally natural environment with moderate evidence of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Concentration of users may be low to moderate with facilities sometimes provided for group activity. Evidence of other users is prevalent. Controls and regimentation offer a sense of security and are onsite. Rustic facilities are provided for convenience of the user as well as for safety and resource protection. Moderate densities of groups are provided for in developed sites and on roads and trails. Low to moderate densities prevail away from developed sites and facilities. Renewable resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.

Table M-1 (Continued)

Opportunity Class	Experience Opportunity	Physical, Social, and Managerial Setting
Rural (R)	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the setting of the physical environment. Opportunities for wildland challenge, risk taking, and testing of outdoor skills are unimportant, except for those activities like downhill skiing for which challenge and risk taking are important.	Area is characterized by substantially modified natural environment. Renewable resource modification and utilization practices are primarily to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of man are readily evident, and the concentration of users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate to high densities of groups and individuals are provided for in developed sites, on roads and trails, and water surfaces. Moderate densities are provided for away from developed sites. Facilities for intensified motorized use and parking are available.
Urban (U)	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are more important than the setting of the physical environment. Opportunities for wildland challenge, risk taking, and testing outdoor skills are unimportant.	Area is characterized by a substantially urbanized environment, although the background may have natural elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Soil protection usually accomplished with hand surfacing and terracing. Sights and sounds of man, onsite, are predominant. Large numbers of users can be expected both onsite and in nearby areas. A considerable number of facilities are designed for the use and convenience of large numbers of people and include electrical hookups and contemporary sanitation services. Controls and regimentation are obvious and numerous. Facilities are provided for special activities. Facilities are highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

Source: Brown, P.J., B.L. Driver, and C. McConnell. 1978. "The Opportunity Spectrum Concept and Behavioral Information in Outdoor Recreation Supply Inventories: Background and Application." *In Integrated Inventories of Renewable Natural Resources*, USFS Gen. Tech. Report RM-55, pp. 73-84.

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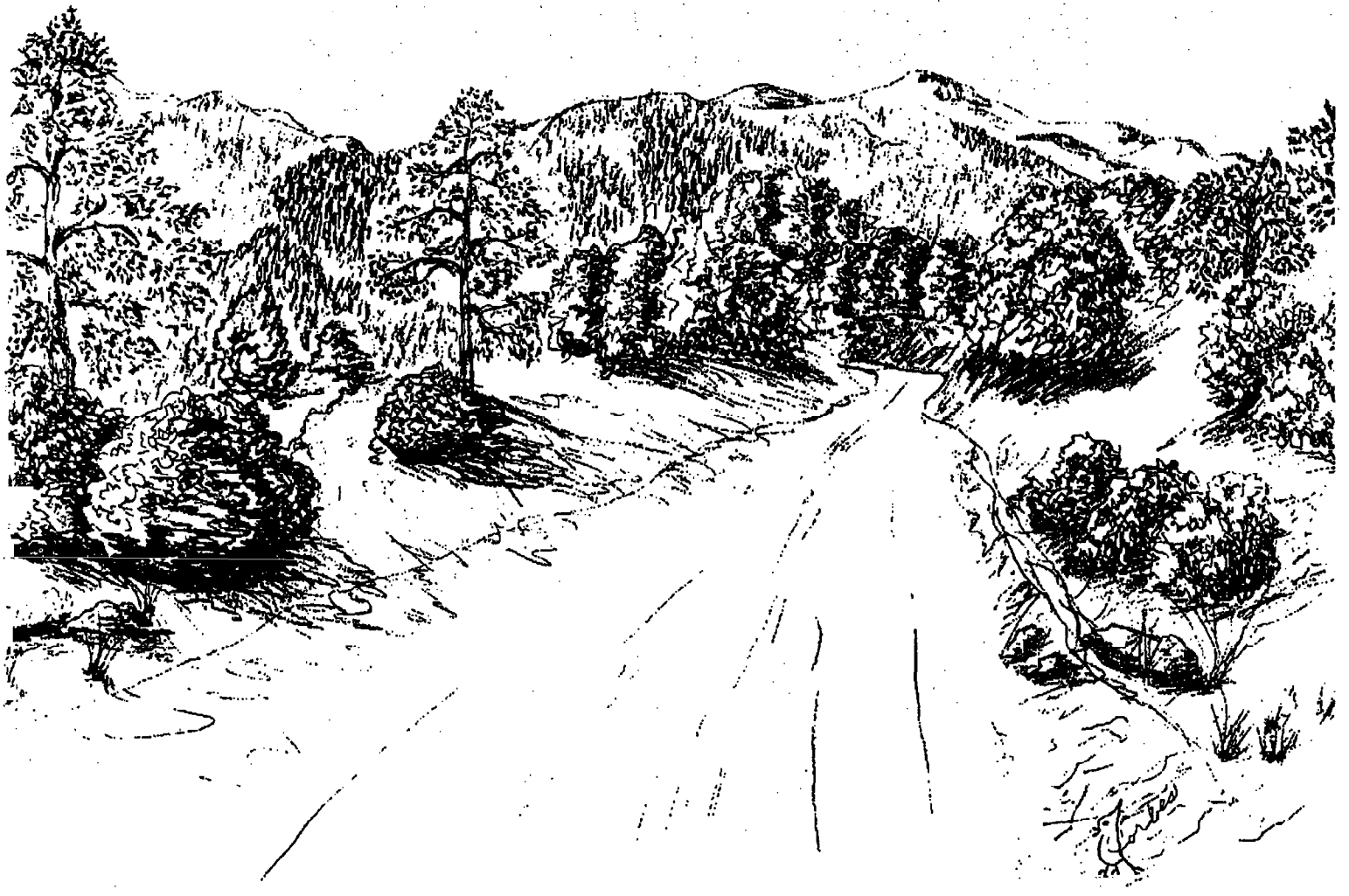

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GLOSSARY

Allotment Management Plan. A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment.

Acre-Foot. A unit for measuring volume, equal to the quantity of water or other material required to cover 1 acre to a depth of 1 foot or a volume of 43,560 cubic feet.

Alluvium. Unconsolidated rock or soil material deposited by running water, including gravel, sand, silt, clay, and various mixtures of these.

Allotment Management Action. A specific action stated within an allotment management plan.

Animal Unit Month (AUM). The forage needed to support one cow or cow/calf pair, one horse, or five sheep for a month or two elk, five deer, or nine antelope for the same period of time (approximately 900 lbs. of forage).

Area of Critical Environmental Concern (ACEC). An area within the public lands where special management attention is required: (1) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes; or (2) to protect life and safety from natural hazards.

Areal. A specified area of land or water defined by square feet or acres.

Avoidance. A partial or complete redesign or relocation of a proposed land use to prevent a potential adverse effect fromoccurring.

Back-Country Vehicle. Any motorized vehicle for cross-country travel over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Biodiversity. The variety of life forms, the genetic diversity contained, and the ecological functions performed.

Biological Perpetuation. Management of aquatic habitat to achieve a healthy and productive ecosystem for the long-term enhancement of cold and warm water fisheries.

Birthing Area Closure. May 15 to July 1.

BLM-Administered Land. Land administered by the Bureau of Land Management.

Canopy. The continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Conditions of Approval. Conditions or provisions (requirements) under which an Application for Permit to Drill or a Sundry Notice is approved.

Contiguous. Lands or legal subdivisions having a common boundary; lands having only a common corner are not contiguous.

Controlled Surface Use. Use and occupancy are allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. This is used for operating guidance, not as a substitute for the NSO or seasonaly stipulations.

Critical Winter Range Closure. Lands identified as critical to big game during winter months (December 15 through March 31).

Cultural Resources. Fragile and nonrenewable remains of human activity reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events.

Glossary (Continued)

Desired Plant Community. A plant community, which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established by an interdisciplinary team for an ecological site or group of sites. The desired plant community must be consistent with the capability of the sites to produce the desired vegetation through management, land treatment, or a combination of the two.

Ecological Status. The present state of vegetation and soil protection of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree of which the kinds, proportions, and amounts of plants in a community resemble that of the potential natural community. Classes or ratings used describe in ecological rather than utilization terms. For example, some agencies are utilizing four classes of ecological status ratings (early seral, mid-seral, late seral, potential natural community) of vegetation corresponding to 0-25%, 26-50%, 51-75%, and 76-100% of the potential natural community standard. Soil status is a measure of present vegetation and litter cover relative to the amount of cover needed on the site to prevent accelerated erosion.

Ecosystem. Collectively, all populations in a community, plus the associated environmental factors.

Endangered Species. Any species in danger of extinction throughout all or a significant portion of its ranges.

Environmental Assessment (EA). A report analyzing the impacts of some proposed action on a given environment. It is similar to an environmental impact statement (EIS) except it is generally smaller in scope and makes recommendations for action. EAs are sometimes preliminary to EISs.

Eolian. Pertaining to, caused by, or carried by the wind.

Ephemeral Stream. A stream that flows occasionally because of surface runoff, but is not influenced by permanent ground water.

Erosion. The process by which soil particles are detached and moved.

Exception. Case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites within the leasehold to which the restrict criteria applies.

Extensive Recreation Management Area (ERMA). BLM administrative units where recreation management is only one of several management objectives and where limited commitment of resources is required to provide extensive and unstructured type of recreation activities.

Flyway. An established air route of migratory birds.

Forb. A nonwoody herbaceous plant.

Fragile Soil. Category of problem sites composed of soils that have moderate to high water holding capacities, moderate to slow permeability, and can be severely degraded by compaction, slumping and sliding, and erosion.

Fragile Soil/Slope Gradient. Problem sites where unstable landforms and unstable or erosive soils are made more vulnerable to degradation by steep slopes.

Game Species. Those species legally harvested for sport.

Geographical Reference Area. A unit of specified land area, which is assigned a set of management directions within this land use plan.

Groundwater. Water beneath the land surface, in the zone of saturation.

Habitat. A specific set of physical conditions that surrounds the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Glossary (Continued)

Habitat Management Plan (HMP). A written and approved activity plan for a geographical area of public lands identifying wildlife habitat management actions to be implemented in achieving specific objectives related to planning document decisions.

Hazard Sites/Areas. Locations on BLM-administered lands that potentially pose a hazardous situation for the users.

Hazardous Materials. Substances that may be encountered on BLM-administered lands and would be potentially harmful to users.

Imprint. A mark or evidence left by man.

Integrated Activity Plan (IAP). An activity level plan completed for more than one resource in a given area/site, usually when conflicts or potential conflicts could occur between various resource activities.

Intermittent Stream. A stream that does not flow year-round but has some association with ground water for surface or subsurface flow.

Intrusion. A feature (land and water form, vegetation, or structure) that is generally considered out of context with the characteristic landscape.

Land Tenure Opportunity. A willing seller offers BLM non-Federal land, either as a donation, purchase, or exchange, which would result in a public benefit.

Lease (fluid). A contract in legal form that provides for the right to develop and produce fluid resources for a specific period of time under certain agreed upon terms and conditions.

Leasable Minerals. Oil, gas, sodium, potassium, phosphate, coal, oil shale, tar sands, asphaltic materials, and, in Louisiana and New Mexico, sulphur and all minerals on the Outer Continental Shelf, and on acquired lands.

Locatable Minerals. Minerals or materials subject to disposal and development through the Mining Law of 1872 (as amended). Generally includes metallic minerals such as gold and silver and other materials not subject to lease or sale.

Management Framework Plan (MFP). Land use plan for BLM-administered lands, which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Management Situation Analysis (MSA). An analysis by the Bureau of Land Management used for making land management decisions that are responsive to public issues to determine the capability of public land resources. This is available for review in the Cañon City District Office.

Management Use. The category applied to any cultural property considered most useful for controlled experimental study that would result in its physical alteration.

Mbf. Thousand board feet.

Mineral Estate. The ownership of the right to all or certain minerals in the land, or reservation of fractional interest in all or certain minerals in perpetuity or for a specified period of time.

Mineral Materials/Salable Minerals. Minerals, such as common varieties of sand, stone, gravel, cinders, pumice, pumicite, and clay that may be acquired under the *Materials Act* of 1947, as amended.

Modification. Fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive criteria applies.

Glossary (Continued)

MSA. See Management Situation Analysis.

National Register of Historic Places. The official list, established by the *National Historic Preservation Act* of 1966, of the nation's cultural resources worthy of preservation. The register lists archaeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state or Federal agencies and approved by the National Register staff.

Native Water. Water located in the original basin or drainage.

No Surface Occupancy. A fluid mineral leasing stipulation that prohibits occupancy or disturbance of all or part of the lease surface in order to protect special values. Fluid resources may be developed by directional drilling.

Nongame Species. Those species not commonly harvested for sport.

Nonuse. Allowable livestock grazing use (in AUMs) that is authorized but is not to be used during a given time period. Nonuse is applied for and authorized on an annual basis.

Off-Highway Vehicle (OHV). This term replaces off-road vehicle (ORV) and is all inclusive of unsurfaced roads. OHV includes any vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain.

OHV Designations. Three categoriesof designations (open, limited, and closed) used for administration by BLM to control vehicular use.

OHV Open Areas. Locations on BLM-administered lands with no limitations nor restrictions to full use and travel of off-highway vehicles.

OHV Limited Areas. Locations on BLM-administered lands with some form of limitation or restriction for the full use and travel of off-highway vehicles (i.e., seasonally limited travel or restrictions of travel to designated roads and trails only).

OHV Closed Areas. Locations on BLM-administered lands where absolutely no use nor travel of off-highway vehicles is allowed.

Perennial Stream. A stream that has year-round surface flows.

Permeability. The condition of being porous; containing openings or interstices through which outside properties can pass.

Public Use. The category applied to any cultural property that is appropriate for consideration as an interpretive exhibit in place.

Range Condition. Current productivity of a range relative to what that range is naturally capable of producing.

Raptors. Birds of prey, such as hawks, owls, and eagles. One of the behavior characteristics of these animals is to return, year after year, to the same nesting area. Accordingly, the nesting sites of these protected species should be retained with minimal human disturbance.

Recreation Opportunity Spectrum (ROS). A method for classifying the land by setting opportunity, according to the ability of the land to provide various types of physical, social, and managerial settings to satisfy the desires and expected behavioral preferences of the users.

Reforestation Problems. Problem sites where two or more types of interfering conditions may cause seedling mortality during the first several growing seasons. High soil temperature, droughty conditions, unshaded southern and western slopes, competing vegetation, animal damage, or wind and frost damage are examples of such conditions.

Glossary (Continued)

Rights-of-Way Corridor. A designated parcel of land, either linear or areal in character, that has been identified through the land use planning process as the preferred location for existing and future major right-of-way grants and suitable to accommodate more than one type of right-of-way or one or more rights-of-way that are similar, identical, or compatible. An area open for a major utility line defined as a powerline greater than 69 kilowatts or a surface-disturbing activity that is greater than 5 feet in width.

Riparian Area. An area of land directly influenced by permanent water, which has visible vegetation or physical characteristics reflective of this permanent water influence.

Riprap. A loose assemblage of broken rock erected in water or on soft ground as a foundation.

Riverine. Pertaining to or resembling a river. Located on or inhabiting the banks of a river (i.e., riparian).

Royal Gorge Planning Area Boundary. The portion within the area boundary identified for study in the resource management plan; i.e., exclude most of the land administered by other Federal agencies.

Salable Minerals. See Mineral Materials..

Scientific Use. The category applied to any cultural property determined suitable for consideration as the subject of scientific or historical study utilizing currently available research techniques.

Sediment Yield. The amount of sediment given up by a watershed over a specified time period, usually a year. Ordinarily, it is expressed as tons, acre-feet, or cubic yards of sediment per unit of drainage per year.

Seral Stage. The developmental stage of an ecological succession.

Soil Association. A mapping unit used on general soil maps in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because the scale of the map or the purpose for which it is being made does not require delineation of the individual soils.

Solitude. The state of being alone or remote from habitations; isolations. A lonely, unfrequented, or secluded place.

Special Recreation Management Area (SRMA). Areas requiring specific recreation management to achieve the Bureau recreation objectives and to provide specific recreation opportunities. Special management areas are identified in the RMP, which also defines the management objectives for the area. BLM recreation investments are concentrated in these areas.

Special Stipulations. Additional specific terms and conditions that change the manner in which operations may be conducted on a lease or modify the lease rights granted.

Split Estate. Lands where the surface and mineral estates have been severed and are under different ownership (i.e., private surface/Federal minerals).

Sustained Yield. The achievement and maintenance, in perpetuity, of a high level of annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. Amount of resource harvested normally equals the amount grown since the previous harvest.

Supplemental Program Guidance (SPG). Program specific guidance for resource management planning from the 1620 series of the BLM manual.

Threatened Species. Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range: satisfactory = >75 percent; unsatisfactory = <75 percent.

Transmountain Water. Water that has been diverted from the original basin or drainage as a result of water development.

Vegetation Management Goals. The overall vegetative prescription for specific units of BLM-administered lands.

Glossary (Continued)

Vegetation Management Status. The relative degree to which the kinds, proportions, and amounts of vegetation in the existing plant community resemble the desired plant community for an ecological site.

Vista. A panoramic scenic view from one or more vantage points.

Visual Resource. The land, water, vegetation, animal, and other features that are visible on all lands.

Waiver. Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

Wetlands. Permanently wet or intermittently flooded areas where the water table (fresh, saline, or brackish) is at, near, or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited and where water depths generally do not exceed two meters.

Wilderness Study Area (WSA). A roadless area, which has wilderness characteristics (thus having the potential of being included in the National Wilderness Preservation System), and which has been subjected to intensive analysis by the Bureau and public review to determine wilderness suitability and is not yet the subject of a congressional decision regarding designation as wilderness.

Withdrawal. An action that restricts the use of public land and segregates the land from the operation of some or all of the public land or mineral laws. Withdrawals are also used to transfer jurisdiction of management to other Federal agencies.

Woodland. Forested land not capable of producing commercial sawtimber, but can and does produce forest products like firewood, transplants, posts and poles, etc.

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