ANALYSIS of the MANAGEMENT SITUATION

for the

Roan Plateau Area Resource Management Plan Amendment

&

Environmental Impact Statement

U.S. Department of the Interior

Bureau of Land Management
Glenwood Springs Field Office

January 2002

ANALYSIS of the MANAGEMENT SITUATION

for the

Roan Plateau Area
Resource Management Plan Amendment
&
Environmental Impact Statement

Prepared by
Bureau of Land Management
Glenwood Springs Field Office

Acting Glenwood Springs Field Manager

January 10, 2003

TABLE OF CONTENTS

	A. Introduction		Page 3
	B. Analysis of the Management Situation (AMS)		Page 3
	C. Planning Area Boundary		Page 3
	D. Planning Area Description		Page 4
	E. Management History of Naval Oil Shale Reserve		Page 4
	F. Additional Public Lands within the Planning Area		Page 6
	G. Other Plans, Policies and Programs		Page 6
	H. Special Management Determinations		Page 7
	I. Scoping Results		Page 8
Major Issues	AMS - 1	Summary for Fluid Minerals	Page 9
	AMS - 2	Summary for Solid Minerals	Page 12
	AMS - 3	Summary for Recreation	Page 14
	AMS - 4	Summary for Travel, Access and Transportation	Page 18
	AMS - 5	Summary for Fish and Wildlife	Page 22
	AMS - 6	Summary for Special Status Species - Fish and Wildlife	Page 28
	AMS - 7	Summary for Special Status Species - Plants	Page 34
	AMS - 8	Summary for Livestock Management	Page 42
	AMS - 9	Summary for Wilderness Suitability	Page 46
	AMS - 10	Summary for Wild & Scenic River Suitability	Page 50
	AMS - 11	Summary for Visual Resources	Page 53
	AMS - 12	Summary for Social and Economic Factors	Page 56
Related Topics	AMS - 13	Summary for Air Quality	Page 61
	AMS - 14	Summary for Soils	Page 63
	AMS - 15	Summary for Surface Water	Page 65
	AMS - 16	Summary for Ground Water	Page 68
	AMS - 17	Summary for Vegetation - Riparian & Wetlands	Page 69
	AMS - 18	Summary for Vegetation -Upland	Page 74
	AMS - 19	Summary for Weeds	Page 79
	AMS - 20	Summary for Forest Management	Page 81
	AMS - 21	Summary for Cultural Resources	Page 83
	AMS - 22	Summary for Paleontological Resources	Page 85

TABLE OF CONTENTS

AMS - 23	Summary for Lands and Realty Actions	Page 86
AMS - 24	Summary for Fire Management	Page 88
AMS - 25	Summary for Hazardous Materials	Page 90
Appendix A - Maps		Page 91
Appendix B - Figures		Page 103
Appendix C - Acronyms		Page 111
Appendix D - References		Page 113

A. Introduction

The US Department of the Interior (DOI), Bureau of Land Management's (BLM) Glenwood Springs Field Office (GSFO), is preparing an Environmental Impact Statement (EIS) that will amend the Glenwood Springs Resource Area (GSRA) Resource Management Plan (RMP) of 1988 and the White River Resource Area (WRRA) RMP of 1996 for the Roan Plateau area. The Federal Land Policy and Management Act (FLPMA) of 1976 directs BLM to develop management direction through a coordinated land use planning process on the basis of multiple use and sustained yield unless otherwise specified by law. RMPs establish goals and objectives for management, prescriptions needed to achieve the goals and objectives and parameters for use of public lands. RMPs must comply with: various statutes, executive orders, resource-specific requirements and planning authorities. Refer to BLM H-1601-1 – Land Use Planning Handbook for detailed descriptions of: applicable Federal laws, regulations, and legal and regulatory mandates.

An RMP amendment became necessary in 1997 when Public Law 105-85 transferred 56,000 acres of the Naval Oil Shale Reserves (NOSR) 1 and 3, from the Department of Energy (DOE) to the BLM. The planning process will evaluate the overlapping and outdated management direction from: the 1988 GSRA RMP, the 1996 WRRA RMP, the Operational Management Plan with DOE, and the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment, in light of biological, social and economic changes occurring on and around the Roan Plateau. The final plan will provide a holistic management strategy for public lands in the Roan Plateau area.

B. Analysis of the Management Situation (AMS)

The AMS is Step 4 in the BLM nine-step land use planning process. The analysis provides a reference for developing and evaluating alternatives. The AMS presents baseline information for resources or topics by describing; (1) Management Plans and Documents, (2) Current Management, (3) Characteristics and Setting, (4) Resource Condition and Capabilities, and (5) Opportunities. The AMS focuses on the major issues (see Part I. Scoping Results) identified during scooping that provide the basis for formulating reasonable alternatives. Information is provided about related resources and topics but to a lesser degree. The AMS also offers resources for further reading.

Table B-1. BLM Land Use Planning Process

Step 1	Identify issues
Step 2	Develop planning criteria
Step 3	Collect/consolidate data
Step 4	Prepare Analysis of Management Situation
Step 5	Formulate alternatives
Step 6	Estimate effects
Step 7	Select the preferred alternative & conduct public review and obtain comments
Step 8	Prepare Record of Decision
Step 9	Monitor and evaluate

C. Planning Area Boundary

Total acreage within the Roan Plateau planning boundary is 126,665 acres. The plan will amend the management of 73,367 acres (68,447surface and 4,455 sub-surface acres) of public lands managed by the GSFO and the White River Field Office (WRFO) within Garfield County (73, 047 acres) and Rio Blanco County (320 acres). The planning area (Appendix A Map 1 and 2) is generally bounded on the east by Colorado State Highway 13, on the south by the Colorado River, on the west by Parachute Creek, and on the north by the Rio Blanco Country line with Garfield Country, all within the State of Colorado. The escarpment, known as the Roan Cliffs, marks the boundary between ”above the rim” and “below the rim”.

Not all land within the planning area boundary is public land managed by the BLM. The BLM includes these lands out of recognition that BLM land use decisions may affect non-BLM lands and the activities that occur there, as well as possibly being affected by activities on those neighboring lands. The final Roan Plateau area RMP amendment will make decisions for BLM administered public lands only.

D. Planning Area Description

The Roan Plateau refers to a geologic uplift extending from north of Parachute, Colorado, to north of Rifle, Colorado. The Plateau rests atop large natural gas and oil shale formations. Elevations range from approximately 5,000 feet in the valley floor to over 9,000 feet on top of the Plateau. Steep, near vertical, talus cliffs on the south and east sides guard the Roan Plateau. Above the cliffs rests a rolling plateau covered by shrublands and aspen woodlands, small steams, and meandering roadways. Below the cliffs, rugged ridges covered by pinyon and juniper woodlands and shrublands lead into flatter mesas. This diverse landscape is home to a variety of wildlife, fish and oil shale endemic plants.

Native Americans of the Ute Indian Tribe raised horses on the Roan Plateau prior to European settlement, a practice that led to the Roan Plateau name. Remnants of that herd provided horses for early settlers who worked to improve bloodlines and harvested stock each fall for sale. A long and colorful history of sheep and cattle grazing, dating from the 1880s, continues today.

These days, the Roan Plateau area also serves as an extended backyard for local communities. Higher elevations offer escape from heat and the urbanized valley in summer; lower elevations offer escape from snow and cold in winter. The top is marked by wildflowers during the spring, grazing cattle during the summer, hunters during the fall, a few snowmobile tracks in the winter. Human activity is visible throughout the landscape with gas field developments on the south, off-highway vehicle (OHV) riding areas on the east, and scattered roads and grazing projects on top.

E. Management History of Naval Oil Shale Reserve

The NOSRs 1 and 3 were withdrawn from the public domain by a series of Executive Orders (NOSR 1 in 1916 and modified in 1919, and NOSR 3 in 1924) to provide a future source of oil for national defense. A Cooperative Agreement was signed in 1935, between the Secretary of the Navy and the Secretary of the Interior, for administration of NOSR 1 and 3. The agreement was superseded by a Cooperative Agreement in 1966 for the administration of surface resource management programs.

The Department of Energy assumed jurisdiction and overall management responsibility for the NOSRs in 1977, pursuant to the Department of Energy (DOE) Organization Act, Pubic Law No. 95-91. In 1987 a Memorandum of Understanding (MOU) was signed between the DOE and the BLM. The MOU provided for BLM custodial administration of surface resources so multiple use of the lands is maintained and resource values prevented from declining, provided that such usage does not interfere with other DOE obligations. The MOU recognized both DOE's need for surface management and BLM's expertise in surface resource management, and required the development of an Operational Management Plan (OMP). In 1988 an OMP was signed that defined administrative procedures and resource management direction for BLM custodial management of surface uses on DOE's behalf.

In 1997, while the GSFO was working on the Oil and Gas Leasing and Development Supplemental Environmental Impact Statement (SEIS), Congress passed Public Law 105-85. The Department of Defense Authorization Act of 1998, Public Law 105-85, mandated that the oil and gas reserves of the developed portion of NOSR 3 be offered for lease by November 18, 1998. Since it was in proximity and had a physical

nature similar to surrounding BLM land, the GSFO included the developed portion (Appendix A Map 3) in the SEIS. For the remaining portion of NOSR 3 that is outside of the production area and NOSR 1 (top of the Roan Plateau), the decision on which lands will be available for leasing were deferred to a coordinated land use planning process. However, because of the intermingled character of the transferred and non-transferred lands below the rim, the Final SEIS analyzed and established surface use mitigation measures for all public lands below the Roan Plateau rim.

Public Law 105-85 also stated that the transferred lands be managed in accordance with the FLPMA of 1976 and other laws applicable to public lands. However, BLM cooperatively managed surface uses when the GSFO completed its RMP in 1984 (Revised 1988). In fact, the OMP stated; "DOE development of hydrocarbon resources of the NOSRs shall have priority over all other programs." Consequently, the GSRA RMP only applied surface management direction in accordance with the OMP. Now that NOSR 1 and 3 are public lands under the administration of the BLM, the GSFO managed them in accordance with the FLPMA of 1976, other laws applicable to public lands and supplementary BLM guidance.

The same is true for public lands north of Trapper Creek that are administered by the WRFO (Appendix A Map 3). For planning and management efficiencies, resource management direction set forth in the 1996 White River Resource Area (WRRA) RMP, in accordance with the OMP, will be reviewed and perhaps amended through the BLM's coordinated land use planning process.

Outside of the production area, BLM is generally managing the transferred lands much like they have always been managed under the OMP with DOE. Under BLM administration several changes have occurred including:

1. Rangeland Standards and Guidelines for Livestock Grazing (http://www.co.blm.gov/standguide.htm and Appendix B Figure 1). In February 1997, the Standards for Public Land Health and Guidelines for Livestock Grazing Management Environmental Assessment, Finding of No Significant Impact and Decision Record for the State of Colorado were approved by the Secretary of Interior. The action amended RMPs within the state, including the GSRA RMP of 1984 (revised 1988) and the WRRA RMP of 1996, by adopting the standard and guidelines. The Standards describe natural resource conditions that are needed to sustain public land health. The Standards encompass upland soils; riparian systems; plant and animal communities; special, threatened, and endangered species; and water quality. The Standards relate to all uses of the public lands. Land health assessments for compliance with Colorado health standards were conducted on the Roan Plateau in 1999 and on the eastern side of the planning area in 2001.

Land use plans must identify how land health standards are to be considered in relationship to management prescriptions. Some actions, by their very nature, will have an adverse effect on attainment of land health standards at some spatial scales (e.g., road or trail construction, or developed recreation sites). The planning process will address under what conditions such adverse effects are permissible and at what spatial and temporal scale attainment is determined. The land use plan may determine that certain land health standards be applied and evaluated on a relatively broad spatial scale and over a long timeframe.

2. Citizen Wilderness Proposal. The Roan Plateau contains 40,424 acres that has been identified as part of the Citizens Wilderness Proposal. According to a 1997 Instruction Memorandum No. CO-97-044; "It is our (Colorado BLM) policy to hold discretionary actions that might have irreversible or irretrievable impacts temporarily in abeyance in accordance with the schedule contained in this memorandum until the wilderness issues raised by the Colorado Environmental Coalition are addressed and resolved through the BLM planning process." Subsequent to the GSFO wilderness character and roadlessness

review (see AMS 9 - Summary for Wilderness Suitability) the GSFO is managing East Fork, Northeast Cliff and the Southeast Cliff Units to prevent irreversible and irretrievable impacts and to maintain present natural and supplemental values so as not to impair suitability until the RMP amendment is completed.

3. The 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. Leasing decisions were made for the production area. Lease stipulations and mitigation measures, designed to avoid or minimize environmental impacts, were outlined for public lands below the Roan Plateau rim. Although the lease stipulations and COAs were developed to apply to oil and gas leasing and development, it is intended that the same or similar measures will be applied to other public land uses in order to maintain or achieve the same resource conditions and to assure equitable treatment to all public lands users. Additional administrative measures may be needed to determine how to best apply comparable measures to other uses.

4. Travel Management. The GSRA RMP and the OMP did not set travel designations on NOSR lands. After the transfer, route inventories were conducted and the Roan Plateau Map and Visitor Guide was published in 1998 (reprinted in 1999). Public comment was also requested on the travel routes. No public comments were received on the routes available for travel. In 2000, following a lack of comment and the completion of the roadless review inventory (see AMS 9 - Summary for Wilderness Suitability), the BLM temporary designated the existing routes as open. Interim travel designations (Federal Register: July 3, 2000, Volume 65, Number 128, Pages 41081 – 41082) were put in place and the visitor guide was reprinted. Interim travel designations were necessary because there were no travel decisions made for the transferred lands. The interim designations were a temporary measure to prevent the proliferation of roads and trails caused by unplanned cross-country travel and to allow time for open, careful discussion about travel designations through the integrated planning process. To protect resources, motorized and mechanized travel, except snowmobiles operating on snow, are limited to designated routes year-round.

F. Additional Public Lands within the Planning Area

Although the transferred lands are the principle motivation to amend the GSRA RMP and the WRRA RMP, additional issues needed to be addressed on the adjacent public lands. These include: new information from the recent inventory of wilderness character and roadlessness, new information from land health assessments, and the need to address the changing uses on the surrounding public lands. The planning process will review current land use decisions and directions and develop a coordinated management strategy for these lands too.

G. Other Plans, Policies and Programs

The BLM works with counties on issues of mutual concern. Garfield, Mesa and Rio Blanco Counties have comprehensive plans developed to provide a general statement of direction for land use in unincorporated portions of the counties. The City of Rifle also has land use regulations within city limits.

The Colorado Division of Wildlife (CDOW) is responsible for maintaining the state's big game herds at population levels that have been determined through a public review process. The Colorado Wildlife Commission approves population objectives. Big game populations are managed as a group or a herd, which is called a Data Analysis Unit (DAU) or herd unit. Normally each DAU is composed of several game management units (GMUs). The planning area is almost entirely in GMU 32. The BLM cooperates with the CDOW on actions that affect wildlife habitat and wildlife.

BLM consults with the U.S. Fish and Wildlife Service (USFWS) under terms of section 7(c) of the Endangered Species Act of 1973, as amended. The BLM has also entered into a Memorandum of Agreement (MOA) with the FWS, and the U.S.D.A. Forest Service to improve the efficiency and effectiveness of plan-level Section 7 consultation processes under the ESA. Through this MOA, the BLM agrees to promote the conservation of candidate, proposed, and listed species and to informally and formally consult/confer on listed and proposed species and designated and proposed critical habitat during planning (1) to assure that activities implemented under these plans minimize or avoid adverse impacts to such species and any critical habitat; (2) to assure that such activities implemented under these plans do not preclude future conservation opportunities; (3) to use, where possible, formal conference procedures specified in 50 CFR 402 to avoid conflicts between elements contained in plans and the requirements for conservation of the proposed species and proposed critical habitat; and (4) to analyze the effects of the plan on candidate species pursuant to agency planning requirements.

BLM has a MOU with the Colorado Oil and Gas Conservation Commission (COGCC) and a long-standing, day-to-day working relationship with the COGCC staff. The working relationship consists of regular communication related to the technical requirements for drilling wells. These include spacing of wells, draining oil and gas reservoirs, and analysis and mitigation of impacts on groundwater. The basis of the relationship is COGCC's authority over oil and gas operations in the State of Colorado.

In cases of split estate, BLM leases federal minerals that lie beneath private surface. 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 on-site inspection and his needs and desires are considered in development of the lease. BLM has the same authority to require mitigation on private surface as it does on federal lands. This ensures the private landowners of protection when the federal minerals are extracted.

H. Special Management Determinations

According to the BLM Handbook, H-1601-1 – Land Use Planning Handbook (http://www.blm.gov/nhp/efoia/wo/handbook/h1601-1.pdf), and consistent with the goals, standards and objectives for the planning area, the BLM, will make the following special management area determinations:

- Designate Wilderness Study Areas (WSAs) to be managed under the interim management policy (H-8550-1) and dentify management direction for WSAs should they be released from wilderness consideration by Congress.
- Determine which eligible river segments are suitable for inclusion in the National Wild and Scenic River System based on criteria specified in the Wild and Scenic Rivers Act and agency guidelines.
- Designate ACECs and identify goals, standards, and objectives for each area, as well as general management practices and uses, including necessary constraints and mitigation measures (see BLM Manual 1613). ACECs are areas of public land where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards. ACECs are BLM administrative designations. ACECs must meet the relevance and importance criteria in 43 CFR 1610.7-2 (b) and must require special management to: 1) Protect the area and prevent irreparable damage to resources or natural systems, 2) Protect life and promote safety in areas where natural hazards exist.
- Designate Research Natural Areas and Outstanding Natural Areas as types of ACECs using the ACEC designation process.
- Designate Back Country Byways, Watchable Wildlife Viewing Sites, or other BLM administrative designations.
- Designate Special Recreation Management Areas (SRMAs), an administrative designation that denotes where recreation is a principal management focus and more intensive recreation management and investment may be needed.

I. Scoping Results

Table I-1 summarizes the results of public scoping and planning team review of the Roan Plateau area.

Table I-1. Roan Plateau Area – Summary of Planning Issues and Related Topics	
Major Issues	• Oil and Gas Development • Wilderness and Roadless Areas • Recreational Opportunities • Travel and Transportation • The Influences of Changing Population, Growth and Development to Public Lands • Fish and Wildlife Habitat • Livestock Grazing Management • Visual Aesthetics • Economic Benefits from Gas Leasing, Grazing, Recreation and/or Tourism • Ecological Richness/Uniqueness/Diversity
Related Topics	• Watershed/Water Resources/Water Pollution • Vegetation/Forest Management • Air Quality • Local Quality of Life/Livelihoods • Loss of Traditional Uses and Activities • Maintaining the Current Activities, Setting and Management • Areas/Routes Open for Motorized Use, Mountain Bikes/Seasonal Restrictions • Protection of Rare and Sensitive Species • Protection of Natural Features • Protection of Paleontological/Archeological Resources • Wildland Fire and Prescribe Fire Management • Conflicts between Users • Rights-of-Ways, Communication Sites, Utility Corridors • Reclamation of Un-needed Routes, Improvements, and Human Impacts • Meeting Land Health Standards • Livestock Grazing Carrying Capacity and Conflicts • Soils/Erosion • Reclamation of Spent Shale Pile and Department of Energy Facilities
Implementation Topics	• Connecting Trails to Rifle • Level of Maintenance on Routes • Recreational Facilities • Signing • Litter and Trash Dumping • Livestock Distribution and Improvements • Enforcement of Regulations • Gas Development Spacing, Directional Drilling and Stipulations • Partnerships/Involving Users in Implementation • Habitat Improvement Projects • Gas Development Mitigation
Related Planning Topics	• Reconfirming existing Land Use Plan Decisions • Multiple-Use Management • Increased and Changing Demands of Public Lands • Sustainability • Cumulative Impact of Gas Development • Balance of Recreational Opportunities • Intent of Transfer Legislation • Revision of Reasonable Foreseeable Development Scenario for Gas Development

AMS-1 SUMMARY FOR FLUID MINERALS

1.1 Existing Management Plans and Guidance

The objective for fluid minerals in the GSRA from the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment, for public lands below the Roan Plateau Rim, is: *"To facilitate orderly, economic, and environmentally sound exploration and development of oil and gas resources using balanced multiple-use management".* The GSFO did not propose changes to the major decisions in the FEIS, namely that: 1) the entire Federal mineral estate in the GSRA (now including portions of the NOSR), except Wilderness Study Areas (WSAs), would be open for oil and gas leasing and development; 2) BLM would apply lease stipulations and lease notices as appropriate to all new leases, and 3) BLM will develop appropriate Conditions of Approval (COAs) for all Applications for Permit to Drill (APDs) for leases issued prior to the FEIS, provided the COAs are consistent with lease rights granted.

The oil and gas objective for the WRRA as described in the 1996 WRRA RMP is to*;" Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values."*

1.2 Current Management

In accordance with the 1920 Mineral Leasing Act, and subsequent amendments, BLM holds quarterly lease sales of the oil and gas mineral estate. These quarterly lease sales are for all BLM resource areas within Colorado.

Current natural gas development is in conjunction with prior existing lease rights and the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. There are no Federal oil and gas leases above the rim of the Roan Plateau because the Department of Navy and the DOE did not have the authority to issue oil/gas leases within NOSR 1 and 3. For the acreage of NOSR 3 that is outside of the production area and for NOSR 1, the decision on lands available for leasing was deferred to this land use planning process.

The 1999 GSRA Oil and Gas Leasing and Development ROD set up the geographic area proposal (GAP) process to address site-specific and cumulative environmental impacts associated with oil and gas development within a defined geographic area proposed for development. The GSFO completed the Wheeler to Webster GAP (BLM GSFO EA # CO-140-2001-048, July 2002) addressing the drilling of 160 proposed vertical and directional conventional gas wells on public lands.

As per planning criteria, the Roan Plateau planning process will review the validity of the (RFD) Reasonable Foreseeable Development for the Production Area made in the 1999 Oil and Gas Leasing and Development FSEIS and determine if a new RFD is necessary. It will also establish a new RFD for the planning area that includes; the un-leased transferred lands, the production area, and the remaining public lands including public lands administered by the WRFO.

1.3 Characteristics and Setting

Gas. The reserves outside the boundaries of the NOSR 1and unleased portions of NOSR 3 are proven. The NOSR tracts have the same geologic zones as the adjacent producing gas wells and therefore it is reasonable to expect that some of the adjacent production zones extend north into the NOSRs. No Federal oil and gas development has taken place above the rim. There are approximately 24 old oil shale exploratory drilling pads used for exploring the oil shale reserves and for hydrological investigations. These old drilling pads are commonly mistaken for oil and gas exploration well pads. Barrett Resources drilled and developed

7 gas wells on private lands in the early 1990's. Production results have been minimal and no wells have been drilled since then**.**

Regionally, the planning area is near the eastern edge of the Piceance Basin and near the prominent Grand Hogback monoclinal feature to the east. The area has a high to very high potential for oil and gas development. These resources occur primarily within the lenticular, fluvial sandstone beds within the Wasatch and Mesa Verde Formations at depths of around 3,000 to 8,000 feet. On the Roan Plateau, they would occur around 2,000 to 3,000 feet deeper.

In the early 1980's, private companies began to develop natural gas reserves in the Rulison, Parachute and Grand Valley Fields, just outside of NOSR 3. In 1985, to protect Federal gas resources from drainage, DOE initiated its own drilling program. DOE drilled 24 wells and entered into joint ownership or communitization agreements with private developers for some 25 -30 additional wells. The wells in which the U.S. holds an interest are located along the southern boundary of the reserve. This area is referred to in the Defense Authorization Act (DAA) for fiscal year 1998 (DAA) as the “developed tract of NOSR 3"

Within the Roan Plateau planning boundary there are approximately 524 Federal or Fee (minerals owned by private individuals or companies) gas wells (Appendix A Map 4) in some form of status (COGCC data, June 2002). The principle operator within the Roan Plateau planning boundary is Williams Production. Williams is developing acreage (both Fee and Federal) on the lower area at approved well densities of 20 subsurface acres. A pilot project for 10-acre subsurface well densities is currently underway on Fee acreage.

Since 1992, new leases offered in the GSFO have been limited, about one a year, because most of the prospectively promising oil and gas areas are already leased. There are about 70,000 acres of public minerals available for oil and gas development. Of that, 10,270 are currently leased. In May of 1999 Barrett Resources leased 8,389 acres of NOSR 3. Current activity is centralized within the Parachute, Grand Valley, and Rulison Fields operated by Williams. The main target for natural gas development is the Williams Fork Formation (Mesa Verde equivalent) due to greater pay sections, permeability and porosity.

There is very little development activity in the WRRA. Tom Brown, Inc is active developing the Williams Fork formation in the White River dome area west of Meeker, Colorado, and Exxon-Mobil is working in the Mesa Verde Group of the Piceance Creek Unit. South of the Exxon-Mobil activity (12-18 miles north of the Roan Plateau planning area) there are no current oil/gas operations.

Coal Bed Methane. The primary formation within this area would be the Mesaverde Cameo Coal Zone at depths in excess of 6,000’. The cumulative coal thickness in the area is ~ 50-70 feet. Currently, 5,000’ is the maximum coal bed depth for economic methane production. The deeper coals are not considered economic because they tend to be more plastic and have low permeabilities. Production is generally not economic at depths below 5,500’. However, it should be noted that (Coal Bed Methane Resources of Colorado, 1984) shows that the entire Roan Plateau area is considered to have a high potential for coal bed methane occurrence (> 400 cu ft gas per ton).

1.4 Resource Condition and Capabilities Evaluation

Gas. The area has a high to very high potential for oil and gas development. These resources occur primarily within the lenticular, fluvial sandstone beds within the Wasatch and Mesa Verde Formations are at depths of around 3,000 to 8,000 feet. Above the rim, they would occur around 2,000 to 3,000 feet deeper. Some natural gas can also be found within the Upper Jurassic Morrison Formation and the Cretaceous Dakota Sandstone, however these are generally considered too deep under current conditions.

The planning area contains 73,398 acres of Federal mineral reserve. The average reserves for Wasatch and Mesaverde wells are estimated to be .7 BCF and 1.5 BCF, respectively. Combined Federal/Fee Reserve estimates within the Roan boundary include 9,499 Bcf for the Mesa Verde zone at 20 acre spacing and 554 Bcf for the secondary target Wasatch zone at 160 acre spacing. Total Federal reserve estimates are 5,505 Bcf and 331 Bcf respectively. The general spacing for the Mesaverde is 20 acres while the Wasatch is 160 acres. Williams is currently piloting a 10-acre spacing project on private lands.

Coal Bed Methane. The entire Roan Plateau area is considered to have a high potential (Coal Bed Methane Resources of Colorado, 1984) for coal bed methane occurrence (> 400 cubic feet gas per ton). The primary formation within the Roan Plateau boundary is the Mesa Verde Cameo Coal zone at depths in excess of 6000 feet. Currently, the maximum depth for economic coal bed methane production is around 5000 feet. Accordingly, although the resource potential for occurrence in this area is quite high, the current development potential is considered low based on current available technology and markets.

1.5 Opportunities

- Increase direct local employment.
- Increase local income and employment through purchases from local businesses and contractor.
- Additional purchases from local businesses by company employees.
- Increase tax base from royalties redistributed to Garfield County.
- Increase property tax revenues.
- Reduce the cost of development economic by removing BLM current surface stipulations.
- Increase the supply of natural gas to meet demands.
- Decide how much of the area will be made available to leasing and the stipulations to be applied.

Gas Well – Production Area

1.6 Additional Information

Additional information on fluid minerals management can be found at:

http://www.co.blm.gov/oilandgas/oilgas.htm.
http://www.co.blm.gov/oilandgas/leasinfo.htm.
http://www.co.blm.gov/pdf/glsfoeis.pdf.

AMS-2 SUMMARY FOR SOLID MINERALS

2.1 Management Plans and Documents

The minerals management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau rim, is: *"To maintain the maximum amount of public land available for exploration and development of minerals".*

The oil shale management objective in the WRRA, as described in the 1996 WRRA RMP, is to: *"Provide for a prudent and planned future leasing and development program for the oil shale resource."* The coal management objective is to; *"Ensure that federal coal resources identified as acceptable for further consideration for coal leasing, are available for exploration, leasing and development."* The mineral materials management objective is to: *"Facilitate the orderly and environmentally sound development of mineral material resources".* The locatable minerals management is to; "*Ensure that lands containing locatable minerals are available for location under the Mining Law of 1872".*

2.2 Current Management

Solid Minerals. Within the GSRA, mineral exploration and development on lands not withdrawn for other uses or restricted to mineral activity is allowed. Withdrawals are pursued on lands where locatable mineral development is not compatible with other uses. Constraints have been placed on mineral activities to protect high value recreation resources, wilderness resources, critical wildlife habitat, and water resources (critical watersheds).

Within the WRRA, public lands are identified to ensure mineral resources are available for exploration, leasing and development. All permitted activities are monitored to assure compliance with lease stipulations and mitigating requirements (conditions of approval), developed in an environmental analysis. Actions must conform to the laws and regulations associated with mineral programs.

2.3 Characteristics and Setting

The solid mineral resources known to exist include oil shale, coal and mineral materials. The sodium minerals, which exist to the north, are believed to pinch out in this area.

Geology. The Piceance Basin is upper Mesozoic to lower Cenozoic in age. Regionally, the planning area is near the eastern edge of the Piceance Basin and near the prominent Grand Hogback monoclinal feature to the east. The surficial geology of the NOSR areas consists primarily of the Eocene Period Uinta and Green River Formations. These formations are approximately 40 to + 50 million years of age. The Wasatch (Debeque) Formation outcrops primarily in the valley floor and the foothills. Geology relating to specific minerals is included in the sections below.

Oil Shale. The Parachute Creek Member of the Green River Formation is about 900 to 1,200 feet thick in this area and is the primary oil shale unit of interest. For this reason, the withdrawal covers those lands that contain the Parachute Creek Member. It consists of black, dark-brown, and dark gray, commonly laminated marlstone, which weathers to a light gray. The upper part of the member contains the thickest and richest oil-shale beds, and would be of the most economic interest. The 2-6 foot thick Mahogany bed is a persistent bed of very rich oil shale within the Mahogany zone, which forms a sheer 80-100 foot thick cliff or ledge of rich oil shale within the upper part of the Parachute Creek Member.

The richer oil shales in the area occur within the Parachute Creek Member of the Green River Formation, although some do also occur in the Garden Gulch Member. Qal Quaternary alluvium also occurs within the

area and the Tertiary Wasatch (DeBeque) Formation outcrops along the side of the cliffs and foothills within the area. Additionally, although there are deposits of oil shale resources within the NOSR #1, they are actually several miles south of the thicker ~1,000 ft thick of 25 gal of oil per ton deposits to the north within the basin. The NOSR #1 contains a continuous oil shale section that averages around 120 ft thick of 25 gal of oil per ton. There are, however, considerable private holdings of oil shale lands with good access, located primarily along the southern cliffs within the region.

The oil shale sequence within the Parachute Creek Member consists of alternating rich and lean zones. All zones are not present throughout the area. The Mahogany zone is considered the richest of the zones in this area. NOSR 3 has essentially no oil shale resources within its boundaries. It contains reserves of 18 billion barrels (bbls) of > 15 (gallon per ton) gpt shale and 6 billion bbls of > 25 gpt shale. In 1998, the USGS estimated that 2 to 3 billion bbls might be recoverable given the then current technology. There have been several projects for oil shale development in this area; however, none of these have been successful on a sustained commercial scale.

Sodium. The potential for any occurrence of nacholite and dawsonite at depth is considered to be negligible within the planning area, as the rich sodium resources to the north pinch out to the south. The (former) NOSRs are actually several miles south of the rich deposits of these minerals within the basin.

Coal. Although in excess of 6,000' depths, throughout this region, coal bearing strata of potential economic interest occurs primarily within the nonmarine rocks of Late Cretaceous age that overlie the Mancos Shale. The primary formation within this area would be the Mesaverde (Cameo Coal Zone). The cumulative coal thickness in the area is ~ 50-70 feet.

Mineral Materials. Some occurrences of sand and gravel, rip-rap or flagstone type materials may exist on a limited scale, however, there are no designated mineral materials sites on public lands.

Locatables. No locatable minerals are known to exist. No currently active mining claims were found in the records. There had been hundreds of claims located prior to 1920 for oil shale within the area, however they have all since been patented or extinguished through the years. The oil shale withdrawal as noted in the GSRA RMP (outside NOSR #1 and #3) was revoked in 2002 (see AMS 23 - Summary for Lands and Realty Actions).

2.4 Resource Condition and Capabilities Evaluation

Oil Shale. In the WRFO, Shell Oil is conducting an experimental operation to the northeast of the NOSRs. Currently, they are experimenting with heaters in drill holes to heat, release and capture the oil. Their drill hole spacing density would be from 10-40'. The heating wells would surround the production well. They are capable of ~2,000' depth range (currently around 1,000'). The life of a well would be about 10 years. Shell Oil has access to ~ 20,000 acres and are in the process of exchanging 5,500 acres for 3,500 BLM (flatter terrain).

Currently, there are about 33,400 federal acres above the rim that contain oil shale resources. Roughly 15,400 acres are not subject to any special stipulations. There are no oil shale leasing provisions currently in place. Additionally, there may be no further consideration of commercial scale leasing until development of the existing leases. Given the current economics of mining and development, the overall potential for any economic development of these resources within the foreseeable future (~15 years) is considered to be low. The oil shale withdrawal outside of the NOSRs, as noted in the GSRA RMP was revoked in 2002 (see AMS 23 - Summary for Lands and Realty Actions).

Coal. Even though the potential for considerable occurrences at depth is high, the current economic potential for mining is considered low as these depths (>6,000' below the rim), which currently exceed those considered necessary under current conventional mining methods (<3,000'). Much more accessible coal resources are available throughout the region.

Mineral Materials. Although some varieties of sand and gravel, rip rap or flagstone type materials might exist on a limited scale, the distance to market and limited access above the rim and possibly conflicting higher resource uses, would probably preclude most marketability within the foreseeable future. The exceptions to this would possibly be above the rim uses for roads, range improvements, oil and gas activities, etc.

Locatables. Due to a low potential, any activity associated with locatable minerals is projected to be minimal**.**

Soda Ash and Sodium Bicarbonate. In the WRRA, in October 2000, American Soda, L.L.P. began producing soda ash and sodium bicarbonate from a nahcolite deposit in Rio Blanco County. The company built a state-of-the-art solution mine, a 71-km dual pipeline, a processing plant, and a railroad spur to produce and ship its sodium products. The mine and plant have a designed production capacity of 900,000 tn/yr of soda ash and 140,000 tn/yr year of sodium bicarbonate (USGS Minerals Yearbook – 2000 available at: http://minerals.usgs.gov/minerals/pubs/state/980801.pdf.

The potential for any occurrence of nacholite and dawsonite at depth in the GSFO is considered to be negligible, as the rich sodium resources to the north pinch out to the south. The former NOSRs are actually several miles south of the rich deposits of these minerals within the basin.

2.5 Opportunities

- The oil shale resource should be protected from the impacts of gas well development by a requirement to set and cement surface casing through the oil shale interval.
- ACECs, etc. could be proposed for protective withdrawals, which would preclude any further mining claim locations and activities.
- Special management areas should be closed for mineral material disposal. The remaining areas should remain available for possible sales on a discretionary basis.

AMS-3 SUMMARY FOR RECREATION

3.1 Management Plans and Documents

The recreation resource management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau Rim, is*; "To ensure the continued availability of outdoor recreational opportunities which the public seeks and which are not readily available from other sources, to reduce the impacts of recreational use on fragile and unique resource values, and to provide for visitor safety*." The GSRA RMP did not address recreational use on NOSR lands except the now abandoned Anvil Points developed recreation site (camping area).

The recreation objective within the WRRA, as described in the 1996 WRRA RMP, is to; *"Provide a broad spectrum and diversity of recreation opportunities to meet expected demand by: 1) providing services to the visiting public; 2) maintaining high quality facilities to meet public needs and demand; and 3) improving public understanding and support of BLM programs through communication and partnerships."*

The recreation objective, as outlined in the OMP, for NOSR 1 and 3 is for; "*Minimal recreation management measures will be taken to prevent deterioration of the soils and vegetation, habitat for fish and wildlife, aesthetic values of the NOSRs, and to protect DOE property and employees of DOE and DOE contractors."*

3.2 Current Management

From 1935 to 1977 the BLM provided custodial surface management of NOSR lands under a cooperative agreement with the Department of the Navy. When the DOE assumed jurisdiction in 1977, they requested that BLM continue to manage surface activities like recreation.

A 1987 Memorandum of Understanding (MOU) with DOE provided funding for some surface resources but not recreation. As a result, minimal recreation administration was done. The NOSR Operational Management Plan of 1988 stated that recreational activities should be managed under accepted BLM recreation management principles. The Operational Management Plan described the recreational objective as: "*Minimal recreation management measures will be taken to prevent deterioration of the soils and vegetation, habitat for fish and wildlife, aesthetic values of the NOSRs, and to protect DOE property and employees of DOE or DOE contractors."*

For public lands below the Roan Plateau rim, no special recreation management areas (SRMAs) have been designated. A SRMA is an administrative designation that denotes where recreation is a principal management focus and more intensive recreation management and investment may be needed. Anything not designated as an SRMA, by default, becomes part of an extensive recreation management area (ERMA). ERMAs are where limited commitment of resources is required to provide unstructured, dispersed recreation activities. Visitors who want to avoid areas of intensive recreational activities prefer ERMAs.

The GSRA RMP management direction was to; "*Manage ERMAs to provide visitor information, minimal sanitation facilities, and access. Also manage ERMAs to resolve management issues and for off-road vehicle use".*

The entire WRRA is managed as the White River ERMA and is managed custodially to provide unstructured recreation opportunities. Specific management can be developed in project plans, or integrated activity plans. Resources would be managed and monitored, to ensure protection of sensitive resources, and continued availability of recreation opportunities and experiences.

The Roan Plateau (above the rim) is managed custodially by both the GSFO and the WRFO, to provide unstructured recreation opportunities, as before under the MOU.

Additional recreation management guidance was provided to BLM Field Offices by the 2000 Recreation Guidelines to meet Public Land Health Standards (http://www.co.blm.gov/rguideline/guidrv12.htm and Appendix B Figure 2). Since the land health standards relate to all uses of the public lands, including recreational use, Colorado BLM has prepared recreation guidelines. The guidelines provide tools, methods, and techniques that can be used by managers to maintain or meet the land health standards as they implement various recreation programs.

The Colorado Division of Wildlife (CDOW) manages fish and wildlife resources related to hunting and fishing. The BLM works in close coordination with the CDOW and others to manage hunting and fishing activities.

3.3 Characteristics and Setting

Recreation Overview - Above the Rim. A 1973 report to the Secretary of Defense noted that a large majority of visitors come for the purpose of big game hunting. An increasing number of visitors enjoyed the scenery and natural beauty while camping, scenic driving, rockhounding and hiking. The report also noted that snowmobiling may become popular as greater recreational demands are anticipated in the near future.

The recreation capability analysis for the 1984 RMP did include NOSR lands. The NOSR Capability Unit was estimated to receive 3,100 recreation visits annually, mostly associated with hunting. Visitor use was expected to rise as the local communities grew. High values for viewing scenery and moderate values for hunting, wildlife viewing, hiking, site-seeing and general dispersed recreation were recognized. Visitors had expressed a preference for more primitive type settings while hunters were identified to have a preference for

a variety of primitive and roaded settings. The capability analysis concluded that as a result having roaded natural settings with a limited amount of more primitive type settings, it would be impossible to provide the desired backcountry settings and activities. Management actions followed an ERMA philosophy and the GSFO basically maintained the existing settings to meet visitor preferences as closely as possible.

A somewhat contradicting 1991 DOE Environmental Assessment for the Proposed Natural Gas Protection Program for Naval Oil Shale Reserves Nos. 1 and 3 gave little recognition to non-hunting recreational values. It stated; *The primary recreational use of the NOSRs is for mule deer hunting. Other types of recreation include off-road vehicle use (snowmobiles, motorcycles and four-wheel drive vehicles) and sightseeing. Due to other nearby mountainous areas, fishing and camping are relatively unimportant on the Reserves.*

Public lands currently provide opportunities for dispersed recreational activities in a variety of settings from backcountry to rural (Appendix B Figure 3). Public participation indicates that the Roan Plateau is now an important supplier of all these activities. Scoping indicates that many people want to see little if any change in the current activities, settings, or outcomes provided on the Roan Plateau. Especially when it involves a decrease in motorized travel and access.

Since the 1997 transfer of jurisdiction to the BLM, the GSFO has taken a more active role in managing and monitoring recreation in the Roan Plateau area. The GSFO produced a visitors guide and map for the Roan Plateau, improved signage, sponsored clean-ups, conducted route inventories and increased visitor patrols. Generally, the GSFO continues to prescribe an ERMA philosophy to the entire planning area.

The current numbers of visitors are not known. Dispersed, unstructured activities typify the recreational activities such as; fishing, hiking, camping, birding, site-seeing, biking, OHV/ATV riding and snowmobiling are all popular today. Big game hunting remains the most popular activity. As a dispersed recreational activity hunting is not limited to specific areas. However, in some areas, like on top of the Plateau and along the adjoining side slopes, hunting becomes concentrated because of prime big game habitat. Two outfitters are permitted by the GSFO to offer big game hunting and some summer sight-seeing /fishing trips.

The landscape looks generally natural even though numerous vehicle routes bisect the Roan Plateau. The creek bottoms and forested side hills offer the best opportunities to be removed from human activity. No developed facilities exist. Primitive dispersed campsites abound. The level of visitor management and regulation is low. Visitor services consist of informational signing at a few key locations, route signing and a visitor brochure/map.

The evidence of and the sights and sounds from other visitors/users remains low. The social setting, especially during the hunting season, has gotten more crowded over time but still remains less crowded than the surrounding public lands. This is probably due to its geographic isolation and the existence of only two public access roads; the JQS Road from the Town of Rifle and the Cow Creek from the north (see Appendix A Map 6 and AMS 4 - Summary for Travel, Access and Transportation).

No visitor surveys have been conducted so little is known of the specific needs of visitors. Scoping indicated the current physical, social and administrative setting and activities offers opportunities to; experience solitude, enjoy natural aesthetics, experience the challenge of driving on rough backcountry roads, rest mentally and physically and maintain an outdoor oriented lifestyle. In addition to these social benefits scoping indicated that hunting and motorized sports provide positive economic contributions to the local economy.

Recreation Overview - Below the Rim. Outside of the gas production area, the foothills of Roan Plateau have a high degree of naturalness, offer opportunities for solitude and have only few public vehicle access points because of terrain and private property (see AMS 9 - Wilderness Suitability). Livestock and game trails offer minimal access into this arduous country and consequently it is gets little visitation.

The lowlands are a sharp contrast to the Roan Plateau sidehills. The area is a popular local destination and used yearround. Dispersed, unstructured activities typify the recreational activities. Activities include; OHV riding and mountain biking, camping, hiking, horseback riding, hunting, target shooting and partying.

The landscape below is visually and physically much more modified by visitor use and traversed with by many rough two-track and single-track vehicle routes. Undeveloped, dispersed campsites abound. No developed facilities exist. The level of visitor management and regulation is low. Informational signing is in place at a few key locations. Interaction among visitors/users is higher than on top of the Roan Plateau. Recreation conflicts are emerging between; adjacent landowners, livestock operators, and between single-track trail users and two-track vehicles.

Motorsports activities are dispersed throughout the area, however, Hubbard Mesa; probably because of terrain, accessibility and proximately to Rifle, has been the dominant use area. Several mountain biking events have been sponsored in the Hubbard Gulch area.

Target shooting occurs mostly in the Hubbard Mesa area. Concerns and complaints by visitors and neighbors are often centered on unsafe and indiscriminate shooting and the trash left behind by shooters. The Rifle Gun Club operates a private shooting range two miles northeast of Rifle off County Road 244. The Rifle Gun Club has requested an expansion of the range to accommodate longer shooting distances.

No visitor surveys have been conducted so little is known of the specific needs of visitors. Scoping indicated that the lowlands are an important close to town area where users can go and escape everyday responsibilities for a while, enjoy outdoor activities, and experience the challenges of both motorized and non-motorized recreation. In addition to these social benefits scoping indicated that hunting and motorized sports provide positive economic contributions to the local economy.

No use statistics exist but all stakeholders agree that recreational use continues to increase with the growing local population, increased marketing, and by word of mouth. The area continues to experience signs of inappropriate use (trash dumping, litter, partying) and in some aspects overuse. Recreational conflicts with soils, vegetation, wildlife, aesthetics and other recreational users have increased.

The physical landscape is now much more developed with ever more user created roads and trails. The social setting is more crowded and evidence (litter, trash, party spots, etc.) of others is common. Field observations confirm that visitation peaks during spring and fall weekends. The BLM still manages it for dispersed undeveloped recreational opportunities with minimal investment in facilities or personnel.

Tourism. Public land recreation is often seen as a means to generate economic growth. Tourism is centered around hunting and motorsports. These activities currently provide unmeasured positive economic contributions to the towns of Rifle, Meeker, Parachute as well as Garfield County. Visitors tend to purchase items such as meals, daily food supplies, fuel, sporting goods, gifts and some lodging. Future growth in population and recreation represents opportunities for tourism to increase contributions to local-regional economic stability.

3.4 Resource Condition and Capabilities Evaluation

Recreation management involves determining recreational opportunities that meet the needs of visitors and communities while protecting resources. By managing the physical, social and administrative aspects of the resource settings, managers make different recreation opportunities available. Planning identifies settings that support the desired and targeted visitor experiences and ensuing benefits.

Recreational Opportunity Spectrum (ROS). The ROS is a conceptual framework that helps to clarify relationships between recreational settings, activities and experiences. The ROS concept recognizes that visitors seek a variety of recreational settings, from highly developed to primitive and a wide variety between the two extremes.

Recreational resources and activities are currently being managed according to the ROS classes adopted in the 1988 GSRA RMP - Map 9. The 1988 GSRA RMP divided the resource area into 6 ROS classes: Urban, Semi-urban, Roaded Natural, Semi-Primitive Motorized, Semi-Primitive Non-Motorized and Primitive. Since the standard ROS class terminology; Semi-Urban", "Roaded Natural", "Semi-Primitive Motorized", and "Semi-

Primitive Non-Motorized" can be confusing, more commonsensical class names will be used: Urban, Rural, Front Country, Middle Country, Back Country and Primitive (Appendix B - Figure 3).

The ROS identifies the available recreational opportunities in an area by the physical, social and administrative setting characteristics. Appendix A - Map 5 displays the current ROS setting inventory. The bulk of the planning area is being managed as the Roaded Natural ROS class with the Semi-Urban class along the highways and a small strip of Semi-Primitive Motorized along the northeast Roan Cliffs. The map reflects the overlay of the physical, social and managerial settings, which are predominantly consistent. Setting inconsistencies are created by the topographic isolation formed by the Roan Cliffs themselves. The Roan Cliffs and the areas below are physically, socially and managerially more primitive than the two dimensional, spatial mapping displayed. As per the ROS Users Guide, those setting inconsistencies created by landforms were resolved by adjusting the Back Country class to include the cliffs and the topographically isolated and roadless pockets below.

3.5 Opportunities

The management challenge is formidable, whether preserving the existing recreational settings or intermingling the desired recreational settings of different recreationalists or commingling recreation with other potential resource use or protection strategies.

Scoping respondents indicated the opportunity to address:

- A changing and growing population, development near public lands, changing uses, more diverse values, different expectations, and less understanding of traditional uses.
- The forseeable increase in recreational use by limiting cross-country travel and developing a travel system (motorized and mechanized) that; reduces excessive erosion, accommodates water drainage, is more wildlife friendly and avoids critical areas.
- Changing the physical, social and administrative settings above the rim to enhance the experiences and benefits of: solitude, enjoying wildness, enjoying natural aesthetics, spiritual renewal and physical and mental rest while engaging in non-motorized activities. To enable visitors to realize these types of benefits and experiences, the physical, social, and administrative character of the landscape should be made more primitive. Suggested actions to make the landscape more primitive include; reduce motorized access, reclaim environmentally impacting human impacts, apply special designations, or just keep roads rough.
- Maintaining the current recreational settings, activities offered and outcomes provided in the lowlands (Hubbard Gulch - Hubbard Mesa). The current management is viewed both socially and economically good because many people and many different users are able to recreate in the area.
- Positively impacting income and employment by emphasizing recreation opportunities and supporting locally sponsored tourism initiatives and community economic strategies.
- Expanding the area leased to the Rifle Gun Club to provide longer shooting distances.

AMS-4 SUMMARY FOR TRAVEL, ACCESS AND TRANSPORTATION

4.1 Management Plans and Documents

All public lands are required to have off-highway vehicle (OHV) designations (see 43 Code of Federal Regulations 8342.1). Public lands must be designated as "open," "limited," or "closed" to OHVs (43 CFR 8342.1). "Open" designations are used primarily for sites selected for intensive OHV recreation, where there are no compelling resource protection needs, user conflicts, or public safety issues that warrant limiting cross-country use. On lands that are designated as "limited," the network of roads and trails available for use and the terms and conditions of use are identified.

The off-road vehicle (ORV) management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau rim, is; *"To protect fragile and unique resource values from damage by ORV use and provide ORV use opportunities where appropriate".* The transportation management objective is; *"To provide access to public land by acquiring those legal rights on nonpublic land that are essential to implement BLM planned actions".* The GSRA RMP did not identify access objectives.

The access management objective in the WRRA is to*; "Enhance access to public lands and resources".* The motorized vehicle travel objective in the WRRA is to*; "Manage motorized vehicle travel on public lands to provide for public need and demand, protect natural resources, provide for the safety of public land users, and to minimize conflicts among various users of public lands."* A comprehensive travel management plan was to be initiated upon approval of the WRRA RMP but has not been completed.

The recreation objective, as outlined in the OMP, for NOSR 1 and 3 is to; "*Minimal recreation management measures will be taken to prevent deterioration of the soils and vegetation, habitat for fish and wildlife, aesthetic values of the NOSRs, and to protect DOE property and employees of DOE and DOE contractors."* The road management objective, as outlined in the OMP, for NOSR 1 and 3 is; "*Road maintenance and construction will be planned so as to provide adequate administrative access to the NOSRs and to minimize erosion or watershed damage."*

4.2 Current Management

Travel Management. The GSRA RMP and the OMP did not set travel designations on NOSR lands. Following the transfer, route inventories were conducted and the Roan Plateau Map and Visitor Guide was published in 1998 (reprinted in 1999). Public comment was also requested on the travel routes. No public comments were received on the routes available for travel. In 2000, following the completion of the roadless review inventory (see AMS 9 - Summary for Wilderness Suitability), interim travel designations (Federal Register: July 3, 2000, Volume 65, Number 128, Pages 41081 - 41082) were put in place and the visitor guide was reprinted. Interim travel designations were necessary because there were no travel decisions made for the transferred lands. The interim designations were a temporary measure to prevent the proliferation of roads and trails caused by unplanned cross-country travel and to allow time for open, careful discussion about travel designations through the integrated planning process. To protect resources, motorized and mechanized travel, except snowmobiles operating on snow, are limited to designated routes year-round.

OHV designations for the transferred lands, including road and trail designations, will be made as described in 43 Code of Federal Regulations 1600. OHV designations on the remaining lands will be reviewed to ensure compatibility with management objectives (see 43 Code of Federal Regulations 8342.3).

Within the WRRA, motorized vehicle travel is managed to; provide for public needs and demands, protect natural resources, safety to users, and minimize conflicts between various user groups. Prior to completion of a travel management plan, no areas were designated as open except to winter snowmobile travel. The yet to be completed, travel management plan is the public process that will evaluate and determine travel designations. The planning process afforded an opportunity to make travel designations on transferred lands north of Trapper Creek. So public lands within the WRRA in T. 5 S., R 94 W., Sections 5, 6 and 7; and T. 5 S., R 95 W., Sections 1, 2, 4, 11 and 12 were included the Roan Plateau area interim travel order (Federal Register: July 3, 2000, Volume 65, Number 128, Pages 41081 - 41082). The adjacent public lands to the north (Cow Creek/Timber Gulch/Hay Gulch) were closed in the 1996 WRRA RMP ROD to motorized vehicle use from August 15 through November 30 each year in order to establish a non-motorized quality hunting area.

Transportation. Transportation systems provide public and administrative access to accommodate all users of public land, and provide access to private land. Most access across public land is accomplished informally as casual use. Reasonable access is made available to persons engaged in valid uses such as mining claims, mineral leases, livestock grazing, recreation, and other uses. Road system management has centered around maintaining major access roads, which are generally the ones receiving significant

recreation traffic. Corrective maintenance occurs as problems are identified and funds permit. Road construction has been limited to improving or upgrading segments of road to improve access or to alleviate maintenance or environmental problems.

The NOSR OMP of 1988 stated that the NOSR road system was maintained and new roads constructed where needed to provide administrative access to the NOSRs. DOE only funded road maintenance and construction as required for DOE programs. If roads were abandoned, they were to be obliterated and revegetated to prevent further use and damage to the revegetated areas.

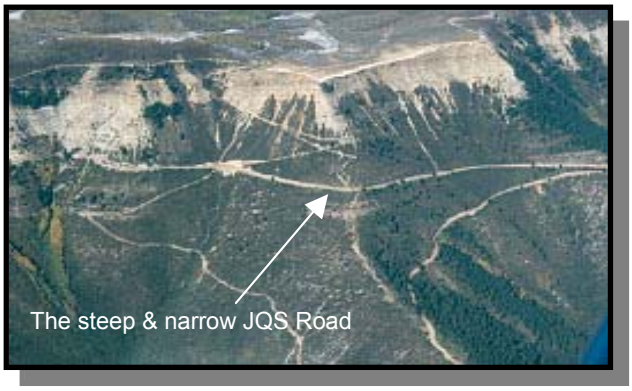
The BLM maintains roads and trails that are part of the transportation plan. BLM maintained routes currently include: #8001- Cow Creek/Divide/Rim (19.7 miles), #8001 (1.0 mile), #8003 - Upper Trapper Creek (1.9 miles), #8004 - Cook Ridge (5.9 miles), #8006 - Northwater (6.5 miles), #8008 - Long Ridge (9.9 miles), #8009 - JQS Gulch (2.7 miles), #8010 - Third Water Gulch (2.5 miles), #8011 - Short Ridge (3.1 miles), #8012 - Bull Gulch (3.5 miles), #8014 - Anvil Points (8.1 miles), #8016 - First Anvil Loop (2.0 miles), #8046 - JQS Road (6.5 miles). Emergency maintenance may be done on other routes as the need arises.

Table 4.2-1 Roads and trails within the Roan Plateau planning area

Class of Route	Miles of Route on BLM Surface
Light-duty road, dirt constructed and regularly maintained	41.89
Primitive road, constructed or user created, sedan clearance, not regularly maintained - i.e. > 3 years	172.86
Primitive road, constructed or user created, 4 wheel drive, high clearance required,not regularly maintained - i.e. > 3 years	11.52
ATV trail, < 52" wide	21.54

4.3 Characteristics and Setting

Above the Rim. Public access to the Roan Plateau is limited to two routes (Appendix A Map 6). From Highway 13, visitors can travel the steep and narrow JQS Road or visitors can come up the Cow Creek Road via the Piceance Creek Road. Both routes become impassable when wet and are closed by snow in the winter. This lack of convenient access keeps overall vehicle use lower than surrounding public lands. BLM currently maintains the JQS Road and the main ridge roads on the Roan Plateau. Other routes are maintained as needed, usually in conjunction with maintaining livestock improvements.



Once on top of the Roan Plateau travel routes tend to be a mixture of high clearance and 4x4 two-track routes. Historically, recreational OHV driving has benefited from the extensive road system that existed but nothing was specifically done to enhance travel and access for motorized or non-motorized recreation. Almost all routes are dead end routes. They terminate at livestock water developments or are user created and end up at a viewpoint or access a creek. Mountain bikers currently use the existing road system. Hikers and horseback riders generally travel cross-country or on the few livestock trails. Besides recreation, the current motorized route system provides access for livestock management.

Below the Rim. The GSRA RMP recognized the popularity OHV travel on public lands in the Hubbard Mesa area and designated them as open to motorized use.

4.4 Resource Condition and Capabilities Evaluation

Above the Rim. The Roan Plateau is beginning to see more mountain biking use. BLM cooperated with the City of Rifle to develop a mountain biking brochure and map but has done little on the ground to enhance mountain biking. Snowmobile use remains low. Motorize travel is expected to increase, especially hunting season ATV use. Most irresponsible vehicle use is done by ATV drivers and occurs during the fall hunting seasons. Scoping comments indicate that the interim travel designations have general public support.

Below the Rim. Private land and terrain restricts travel and access on the southern foothills of the Roan Plateau. Vehicle routes tend to be associated with gas production. Only landowners or those with access privileges can travel on public lands.

In contrast, public lands and the open pinyon and juniper vegetation of Hubbard Gulch and Hubbard Mesa allow easy access and cross-country passage for OHVs. Overtime this has resulted in an widespread system of rough and challenging roads and trails.

Hubbard Gulch and Hubbard Mesa areas have always been a popular, yearround, close to town, place to recreationally ride and drive. Unfortunately many of the routes also cross onto private lands. Private landowners have done little to discourage trespass and many users probably don't realize they are on private property. The intermingled public and private lands makes managing travel difficult.

As the area's population has grown so has mechanized and motorized recreation. BLM has issued several special recreation permits for mountain bike events/races. Stakeholders and landowners have complained about the open travel designations (cross-country travel) and raised concerns about conflicts with soils, vegetation, wildlife, aesthetics and other recreational users. The trend towards increasing mechanized and motorized use and associated problems that has occurred in recent years is expected to continue.

4.5 Opportunities

Public comments on travel and access are often linked to their desired outcomes for recreation (see AMS-3 Recreation). For example, respondents that expressed a desire for; solitude, wildness, natural aesthetics, spiritual renewal and physical and mental rest while engaging in non-motorized activities desired less motorized routes.

Many opportunities for future management have been presented during scoping. They include:

- Reduce vehicle routes to; enhance backcountry experiences for people, decrease habitat fragmentation, lessen wildlife displacement and curb riparian impacts.
- OHV driving is a traditional use and little if any change is needed in the current travel so allocate OHV use as it is presently and designate, as open, the already heavily used areas.
- An open cross-country play area is inappropriate and a designated mechanized / motorized route system with opportunities for a variety of skill levels is more appropriate.
- Some hunters see the need for seasonal restrictions or a reduction in routes to reduce motorized disturbance of big game and enhance hunting success.
- Reclaim routes that are troublesome, redundant, unneeded, or cause resource damage.
- Proponents of all viewpoints suggest a greater level of partner involvement in management.

AMS- 5 SUMMARY FOR FISH AND WILDLIFE

5.1 Management Plans and Documents

The aquatic habitat management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau Rim, is; *To increase fish production and recreational fishing use on streams having more than one-half mile of continuous flow across public land and on lakes surrounded by at least 40 acres of public land. (Only streams and lakes with existing or easily obtainable public access and either an existing or potential fishery qualify for management.)*. The terrestrial habitat management is; "*To provide approximately 57,933 animal unit months (AUMs) of big game forage (the amount needed to meet CDOW big game population goals in 1988), to improve existing wildlife habitat conditions, and to increase wildlife species diversity".*

The wildlife - big game management objectives, within the WRRA, as described in the 1996 WRRA RMP is to; *1) "Ensure that big game habitats provide components and conditions necessary to sustain big game populations at levels commensurate with multiple use objectives and state-established population objectives, 2) Maintain or enhance the productivity and quality of preferred forages on all big game range, 3) Provide the forms, distribution and extent of vegetative cover and forage that satisfy the physiological and behavioral requirements of big game and encourage efficient use of available forage supplies, 4) Reduce the duration, extent, and intensity of manageable forms of animal harassment during crucial timeframes, and avoidance-induced disuse of suitable habitats considered limited in supply and/or critical in fulfilling special functions."*

The wildlife - raptors management objective, within the WRRA, as described in the 1996 WRRA RMP is to; *"Maintain the short-term utility and promote the continued long:term development and availability of suitable raptor habitats. This includes prey base, nest sites, and other special habitat features necessary to help stabilize or allow increases in regional raptor populations."*

The wildlife - grouse management objective, within the WRRA, as described in the 1996 WRRA RMP is to; *"Restore, maintain, or enhance habitat conditions and features conducive to the maintenance or expansion of native grouse populations. Reduce disruption of important seasonal use activities associated with production and recruitment."*

The wildlife - fisheries management objective, within the WRRA, as described in the 1996 WRRA RMP is to; *"1) Promote improvement and recovery of current, historic and potential stream fisheries to help increase populations of sport and native fishes, 2) Develop and maintain facilities capable of supporting warm-water fisheries, 3) Increase recreational fishing opportunities within the Resource Area."*

The management of Second Anvil Creek, Parachute Creek, Northwater Creek and Trapper Creek is outlined in the *Naval Oil Shale Reserve Aquatic Habitat Management Plan, 1982, Environmental Assessment Number CO-070-GSI-167.* This supplemental plan was needed to increase the quantity and quality of Colorado River cutthroat trout habitat and provide a recreational fishery.

The wildlife management objectives, as outlined in the OMP, for NOSR 1 and 3 is; *"1) Hunting and fishing will be allowed only to the extent that they do not interfere with DOE programs or DOE custodial management objectives, and 2) Cooperation will be maintained with U.S. Fish and wildlife Service, Colorado Division of Wildlife, as appropriate, to control and protect wildlife, and to prevent or minimize wildlife damage to other resources."*

5.2 Current Management

Fish and wildlife management direction is to meet or exceed Colorado land health standard # 3 (see Appendix B Figure 1).

For NOSR 1 (top of the Roan Plateau), the decision on stipulations to be applied was deferred to the Roan Plateau area land use planning process. Fish and wildlife standards in the remaining GSFO portion of the planning area (below the rim) are met through the application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. These include:

- NSO 3. Major River Corridors.
- NSO 7. Raptors.
- NSO 11. Wildlife Seclusion Areas.
- TL 1. Big Game Winter Habitat.
- TL 2. Big Game Birthing Areas.
- TL 6. Raptor.
- TL 10. Bald Eagle Nest Site.
- TL 12. Peregrine Falcon.
- TL 13. Waterfowl and Shorebird Nesting Areas.

Within the WRRA, big game forage allocations remain the same as specified in the 1981 Grazing Management Environmental Impact Statement and subsequent Rangeland Program Summary. Rangeland and grazeable woodlands that are in a downward trend would be reevaluated for forage reallocations. Developing water sources, vegetation manipulations and animal redistribution techniques are normally integrated with range improvement or riparian restoration activities. Monitoring is conducted to determine which rangelands are healthy, at risk, and/or not functioning properly. Existing information on raptor nest locations are verified and supplemental surveys are conducted on a project driven basis. Protective stipulations and conditions of approval, determined through NEPA process, are applied. Habitat conditions for native grouse populations are being restored, maintained and enhanced. Habitat management guidelines for grouse are applied during the NEPA process. Fisheries are improved, recovered and maintained to increase fishing opportunities. Impacts by projects and authorizations are assessed during the NEPA process, with appropriate mitigation applied. Fisheries mitigation does not violate valid existing rights.

For public lands administered by the WRFO, wildlife stipulations listed in Appendix B of the WRRA RMP are applied to all surface-use activities. These include:

- NSO 3. Raptors – Non-Special Status Species.
- CSU 6. Colorado River Cuttroat Trout.
- TL 4. Raptors – Non-Special Status Species.
- TL 7. Elk Production Areas.
- TL 9. Deer/Elk Summer Range.

The Colorado Division of Wildlife (CDOW) manages fish and wildlife resources as related to hunting and fishing licenses and regulations. The CDOW sets population and species management goals for both game and nongame species within the State. The BLM collaborates with CDOW in helping to meet these goals by providing an appropriate amount and quality of habitat on public land, consistent with multiple use management. State big game management objectives are set through a public involvement process with final decisions set by the Colorado Wildlife Commission. Current management focus is on protecting crucial habitats and improving range conditions. Over the years, the BLM has implemented site-specific projects to improve range conditions for wildlife including prescribed fires, and upland water developments.

The CDOW has mapped use areas for many species of wildlife in Colorado. This data is stored in the "Wildlife Resource Information System" (WRIS), a Geographical Information System (GIS), and is used extensively by BLM in land use planning.

5.3 Characteristics and Setting

The Roan Plateau area provides habitats for a diverse array of fish and wildlife species. Wildlife habitat needs vary significantly by species. It is generally true, however, that healthy and sustainable wildlife populations can be supported where there is a diverse mix of plant communities to supply structure, forage, cover, and other specific habitat requirements. Readers should refer to the GSRA Oil and Gas Leasing and

Development Final SEIS, Chapter 3.5 - Wildlife, for a detailed description of pertinent physical/biological characteristics and current conditions for fisheries and wildlife.

A land health assessment was completed on the lands above the rim in 1999. The findings concluded:

- Overall, the lands above the rim were found to be meeting the Standards and Guidelines for rangeland health. Mixed mountain shrub communities were found to be in either good or excellent condition with a good grass and forb understory. Aspen condition varied with some stands showing good recruitment and age class diversity while many others are older age class with little to no recruitment and are being replaced by conifers. Weeds are a definite concern across portions of the landscape particularly along drainages. Many sites are in late seral condition and age-class diversity could be improved.
- Riparian areas varied from proper functioning to functioning at risk. However, all but one stream that was rated as functioning at risk had an upward trend. All stream reaches showed improvement from an intensive assessment completed in 1994 on the same stream reaches.

A land health assessment was completed on a portion of the lands below the rim from Hubbard Mesa to the north. The findings concluded:

- Much of the lower elevation lands are not in good condition. Sagebrush is old, decadent and unproductive. Decades of fire suppression have allowed pinyon and juniper trees to encroach into sagebrush parks. Sagebrush density is increasing and herbaceous cover is declining. In many of these low elevation areas, sagebrush, mountain mahogany and serviceberry are severely hedged. In some areas, cheatgrass has become dominant or poses a significant threat of invasion. OHV use in some areas has severely fragmented habitats and resulted in increased erosion, weeds, trash, soil compaction, and loss of vegetation.
- Riparian areas were generally in good condition. Portions of Government Creek are in less than desirable condition due to OHV use within the stream channel, and limited water supply.

The lands below the rim to the west have not been reviewed through a land health assessment. Points of consideration include:

- The lands have been developed for oil & gas. Roads, pipelines, and ancillary facilities have fragmented big game winter range and resulted in direct losses of habitat, and have indirectly affected animals due to displacement. Cheatgrass is common in some areas and sagebrush parks are decadent with pinyon-juniper encroachment common. Shadscale and greasewood in the lowest elevations have little herbaceous understory.
- Very few riparian areas exist in this area. Conditions appear to be good given the potential of these small drainages.

Habitat, below the rim, has been mapped (GSRA Oil and Gas Leasing and Development Draft SEIS, 1998) from an ecological perspective using four criteria: High Value Habitat, Moderate Value Habitat, Lesser Value Habitat, and Seclusion Areas (GSRA Oil and Gas Leasing and Development Final SEIS, 1999).

Big Game. The big game data presented within this document are reasonable and informed estimates from the CDOW. The Roan Plateau planning area falls almost entirely within Game Management Unit (GMU) 32. GMU 32 will be the focus of this discussion even though, a few hundred acres of the planning area are within GMU 22. GMU 32 is part of CDOW Region 4, which includes portions of nine GMUs: 22, 23, 31, 32, 33, 42, 421, 43 and 521. The majority of public lands managed by the BLM in Region 4 occur in GMUs 31, 32, 33 and 42.

GMU 32 is approximately 309 square miles in size. Of this, approximately 39% is public land and 61% is private land. The majority of the private land, approximately 190 square miles, occurs in the Parachute Creek drainage and along the I-70 corridor. The parcels of private land are typically large, 15,000 + acres, and are owned by energy companies

Mule deer and elk are the most common and intensively managed big game species. The Roan Plateau provides crucial summer and transitional range for both species. The surrounding lowlands provide winter range. The availability of winter range is generally considered the limiting factor to big game populations in western Colorado.

Deer and elk migrate seasonally from summer and transitional range located on top to important winter range located below the rim. During the cold winter months, big game prefer the more southerly aspects where temperatures are warmer and the snow is less deep. Slopes of fifteen to 40 percent are preferred and slopes greater than 75 percent receive very little use. Vegetation communities on transition and winter ranges typically range from mixed mountain shrub and pinyon/juniper in the foothills, to low elevation sagebrush and desert scrub habitats in the valleys and along the Colorado River.

The winter range is utilized from late fall until early spring, with December 1 to April 30 the most critical period for deer and elk. During mild winters, most big game are scattered throughout the winter range. However, in severe winters, due to deep snow conditions at the higher elevations, they tend to concentrate in the lowest portions of the winter range, along major drainages, typically in the sagebrush/ saltbush and pinyon/juniper habitats; hence the designation of these areas as severe winter range.

Regionally, the BLM has initiated big game habitat improvement projects within winter range habitat including clearing of trees, roto-chopping of sagebrush shrublands and prescribed burns.

Deer. The Rocky Mountain mule deer occurs throughout the mountains and valleys of western Colorado. Mule deer populations have historically fluctuated, periodically affected by drought and severe winter weather. Local populations have followed that trend; however, in recent years, their numbers have not rebounded as in the past. Many theories have been suggested for the decline of mule deer in the west including; over harvest, increased predator populations, increased habitat competition with elk populations, poor habitat conditions, ecological succession due to lack of fire, and increased human populations and related development.

General movement of the herd is from the summer range on the Roan Plateau, south onto winter range below the Roan Cliffs. Important areas to deer include: the Magpie Gulch - Sharrard Park area, and Parachute Creek side slopes above the valley floor. These high value areas provide the best remaining winter habitat in the GMU. They typically consist of pinyon/juniper, desert scrub and mixed mountain shrub communities that provide critical food and cover during the winter months. The riparian habitat within these areas also provides important food, cover, water and birthing areas for deer, as well as important values for a number of other species of wildlife. Portions of these areas are basically unroaded and provide escape areas for big game. They also support higher concentrations of other wildlife species due to reduced habitat fragmentation and disruption.

The CDOW manages big game species by herd units defined as Data Analysis Units (DAUs). These DAUs are composed of one or more GMUs. The management objectives are identified in DAU Management Plan. The CDOW estimates current populations of mule deer in DAU D-41, which includes GMU 31 and 32, to be approximately 16,000 deer. The CDOW long-term objective for this population is set at 16,700 animals. Population Tread Chart/Harvest Data/Objectives

Elk. The changes that seem to be affecting mule deer do not seem be affecting elk. In addition to their winter hardiness, elk have a propensity to move onto private property and avoid hunters. Consequently, the dramatic population undulations typical of mule deer are not seen in the generally increasing elk populations of DAU E-10, which includes GMUs 21, 22, 30, 31 and 32.

The current population estimate is approximately 6,000 elk, up from 75 in 1972 and double the DAU population objective of 3,000 elk. Population Tread Chart/Harvest Data/Objectives

The Roan Plateau is emphasized as a crucial habitat due to its heavy use as summer range. Summer range was determined to be crucial habitat, with particular emphasis on water areas and aspen and spruce pockets that are needed for elk cover and production. Water availability is a critical factor in this DAU due to the xeric

climate of the region. Few elk winter in the Parachute Creek drainage. Most elk move north or west off the Roan Plateau into the Piceance and Roan Creek drainages. Thus elk are having an inconsequential impact on mule deer in this GMU.

Black Bear. Black bear inhabit the top of the Roan Plateau, the steep rugged side slopes and the more mesic (moist) habitats. They are dependent upon mast and berry crops during the fall and aspen buds during the spring, and consequently tend to concentrate in these habitat types. They typically den up for hibernation in rocky/talus areas, small caves and under root wads in conifer habitats. Population/Harvest Info

Mountain Lion. Mountain lion typically follow their primary food source, which includes: mule deer, elk, bighorn sheep and other smaller mammals. Populations on public lands are usually at their highest during the winter months when the big game populations are greatest on the winter ranges. Mountain lion numbers cycle with the prey base (as do those of most predators). As big game numbers dwindle, lion are forced to shift to other prey bases (domestic livestock, etc.) and will eventually dwindle also. Damage complaints from lion depredation on domestic sheep are normal in the eastern portion of the planning area.

Birds. Common raptor species include golden eagles, red-tailed hawks, Cooper's hawks, and sharp-shinned hawks. Songbirds are common. Waterfowl are found extensively along the Colorado River. Occasionally waterfowl will use the larger stock ponds, reservoirs, and streams found on top of the Roan Plateau. Many of the same bird species found on top, utilize the cliffs and habitats below the rim.

Upland gamebirds present include: wild turkey common within the Parachute Creek and Government Creek drainages; blue grouse common on the Plateau; chuckar occasionally found on the steep slopes and talus areas of the Roan Cliffs; mourning doves found throughout the region. The status of Northern sage grouse populations are uncertain and thought to be declining. Columbian sharp-tailed grouse have been documented on the Plateau, however, their status is unknown and populations are thought to be declining.

Bats. Bats, many of which are sensitive species, may occupy natural caves and man made structures in the area. Abundant foraging habitat for a variety of bat species is present. The status of individual species is largely unknown.

Fish. Colorado River cutthroat trout, a Colorado BLM sensitive species (see AMS- 5), and brook trout, are located on top of the Roan Plateau. Non-native brook trout were introduced to the East Fork drainage sometime during the early 1970's. Brook trout have proliferated and now dominate much of the East Fork Parachute Creek drainage. Twenty-one fish species, including several native fishes, are known to occupy the waters of the Colorado River and Parachute Creek in the vicinity of the planning area.

Amphibians/Reptiles. Amphibian species include, tiger salamanders that inhabit stock ponds and reservoirs in the area. Great basin spadefoot toads and northern leopard frogs (both BLM sensitive species), and woodhouse toads have been identified in the Parachute Creek area. Reptiles species include; the common water snake, western garter snake, collared lizard, tree lizard, and horned lizard and midget faded rattlesnake.

5.4 Resource Condition and Capabilities Evaluation

Several regional trends are directly or indirectly affecting wildlife species and wildlife habitat locally.
Habitat Alteration. The natural environment, especially winter ranges of big game at the lower elevations, has been altered and fragmented by increases in road and highways, gas development, utility corridors, subdivisions, and homesites. Human population and the associated physical development has resulted in concomitant physical and biological disturbance including; a reduction in available winter habitat (forage and cover), increased disturbance (stress levels) and displacement of wildlife.

Interstate 70 was constructed in the 1970's and bisects the Colorado River valley, effectively eliminating big game herd migration across the valley in many areas, thus forcing them to concentrate in less desirable

habitat. Both Highway 13 and Interstate 70 have increasing traffic that in turn has increasing vehicle-wildlife mortality.

Oil shale development and the associated infrastructure during the late 1970's and early 1980's affected thousands of acres of summer and winter range. Gas development began to pick up pace in the early to mid-1980's and has directly impacted approximately 1,800 acres to date, but with the associated roads and traffic, has indirectly impacted over 10,000 acres (GSRA Oil and Gas Leasing and Development Draft SEIS, 1998). The overall number and density of wells continues to grow. The result is more forage loss and increased habitat disturbance in previously undisturbed areas. As a result, the importance of habitats not yet impacted has increased. Construction and daily management activity also causes time-specific disturbances especially detrimental to wildlife in critical habitats or during critical time periods.

Habitat Condition. The lack of fire over time has allowed many vegetation communities to move into late-seral condition, resulting in over-mature and decadent stands of vegetation. These stands are typically less productive as wildlife habitat. Most notably affected are the desert scrub, sagebrush, mountain shrub and pinyon-juniper habitats types.

Riparian Vegetation Condition. Riparian vegetation is critical to wildlife populations and has been frequently impacted in a negative manner through site-specific disturbances; i.e. excessive livestock grazing, intensive recreation use, gas development, etc. It is difficult, and often impossible, to restore the biological structure and function of riparian areas. The time lag for restoration is great and the impact to the number of wildlife species is large. These combined issues create significant and complex impacts. Fencing of riparian vegetation is resulting in improved fish and wildlife habitat along Trapper Creek.

Habitat Loss. Loss of vegetative cover results in increased runoff (amount and speed), which increases erosion and subsequent downstream sedimentation. This results in downcutting and the resultant loss of riparian habitat, decreased water quality, reduced stream productivity, including fisheries production and overall reduced streamflow over time. Much of the area is composed of fragile soils and steep slopes that have generally proven to be unreclaimable. Loss of vegetative cover for any significant length of time causes irreparable damage through increased potential for erosion, mass wasting and sedimentation. This in turn results in loss of wildlife habitat and forage.

Weeds. Noxious weeds are rapidly spreading (see AMS 19 - Summary for Weeds). Weeds replace more desirable forage and cover plants which results in a reduction in quality of wildlife habitat. Weeds are particularly common along the majority of the drainages located on top of the Plateau. The more common species include Canada thistle and houndstongue.

Recreation. Recreational use of public and private lands continues to increase. Of greatest concern is off-highway vehicle (OHV) use. This has resulted in; a loss of seclusion, increased wildlife harassment, soil disturbance and a loss of vegetation which provides important food and cover.

Hunting. Private land has historically blocked access to large parcels of public land. In some areas, this makes big game population control more difficult and increases game damage to other private lands in the vicinity. Big game hunting pressure and hunting season length have increased, as has upland game and fishing pressure. This results in; greater stress levels on the wildlife, generally greater harvest, increased revenues to local communities and increased job opportunities.

Grazing. Poor livestock grazing management practices (past and present) is negatively impacting fish and wildlife populations by degrading important habitats, decreasing plant diversity, allowing establishment of annual grasses and forbs, and preventing natural succession. Many areas still have winter livestock grazing in habitats that provide important winter range for deer thus there is direct competition for forage on these areas. There has been a decrease in both sheep operators and winter sheep use in Unit 32. This combined with proper summer grazing by sheep may improve habitat conditions for mule deer.

5.5 Opportunities

Scoping comments pertaining to wildlife recognized fish and wildlife as indicators of the areas' health and diversity, and the need to protect and improve wildlife habitat. Respondents expressed a concern that additional use and uses could; increase habitat fragmentation, risk ecological integrity, increase sediment loads in streams and introduce non-native plants.

Opportunities identified include:

- Increase turkey populations.
- Increase the amount and productivity of wildlife winter range in this area.
- Prescribed burning to improve critical winter deer habitat
- Controlling or eliminating off-route vehicle use to reduce stress on wintering deer and elk.
- Direct human activity away from biological features, nest sites, wildlife forage grounds, hunting grounds, and water sources.
- Big game species would be managed with consideration of carrying capacity.
- Maintain largely natural conditions to benefit more sustainable wildlife habitat and healthy wildlife populations.
- Improve declining mule deer populations.

5.6 Additional Information

For additional information, the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment DSEIS provides narratives of broad vegetative communities and includes discussion of wildlife dependence with each community.

AMS-6 SUMMARY FOR SPECIAL STATUS SPECIES – FISH AND WILDLIFE

6.1 Management Plans and Documents

Section 7of the Endangered Species Act (ESA) of 1973 requires that BLM ensure that any action authorized, funded, or carried out, is not likely to jeopardize the continued existence of any threatened and endangered (T&E) species and avoids any appreciable reduction in the likelihood of recovery of affected species. Colorado BLM is currently contracting programmatic statewide assessments for candidate, threatened and endangered species.

BLM Sensitive Species Policy outlined in BLM Manual 6840 (IM No. 97-118) directs BLM to ensure that no action that requires federal approval should contribute to the need to list a species as threatened or endangered. This applies to candidate and BLM sensitive species. Species proposed for Federal listing are to be managed with the same level of protection provided for T&E species.

The GSRA RMP of 1984 (revised 1988) had no specific objective for managing special status species. The RMP did however identify that; monitoring, maintaining, or improving habitat for threatened or endangered species was a priority for implementation.

The wildlife – special status species objectives within the WRRA as described in the 1996 WRRA RMP are to*; "1) Contribute to the recovery of special status animals (i.e. listed, proposed, or candidate T&E, BLM sensitive) in an effort to ultimately remove these species from special status consideration, 2) Maintain or restore special status animal populations, and the suitable extent and/or utility of important habitats on public lands, 3) Ensure that federally authorized actions do not adversely disrupt or compromise important biological activities or contribute to increased mortality or depressed production or recruitment into a breeding population, 4) Maintain or improve, to proper functioning condition, bank, channel and floodplain*

processes associated with designated critical habitats for listed and candidate fishes of the Upper Colorado River Basin."

6.2 Current Management

Table 6.2-1 displays threatened and endangered species or their habitat that are currently known to occur or potentially occur within the planning area.

Table 6.2-1
Current listed wildlife species within the GSRA

Species Name	Federal Status
The Big River Fishes	
• Razorback sucker…..	Endangered
• Bonytail chub……..	Endangered
• Colorado pikeminnow	Endangered
• Humpback chub…….	Endangered
Black-footed ferret……..	Endangered
Bald eagle ……..	Threatened

Endangered Species Act consultation and coordination is performed under guidance as outlined in the Intergency Memorandum of Agreement (MOA) for Programmatic ESA Section 7 Consultations. The MOA established a general framework for a "streamlined" process for interagency cooperation among the BLM, U.S. Forest Service (FS), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) in the exercise of their responsibilities under the ESA of 1973, as amended (ESA; 16 U.S.C. 1531-1544) and the 1994 Memorandum of Understanding on the conservation of species which are tending towards federal listing (94-SMU-058), which all four agencies signed.

For NOSR 1 (top of the Roan Plateau) the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment deferred decisions on surface use stipulations to the Roan Plateau area land use planning process. Special status species standards in the GSFO portion of the planning area (below the Roan Plateau rim) are met through the application of mitigation measures as identified in the ROD. These include;

- NSO 2 Riparian and Wetland Zones
- NSO 3. Major River Corridors.
- NSO 7. Raptors.
- NSO 8. Bald Eagle
- NSO 9. Peregrine Falcon
- NSO 12. Threatened or Endangered Species
- TL 6. Raptor.
- TL 10. Bald Eagle Nest Site
- TL 11 Bald Eagle Winter Roost Site
- TL 12. Peregrine Falcon.
- TL 13. Waterfowl and Shorebird Nesting Areas.
- CSU 2. Riparian and Wetland Zones
- CSU 3. BLM Sensitive Species

Within the WRRA, the recovery of special status species (i.e. candidate, listed or proposed) is pursued to ultimately remove these species from special status consideration. The ESA process would continue to be implemented with appropriate conditions of approval as listed in Appendix C - Conditions of Approval (Best Management Practices) and stipulations listed in Appendix B of the WRRA RMP. These would be applied to all surface-use activities and include:

- NSO 2. Raptor Nests –T&E, Candidate and BLM Sensitive Species
- NSO 5. Bald Eagle Roost/Concentration Area
- NSO 8. Known Potential Habitat for Listed and Candidate T&E Plant Species
- CSU 5. Bald Eagle Nest, Roost and Perch Habitat
- CSU 6. Colorado River Cuttroat Trout.
- TL 1. Raptor Nesting Sites Listed, Proposed, and Candidate T&E and BLM Sensitive Except Bald Eagle and Ferruginous Hawks)
- TL 2. Bald Eagle Nest
- TL 5. Bald Eagle Roost or Concentration Areas

6.3 Characteristics and Setting / Resource Condition and Capabilities Evaluation for Listed Species

Big River Fish. All 4 of these fishes are Federally listed as endangered. Big River Fishes historically occurred within the Colorado River along the southern boundary of the planning area. These fishes require a diversity of habitats within the Colorado River, particularly during certain life stages. Low velocity side channels, backwaters, oxbows, sloughs, and flooded bottom lands are all important habitats for both young and adult fish, particularly pikeminnow and razorbacks. Adult humpback and bonytail chubs prefer deeper pool habitats in canyon reaches of the river. The Colorado River, and its 100-year floodplain from the town of Rifle downstream is designated critical habitat for the razorback sucker and Colorado pikeminnow. Critical habitat for the bonytail and humpback chub is located in the Colorado River near the Colorado-Utah state line.

Populations of Colorado pikeminnow are low but relatively stable in the upper Colorado River Basin. Razorback sucker numbers are lower and limited numbers of individuals are known to reside in the area. Bonytail and humpback chub are not known to occur within the planning area and are currently found in lower portions of the basin. Numbers are extremely low for both species range wide. Recovery efforts are ongoing.

The decline of these fishes is mainly attributed to changes in the Colorado River resulting from the impoundment of large portions of the mainstem and its tributaries. In addition, irrigation use and dams have dewatered, cooled, and altered much of the river system. The “controlling” of the river has resulted in losses of habitat and natural function such as flooding. In addition to losses of habitat function, many of these changes in the river system have resulted in more favorable conditions for non-native fishes. Non-native fishes, which are now common, compete for resources including food, space, cover, and physical habitat, and are known to prey on native fishes.

Direct impacts to these fishes from actions within the planning area are minimal. The majority of lands along the Colorado River and its 100-year floodplain are private. However, there is the potential for offsite, secondary, and cumulative impacts associated with various actions that could occur on public lands. Main risk factors include oil & gas development and associated roads, water depletions resulting from tributary and upland water impoundments, dams, commercial and residential development, off highway vehicle use, gravel pits, and the proliferation of non-native fishes. Although management actions that result in increased erosion could affect these fishes, it is important to note that these fishes evolved in the high sediment carrying Colorado River. Impoundments that have resulted in “cleaner” water may actually be creating water conditions that favor competing non-native species. It is unlikely that any management action or combined actions will result in cumulative impacts significant enough to detrimentally impact these fish with regard to addition of sediment.

Black-footed ferret. The Black-footed ferret is Federally listed as endangered. Black-footed ferrets historically occurred throughout much of the western United States where large colonies of prairie dog towns were present. Black-footed ferrets have not been documented as occurring within the planning area, and it is likely that this species was never common due to a lack of suitable habitat. Prairie dog surveys conducted by the CDOW in the late 1980's resulted in 1 identified prairie dog colony. The site is located just north of Rifle and is approximately 20-acres in size. The only known ferret population in the state is a recently reintroduced population located in Moffat County. The USFWS has determined that, at a minimum, potential habitat for black-footed ferrets must include a single white-tailed prairie dog colony of greater than 200 acres, or a complex of smaller colonies within a 4.3 mile (7km) radius circle totaling 200 acres (USFWS 1989).

The Black-footed ferret is one of the rarest mammals in North America, and was once thought to be extinct. Recovery efforts are ongoing in several states, including Colorado, and approximately 40 individuals were recently released into northwestern Colorado.

Risks to this species are minimal. This species is not known to reside here due to limited habitat.

Bald Eagle. Bald eagles are Federally listed as threatened. Bald eagles are known to winter along portions of the Colorado River and Parachute Creek. Results of past CDOW mid winter bald eagle counts and limited surveys have resulted in the detection of no active nests on BLM lands (Gene Byrne - CDOW pers. comm.).

Wintering bald eagles are generally present from mid-November to mid-April. Wintering bird numbers vary annually. Large mature cottonwood trees along the Colorado River and Parachute Creek are used as roosting and perching sites and these waterways provide the main food sources of fish and waterfowl. Upland habitats adjacent to these waterways are used as scavenging areas primarily for winter killed mule deer and elk. Little public land exists within mapped bald eagle winter habitat. The majority of winter roost habitat is found on private lands located along the river and creek bottoms.

The bald eagle is currently doing well range wide and may be near de-listing. Populations have steadily increased since it was listed in 1967.

Direct risks to this species are minimal, as most habitat is located on private lands located along the Colorado River and Parachute Creek. However, there is a risk for offsite, secondary, and cumulative impacts from management actions on public lands. Risks include loss of winter roost habitat through residential and commercial developments, noise and human activity along the adjacent interstate highway, and oil & gas development.

Migratory birds. Many species of migratory birds exhibit variable habitat requirements and are found in a variety of habitat types. The planning area supports a wide variety of migratory bird species that spend a portion of their annual life-cycle here but conduct other life-cycle requirements such as breeding or wintering elsewhere in North, South, or Central America. Populations of some of these species are declining as a consequence of land use and management practices as well as other factors.

These species are protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA), originally passed in 1918, implements the United States' commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. Migratory game bird management in the United States is a cooperative effort of state and federal governments.

The following websites contain additional information for migratory birds:

- **http://migratorybirds.fws.gov/**
- **http://www.r6.fws.gov/endspp/**
- **http://ndis.nrel.colostate.edu/**
- **http://www.cnhp.colostate.edu/**

6.4 Characteristics and Setting / Resource Condition and Capabilities Evaluation for BLM Sensitive Species

Following is a detailed discussion (habitat, status, trend and risks) of BLM Sensitive species or their habitat that are known to occur or potentially occur within the Roan Plateau planning area.

Colorado River cutthroat trout. Colorado River cutthroat trout are the native trout of the upper Colorado River basin and were once common throughout the drainage. Today, populations are restricted mainly to small headwater streams and lakes. The major streams of the Roan Plateau contain populations of Colorado River cutthroat trout. These include, Northwater Creek, Trapper Creek, East Fork Parachute Creek, East Middle Fork Parachute Creek, Parachute Creek, JQS Gulch, First Anvil Creek, and Second Anvil Creek. The East Fork Parachute, Northwater, Trapper, and East Middle Fork Parachute Creek are all considered Conservation Populations due to the genetic purity of these populations.

Range wide, numbers of pure strains of Colorado River cutthroat trout are low, but many populations are stable to increasing. Populations are relatively stable in Trapper, Northwater, and East Middle Fork Parachute Creeks. Numbers within East Fork Parachute Creek are steadily decreasing as brook trout are displacing this population.

The decline of cutthroat is mainly attributed to the introduction of non-native salmonids including rainbow, brown, and brook trout. These species compete for resources including food, space, cover, and physical habitat and have displaced the native cutthroat in many streams. In addition, cutthroat and rainbow trout readily cross when the two co-exist, which increases genetic variance, and reduces genetic purity.

Risk factors include oil & gas development, livestock grazing, OHV and related travel management, weeds, water availability, and non-native trout species.

Greater sage grouse. Sage grouse are a sagebrush obligate species that require a diverse age-class of sagebrush and open grassland habitats. Greater sage grouse have declined dramatically within the past 20 years in large portions of its overall range. This species was historically found in the larger sagebrush habitats. A limited amount of mapped historic habitat is located in the Hubbard Mesa area north and west of Rifle.

This species is no longer found within the Roan Plateau planning area. Birds have not been seen in over 20 years. Reasons for decline include habitat fragmentation, OHV and other recreational use, livestock grazing, powerlines, and commercial and residential development. It is unlikely that stable, self-sustaining populations of this species will ever return. There are no current risks to this species, as no birds are known to inhabit these lands. Locally sage grouse are found north of Eagle, Gypsum, and Wolcott.

Midget-faded rattlesnake. Little is known about the midget faded rattlesnake in Colorado. However, this species has been documented as occurring within the planning area. This snake ranges from across Utah and portions of Wyoming into west central Colorado. Colorado's populations make up the eastern margin of range for this species. This species is of concern in Colorado because of the small number of records and restricted range.

Population trends within Colorado are unknown. Numbers of individuals are thought to be small but stable. Risks to this species include development, outright killing, and illegal collection of individuals for commercial purposes.

Utah milk snake. Little is known about the Utah milk snake. This snake ranges from Utah and portions of Wyoming into west central Colorado. Colorado's populations make up the eastern margin of range for this species. Population trends within Colorado are unknown. Numbers of individuals are thought to be small but stable.

Utah milk snakes occupy various habitats, but many records have been noted within and near floodplains. This species is of concern in Colorado because of the small number of records and restricted range. Risks to this species include development, outright killing, and illegal collection of individuals for commercial purposes.

Great Basin spade-foot toad. This species, as the name implies, is found mostly in the Great Basin. However, records exist within the planning area. Colorado is at the southeastern edge of this species range. This species inhabits pinyon-juniper woodlands, and sagebrush and semi-desert shrublands. This species is of concern in Colorado due to its limited occurrence and small range.

Population status is largely unknown but it appears that numbers are stable and currently the majority of habitats important to this species are not threatened. Risks include development, and conversion of habitat from pinyon-juniper woodlands to cheatgrass. Wildland fires that burn in pinyon-juniper woodlands or sagebrush with cheatgrass or potential for cheatgrass invasion could reduce habitat quality.

Northern leopard frog. This species ranges across much of the northern United States and southern Canada, and has been found within the planning area. This frog inhabits many aquatic and wetland habitats including springs, ponds, lakes, and wet meadows.
Populations of many amphibians, including the leopard frog, have been declining worldwide. Population trends are largely unknown. Risks include loss of habitat, and competition with non-native bull frogs.

Flannelmouth sucker. This native fish species is found in the mainstem of the Colorado River along the southern boundary of the planning area. This fish may also be found in the lower portion of Parachute Creek.

The flannelmouth sucker is a native species that has been experiencing a slow range wide decline. Numbers of individuals within the planning area are not known. The decline of this species is mainly attributed to changes in the Colorado River resulting from the impoundment of large portions of the mainstem and its tributaries. In addition, irrigation use and dams have dewatered, cooled, and altered much of the river system. The "controlling" of the river has resulted in losses of habitat and natural function such as flooding. In addition to losses of habitat function, many of these changes in the river system have resulted in more favorable conditions for non-native fishes. Non-native fishes that are now common, compete for resources including food, space, cover, and physical habitat, and are known to prey on native fishes.

Direct impacts to these fishes from land use actions are minimal. The majority of lands along the Colorado River and its 100-year floodplain are private. There is potential for offsite, secondary, and cumulative impacts associated with actions that could occur on public lands. Main risk factors include oil & gas development and associated roads, water depletions resulting from tributary and upland water impoundments, dams, commercial and residential development, off highway vehicle use, gravel pits, and the proliferation of non-native fishes. Although management actions that result in increased erosion could affect these fishes, it is important to note that this fish evolved in the high sediment carrying Colorado River. Impoundments that have resulted in "cleaner" water may actually be creating water conditions that favor competing non-native species. It is unlikely that any management action or combined actions will result in cumulative impacts significant enough to detrimentally impact these fish with regard to addition of sediment.

Roundtail chub. This native fish species is found in the mainstem of the Colorado River along the southern boundary of the planning area. This fish may also be found in the lower portion of Parachute Creek along the western boundary.

The roundtail chub is a native species that has been experiencing a slow range wide decline. Numbers of individuals are not known. The decline of this species is mainly attributed to changes in the Colorado River resulting from the impoundment of large portions of the mainstem and its tributaries. In addition, irrigation use and dams have dewatered, cooled, and altered much of the river system. The "controlling" of the river has resulted in losses of habitat and natural function such as flooding. In addition to losses of habitat function, many of these changes in the river system have resulted in more favorable conditions for non-native fishes. Non-native fishes that are now common, compete for resources including food, space, cover, and physical habitat, and are known to prey on native fishes.

Direct impacts to these fishes from land use actions are minimal. The majority of lands along the Colorado River and its 100-year floodplain are private. There is potential for offsite, secondary, and cumulative impacts associated with actions that could occur on public lands. Main risk factors include oil & gas development and associated roads, water depletions resulting from tributary and upland water impoundments, dams, commercial and residential development, off highway vehicle use, gravel pits, and the proliferation of non-native fishes. Although management actions that result in increased erosion could affect these fishes, it is important to note that this fish evolved in the high sediment carrying Colorado River. Impoundments that have resulted in "cleaner" water may actually be creating water conditions that favor competing non-native species. It is unlikely that any management action or combined actions will result in cumulative impacts significant enough to detrimentally impact these fish with regard to addition of sediment.

Northern goshawk. Northern goshawks preferred habitat consists of large conifer stands with relatively closed canopies. However, interspersed openings are also important for foraging. This species has not

been documented within the planning area so no trend information is known. However, suitable habitat does exist on top of the Plateau within the aspen and spruce-fir habitats.

There are no risks for this species as no birds have been documented. However, suitable habitat can be impacted by: roads, vehicle travel, oil & gas development, livestock grazing, and habitat fragmentation.

Peregrine falcon. The peregrine falcon was recently taken off of the list of T&E species. It occurs along cliff faces along portions of the Colorado River. At least 2 known nesting pairs have been noted.

This species has been steadily increasing in numbers and was recently taken off of the Federal list of threatened and endangered species. Occupied and suitable habitat is located within the planning area and may allow for expansion of existing populations. Risks to this species include, oil shale development, oil & gas development, and recreation. Risks are generally small given the preferred nesting habitats.

Columbian sharp-tailed grouse. Columbian sharp-tailed grouse require a mixture of habitat types with mountain shrub, grassland, and riparian vegetation. Cultivated fields with alfalfa and wheat are important at certain times of the year as are aspen and small conifer stands with open grassy parks.

Although some limited potential habitat may exist, only one unconfirmed record exist for this species within the planning area. No birds are currently known to reside in the Roan Plateau area. Within the GSFO, mixed mountain shrub habitats are generally associated with steep rugged slopes with few open grassy areas. Thus important breeding habitat is the main limiting factor for this species. Potential habitat could be impacted by; roads, vehicle travel, oil & gas development, recreation, and weeds.

6.5 Opportunities

Opportunities to protect special status species or protect and improve special status species habitat include:

- Reduce threats to Colorado River cutthroat trout including removing competing Brook trout.
- Limit surface disturbances within ½ mile of mapped winter range and winter roosting habitat.
- Riparian improvement/protection from grazing, OHV/roads, oil & gas development.
- Weed control.
- Identify and designate wildlife seclusion areas.
- Protect suitable habitat that can be impacted by roads and travel management, oil & gas development, surface uses, livestock grazing, and habitat fragmentation.

AMS-7 SUMMARY FOR SPECIAL STATUS SPECIES - PLANTS

7.1 Management Plans and Documents

Section 7of the Endangered Species Act (ESA) of 1973 requires that BLM ensure that any action authorized, funded, or carried out, is not likely to jeopardize the continued existence of any threatened and endangered species and avoids any appreciable reduction in the likelihood of recovery of affected species. Colorado BLM is currently contracting programmatic statewide assessments for candidate, threatened and endangered species.

BLM Sensitive Species Policy outlined in BLM Manual 6840 (IM No. 97-118) directs BLM to ensure that no action that requires federal approval should contribute to the need to list a species as Threatened or Endangered. This applies to candidate and BLM sensitive species. Species proposed for Federal listing are to be managed with the same level of protection provided for T&E species.

The GSRA RMP of 1984 (revised 1988) had no specific objective for managing special status species since very few species and locations were known to exist within the Resource Area. The only direction for the management of special status species was: 1) *Designate the lower Colorado River as an area of critical environmental concern (ACEC) to protect important riparian and wildlife values (including the Endangered bald eagle, and the great blue heron, a species of concern) and 2) Monitor, maintain, or improve habitat for threatened and endangered species (bald eagle and peregrine falcon).*

The threatened and/or endangered plant species objectives within the WRRA as described in the 1996 WRRA RMP are to*; "Promote the protection and recovery of federally listed and proposed threatened or endangered plant species, participating to the extent practicable in achieving applicable recovery plan objectives. Ensure that land use and other multiple uses are compatible with or complementary to the protection, maintenance or enhancement of all candidates for listing and all listed threatened or endangered plant species and their habitats so as to avoid the need for subsequent more restrictive listings".*

The 1996 WRRA RMP objectives for sensitive plants and remnant vegetation associations are to: *"Provide for the conservation, protection and management of plant species designated as BLM sensitive species. Ensure that land use is complementary to the protection, maintenance or enhancement of BLM sensitive plant species and their habitats so as to avoid the need for subsequent listing and protection under the Endangered Species Act. Provide for the conservation, protection and management of selected occurrences of high priority remnant vegetation associations (RVAs) and unique plant communities".*

7.2 Current Management

The 1988 GSRA RMP documented only one threatened plant species, the Uinta Basin hookless cactus (*Sclerocactus glaucus*). Phacelia submutica has been upgraded to a Candidate species. Penstemon harringtonii is currently listed as a BLM Sensitive species on the State Director's Sensitive Plants List.

ESA consultation and coordination is performed under guidance as outlined in the Interagency MOA for Programmatic ESA Section 7 Consultations. The MOA established a general framework for a "streamlined" process for interagency cooperation among the BLM, USFS, USFWS, and the NMFS in the exercise of their responsibilities under the ESA of 1973, as amended (ESA; 16 U.S.C. 1531-1544) and the 1994 Memorandum of Understanding on the conservation of species which are tending towards federal listing (94-SMU-058), which all four agencies signed.

For NOSR 1 (top of the Roan Plateau), the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment deferred decisions on surface use stipulations to the current land use planning process (Roan Plateau RMP Amendment). Standards for special status plants and significant plant communities in the remaining GSFO portion of the planning area below the Roan Plateau rim are met through the application of mitigation measures as identified in the ROD. These include;

- NSO-12. Threatened or Endangered Species.
- CSU-3. BLM Sensitive species and Significant Natural Plant Communities.

Within the WRRA, vegetation resources are managed to enhance and maintain sustainability for ecological condition within plant communities. Riparian, sensitive plants and remnant vegetation associations are inventoried and protected in accordance with RMP objectives, and in cooperation with Colorado Natural Area programs and other interested parties. Standards for special status plants within the WRFO portion of the planning area are met through the application of mitigation measures as listed in Appendix C - Conditions of

Approval (Best Management Practices) and stipulations listed in Appendix B of the 1996 WRRA RMP. These would be applied to all surface-use activities and include:

- NSO 6. Designated Areas of Critical Environmental Concern (ACECs).
- NSO 8. Known and Potential habitat of Listed and Candidate T&E Plant Species.
- NSO 9. Sensitive Plants and Remnant Vegetation Associations.
- CSU 2. Proposed ACECs.

7.3 Characteristics and Setting

Ecoregional Setting. The Roan Plateau planning area falls within two distinct ecoregions. An ecoregion is an area distinguished by climate, topography, elevational range and bedrock geology, all of which function in concert to determine the types of ecosystems and wildlife habitat that can occur in a given area. The rolling lowlands and foothills immediately west and northwest of Rifle are derived from the Wasatch Formation and are considered to be part of the Southern Rockies Ecoregion (TNC, 2001). The foothills rise abruptly to form a 4,000-foot high cliff of the Green River Shale Formation. Atop the cliffs, the terrain consists of rolling plateaus dissected by steep canyons that are part of the Utah High Plateaus Ecoregion (TNC/Bailey's).

The Roan Plateau planning area is unique within either ecoregion. Although the geomorphology of the plateau is similar to that in the Tavaputs and Wasatch Plateaus of Utah and the Book Cliffs of western Colorado, the geology and elevation create a unique environment with numerous rare and endemic species and many excellent examples of uncommon plant communities. The Roan Plateau feature extends from Parachute Creek to the cliffs northwest of Rifle. The Plateau rises from west to east with the area portion of the Plateau comprising the highest elevation. Therefore, although the Green River formation continues west into Utah, because the Roan Plateau is higher in elevation it has cooler temperatures and receives more moisture. The aspen groves, spruce-fir forests and lush riparian zones are not found in the rest of the Roan Plateau or in the Book Cliffs. Even more unique, the hanging gardens and seeps are not found anywhere else in the ecoregion. The Wasatch Plateau of Utah is similar in elevation but the substrate is different, thereby producing different vegetative communities.

Deep canyons isolate drainages and plateaus of the ecoregion. Over the millennia since the ancient lakebed uplifted and the canyons eroded, the flora and fauna have evolved with little genetic interaction. Therefore, each watershed represents a biological (genetic) island and each contains its own set of endemic plants (Rondeau, CNHP).

Biological Richness. The Roan Plateau is also rich in biological diversity which is not represented elsewhere. "For the relatively small size of the geographic area, the NOSR (Roan Plateau) is extremely species rich. There are only three other areas of comparable size in western Colorado that contains such a richness of rare species. The other three areas include two National Monuments and a National Park." (CNHP Report, 1997).

Rare Plants and Plant Communities. The landscape above the rim is comprised of cool, mesic, mid-elevation plateaus and canyons. Upland vegetation consists of a combination of mixed mountain shrubs, mountain big sagebrush, aspen groves, spruce-fir forests, grasslands, and sparsely vegetated shale barrens. Riparian areas include moist meadow/graminoid wetlands, riparian shrublands and riparian woodlands. Riparian vegetation above the rim generally consists of tufted hairgrass, various sedges, Rocky Mountain willow, Drummond's willow, blue spruce, and Engelmann spruce. A unique wetland feature found on the plateau is the hanging garden seeps that support the rare hanging garden sullivantia (*Sullivantia hapemanii*). The remaining special status plants above the rim are limited almost exclusively to the sparsely vegetated shale barrens environment. Significant natural plant communities are primarily associated with riparian areas, grasslands and mesic aspen forests.

The landscape above the rim and the cliffs themselves are comprised of various members of the Green River shale formation. This formation is home to numerous rare, unique, and endemic plants and plant communities. Special status plant species found in this formation include: Parachute penstemon

(*Penstemon debilis*) and Southwest stickleaf (*Mentzelia argillosa*). Other rare plants include: Dragon milkvetch (*Astragalus lutosus*), Utah fescue (*Festuca dasyclada*), and the Hanging garden sullivantia. The Southwest stickleaf, which grows only in the Green River shale, has also been found in several places below the rim where alluvial/colluvial deposits from the Green River formation extend down into the drainages. Piceance bladderpod (*Lesquerella parviflora*), another Green River Shale Formation endemic and a BLM Sensitive plant, is known to occur to the immediate north, west and south of the planning area, but has not yet been found here.

The landscape below the rim is generally arid, low elevation, rolling hills, breaks and terraces. Vegetation typically consists of Wyoming and Basin big sagebrush flats, and rolling hills or breaks of Utah juniper mixed with some pinyon pine. The few riparian areas on the southern and eastern side of the planning area typically consist of willows with scattered narrowleaf cottonwood trees or sparse stands of tamarisk. On the western side in East Fork Parachute Creek and East Middle Fork Parachute Creek have extensive, woody riparian vegetation in good condition. East Fork Parachute Creek contains a unique riparian community of boxelder-narrowleaf cottonwood-red-osier dogwood.

Below the cliffs, the geology consists largely of the Wasatch Formation. The special status plants, Debeque phacelia and Debeque milkvetch, are found exclusively on this formation which extends from the vicinity of Debeque to Sharrard Park (a distance of about 25 miles). The Roan Plateau represents the easternmost extent of these species' range and therefore may contain unique genetic adaptations. This formation also provides potential habitat for Uinta Basin hookless cactus and Grand Junction milkvetch, although none have yet been documented.

Below the rim, most of the rare plants are found on barren clay soils, sparse sagebrush stands or in open pinyon/juniper woodlands.

7.4 Resource Condition and Capabilities Evaluation

Within the planning area, one threatened plant, two candidate plants, two BLM sensitive plants, a rare hanging garden environment, and eight significant natural plant communities are known to exist. The CNHP ranks rarity on a global (G) and a statewide (S) basis (Table 7.4-1). A rank of G1 or S1 is given to those plants or plant communities with usually 5 or fewer known occurrences. A rank of G2 or S2 is given to those species or communities with usually between 5 and 20 occurrences.

7.4.1 Plants

Uinta Basin hookless cactus (*Sclerocactus glaucus*) was listed as a Threatened species in 1979, G3/S3. The Uinta Basin hookless cactus is found in four counties in western Colorado and in portions of eastern Utah. Habitat for the plant exists, but it has not yet been documented to occur.

Parachute penstemon (*Penstemon debilis*), a candidate species, is extremely rare; only 5 populations are known globally (all within Garfield and Mesa Counties, CO). Three populations occur on public land; the other two (including the largest population) occur on private land. Two populations are within the planning area. Total land area covered by all 5 populations is approximately 50 acres. The plant is found only on the Parachute Creek Member of the Green River Shale Formation (O'Kane and Anderson, 1987). This species is adapted to survive on steeply sloping and constantly moving talus slopes.

One population on a steep open slope adjacent to the Anvil Points Rim Road is quite small in numbers and has diminished steadily over the past decade. This population is at high risk of loss should oil-shale development ever resume. The other population, on a bench within the Green River Formation Shale below the Roan Plateau rim has between 500-1000 individuals and appears stable. The population of the Parachute penstemon above the cliffs is declining due to undetermined causes. Livestock grazing is not a significant factor since the area is too steep and too sparsely vegetated to attract much livestock use. The steepness of the site also inhibits OHV use and weed encroachment has been minimal.

Parachute penstemon is a candidate for listing on the U.S. Fish and Wildlife Service's Endangered Species List (USFWS, 1996) and is considered "critically imperiled" (G1/S1) by the CNHP (CNHP, 1997) based on its few occurrences, narrow global distribution, and current and potential threats at all of its known populations. The CNHP believes that unless strong protective actions are taken, listing as Threatened by the U.S. Fish and Wildlife Service may be necessary to prevent extinction (CNHP, 1997).

Debeque phacelia (*Phacelia submutica*) was listed as a candidate species in 1996 and first documented within the planning area in 2001. This plant was found in several locations in the slopes above the Garfield County landfill. No attempt was made to census the entire population. Population size is unknown. The global distribution of this species ranges from approximately 10 miles northwest of Debeque to six miles west of Rifle. Within this narrow range, the Debeque phacelia is further restricted to small patches of shrink swell clay soils on the Atwell Gulch and Shire Members of the Wasatch Formation. The populations may be genetically unique. There is no data on current condition or trends.

Southwest stickleaf (*Nuttalia argillosa* or *Mentzelia rhizomata*), a BLM sensitive species, is an oil shale endemic. Populations of southwest stickleaf occur in two distinct regions: central Utah and Garfield County, Colorado. Recent taxonomic research indicates the stickleaf populations in Colorado may in fact be a separate species from the Utah species (Reveal, 2001). There are 33 known occurrences in Colorado extending from Conn Creek (north of Debeque) to Anvil Points (north of Rulison).

The plant is adapted to survive on steeply sloping and constantly moving talus or scree slopes of the Green River Shale Formation. The occurrences on the Roan Plateau are on talus slopes along each fork of Parachute Creek, along the southern rim of the Roan Cliffs and in steep drainages and washout areas below the rim. The populations of Southwest stickleaf which occur below the rim are all found along the banks of drainages where Green River shale has been deposited from the cliffs above

Little or no research has been conducted on any of these rare species, so little is known about life history characteristics, habitat requirements, pollinator species, dispersal mechanisms, or other factors determining the status and trends of the species. The species is considered at-risk of extinction strictly due to its narrow range. The populations above the rim and near the East Fork of Parachute Creek falls are small but appear to be healthy and self-sustaining. The populations along the drainages at the base of the cliffs are small in number and are susceptible to disturbance. Loss of even a few individuals may put the whole site at risk.

Debeque milkvetch (*Astragalus debequaeus*), a BLM sensitive species, occupies a very small range on a very specific geologic formation (CNHP, 1997). Debeque milkvetch is found only on the Wasatch Formation (in a narrow geologic environment) between Debeque and Rifle, Colorado. Plants are common on the Atwell Gulch Member of the Wasatch Formation, but not elsewhere. Several occurrences have been documented at the eastern edge of the species' range. These populations at the edge of the range are especially important for genetic diversity and adaptation. No research has been done on this species, so little is known about this species' habitat needs and life history requirements.

This species occurs within and immediately adjacent to an area being developed for natural gas. Surface disturbing activities, such as construction of roads and pads, may directly affect Debeque milkvetch populations through destruction of individual plants and fragmentation of habitat. Nearly 90% of the occupied habitat for Debeque milkvetch is already leased for oil and gas. Most of these (approx. 2400 acres) are old leases without any protective stipulations other than the standard stipulations that allow the location of a pad, road or other disturbance to be moved up to 200 meters to protect resources at risk. The other lease (2573 acres) is issued under the terms and conditions of the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment that provides a Controlled Surface Use stipulation. Other potential threats in the area include off-highway vehicles, activities associated with oil shale extraction and processing, weeds and trampling by cattle.

Piceance bladderpod (*Lesquerella parviflora*), a BLM sensitive species, is endemic to talus slopes of the Green River Shale Formation. The plant is known to occur in parts of Rio Blanco, Garfield and Mesa Counties and has been found to the immediate north, west and south, but has not yet been documented within the planning area.

Hanging garden sullivantia. (*Sullivantia hapemanii var. purpusii*) is a Colorado endemic rare plant which occurs only in hanging garden environments created by moisture seeping between the layers of shale or in close proximity to waterfalls. *Sullivantia hapemanii var. purpusii* has been documented from 52 occurrences within Garfield, Rio Blanco, Montrose, Pitkin, and Gunnison Counties in Colorado. Although the hanging garden sullivantia is ranked G3/S3 and occurs in several places other than the Roan Plateau, the Roan Plateau occurrences are considered target populations for conservation because they comprise nearly 62% of the known occurrences. The hanging garden sullivantia often occurs in association with other wetland plants such as *Mimulus guttata* and *Aquilegia barnebyi*. Risks to the hanging garden communities are primarily associated with changes in hydrology that might dry up the seeps that support the hanging gardens community. Due to the steep slopes where the communities generally occur, grazing is not considered a direct risk factor.

Sun-loving meadowrue (*Thalictrum heliophilum*) is considered globally and locally vulnerable and is a Colorado Natural Heritage Program watch-listed species in Garfield, Mesa and Rio Blanco County. Less than 36 occurrences are known. The Roan Plateau is central to the species' distribution. Narrowly restricted, this Colorado endemic is found only on the Green River shale.

Other Green River shale endemics. The Roan Plateau is also home to a number of other species that are narrowly restricted to the Green River Shale Formation. These include the Sun-loving meadowrue (Thalictrum heliophilum, G3/S3), Utah fescue (Festuca dasyclada, G3/S3), and Dragon milkvetch (Astragalus lutosus, G3/S3). Although the Utah fescue and the Dragon milkvetch are comparatively widespread and abundant, the Sun-loving meadowrue is known from less than 36 occurrences in Garfield, Mesa, and Rio Blanco County.

7.4.2 Plant Communities

The CNHP has identified 9 significant natural plant communities on the Roan Plateau that are in good to excellent condition and are relatively rare (*CNHP, 1997).* The Western slope sagebrush shrubland community occurs on private land. The other communities are found within the East Fork of Parachute Creek watershed and along the rim of the Roan Plateau.

Table 7.4-1 Significant Natural Plant Communities

Common Name	Scientific Name	Rarity Rank
Boxelder riparian forest	Acer negundo-Populus angustifolia/Cornus sericea	G2/S2
Montane riparian forest	Picea pungens/Cornus sericea	G4/S2
Hanging garden seeps	Aquilegia micrantha/Mimulus eastwoodiae	G2G3/S2S3
Aspen/Rocky Mountain maple forest	Populus tremuloides/Acer glabrum	G2/S1S2
Western slope sagebrush shrubland	Artemisia tridentata vaseyana/Festuca thurberi	GU/S1S2
Sagebrush bottomland shrubland	Artemisia tridentata vaseyana/Leymus cinereus	G4/S2
Western slope grassland	Oryzopsis hymenoides shale barren	G2/S2
Great Basin grassland	Pseudoroegneria spicata inermis	G2?/S2?
Great Basin montane grassland	Pseudoroegneria spicata inermis-Poa secunda	G4/S1
Old growth Douglas-fir forest	Pseudotsuga mentziesii	N/A

Boxelder riparian forest (*Acer negundo-Populus angustifolia/Cornus sericea*) is a low-elevation riparian community restricted to just a few sites in western Colorado. In the planning area, an excellent example of this community is found along the box canyon below the falls in East Fork Parachute Creek.

Montane riparian forest (*Picea pungens/Cornus sericea*) is a globally uncommon riparian plant association. Its global distribution is limited to western Wyoming, western Colorado, northern New Mexico, and Arizona. This plant association occurs in narrow valleys at low to mid elevations (7,000 to 8,500 feet). This plant association is found along East Fork Parachute Creek above the falls. Houndstongue and Canada thistle are becoming increasingly common in the riparian zones on the Roan Plateau. These noxious weeds outcompete native vegetation, change the composition of the communities, and are less able to stabilize the streambanks than the deeper-rooted native riparian species.

Hanging garden seeps (*Aquilegia micrantha/Mimulus eastwoodiae*). Hanging gardens occur on the Roan Plateau where water seeping through the Green River formation is exposed at the surface along steep drainages and cliffs. "Hanging gardens" are abundant along East Fork Parachute Creek, East Middle Fork Parachute Creek, and lower Northwater Creek. However, most of these hanging gardens consist almost exclusively of the Hanging garden sullivantia. Only one occurrence of the Mancos columbine/Eastwood's monkeyflower (Aquilegia micrantha/Mimulus eastwoodiae) community has been documented. This site is just below East Fork Parachute Creek falls.

Aspen/Maple forests (*Populus tremuloides/Acer glabrum*) have been documented in one drainage in the Sawatch Range of Colorado and from a few other scattered locations in the mountains of Colorado (CNHP, 1997). On the Roan Plateau the plant association was noted in two locations near the headwaters of First Anvil and Second Anvil Creeks. Each stand is approximately 40 acres in size. These appear to be healthy, climax aspen stands with good regeneration of aspen and maple and diverse and productive understory vegetation. The Anvil Points Rim Road cuts through one of these stands. Although the primary plant association appears to be in good condition, there are weeds invading along the road that may potentially degrade the overall community.

Western slope sagebrush shrublands (*Artemisia tridentata ssp. vaseyana/Festuca thurberi*) have only been described from the western slope of Colorado (Johnston 1987). On the Roan Plateau, this plant association is located on private land along the gentle slopes of a Northwater Creek tributary. Thurber fescue is uncommon on the Roan Cliffs, therefore this is a very unusual site. The Northwater site also has an adjacent pure stand of Thurber fescue.

Sagebrush bottomland shrublands (*Artemisia tridentata ssp. vaseyana/Leymus cinereus*) have been recorded in Idaho, Nevada, and northwest Colorado (CNHP, 1997). This association requires fairly unusual conditions of moist, but not saturated, deep soils along flat to gently sloping areas. It occurs in a narrow elevation band from 7,500 to 8,800 feet. These unusual conditions probably help explain its limited distribution. Another reason for its rarity may be due to a century of livestock grazing. The Wild rye grass (Leymus cinereus) is very palatable for cattle and is quickly utilized. It is suspected that heavy utilization and/or lack of fires will favor Mountain sagebrush (Artemisia tridentata ssp. vaseyana) and weakened conditioned Wild rye grass (Leymus cinereus) or other smaller grasses such as bluegrass. Three occurrences of this plant association were found: two near Anvil Points and one along Bull Gulch. All of these occurrences were in fair to moderate condition.

Western slope grasslands (*Achnatherum hymenoides* shale barren), a sparsely vegetated grassland, is extremely limited in its distribution, known only from three counties in western Colorado, from approximately 7,000 to 8,500 feet in elevation. It is restricted to south-facing slopes with soils derived from shales or mudstones. These soils are normally clayey, loamy, calcareous and shallow, often capped by a thin gravel layer (Reid, M. S., L.D. Engelking, and P. S. Bourgeron, 1994). Total vegetative cover is sparse, and bare soils may cover up to 75% of the ground surface. On the Roan Plateau, the plant association was found on south-facing slopes of East Fork Parachute, Northwater, Trapper and Ben Good Creeks (CNHP, 1997).

Great Basin grasslands (*Pseudoroegneria spicata ssp. inermis*) plant associations have only been recorded from the Piceance Basin of Colorado, specifically from Rio Blanco and Garfield Counties (Baker, 1983; CNHP, 1997). It occurs on either south-facing slopes or on broad ridge tops and plateaus that are often gently sloping to the south or southwest (Baker, 1983). On the Roan Plateau, this plant association occurs along the eastern rim of the Plateau from East Anvil Point to the vicinity of the JQS trail. The site is characterized as a windswept area dominated by grasses and devoid of tall shrubs. Baker (1983) believes high quality occurrences of this plant association are very hard to find, primarily due to heavy grazing pressures. The Anvil Points site is a good example (B-ranked) of this type.

Great Basin montane grasslands (*Pseudoroegneria spicata ssp. inermis/Poa secunda*) reach their southern limit in Utah and Colorado (Bourgeron and Engelking, 1994). The plant association is more widely distributed throughout Idaho, Montana, Wyoming and eastern Washington and Oregon. It occurs on extremely dry windswept knolls and exposed upper slopes of 2-10%. In Colorado, the normal elevation

range for this plant association is between 8,200 and 9,000 feet (Johnston, 1987). On the Roan Plateau this plant association is represented by a single occurrence on Gardner Peak, and is part of the larger grassland dominated by Beardless bluebunch wheatgrass without Sandberg bluegrass.

Douglas-fir communities are relatively common along steep, north-facing drainages in western Colorado. However, old-growth stands are becoming increasingly rare. The Roan Plateau hosts several small excellent-condition, old-growth stands of Douglas-fir on the cliffs north of the JQS Road.

General Trends. Invasion of noxious weeds is causing a decline in the condition of the riparian communities. In some areas along the creeks, noxious weeds form a monoculture out-competing all native vegetation. These noxious weeds do not have the bank-stabilizing root systems that native riparian species have and as a result, the streams are more vulnerable to bank damage and sedimentation. Roads bisect or border several of the significant plant communities. Roads bisecting plant communities may be causing fragmentation of the sites, and a decrease in the condition and extent of the communities, as well as providing an avenue for the introduction of noxious weeds. The flat nature of the grasslands also makes them vulnerable to unauthorized off-road vehicle use.

7.5 Opportunities

Scoping comments regarding biodiversity expressed that the planning process offers the opportunity to; 1) Protect and enhance threatened, endangered, sensitive, rare and endemic plants and significant natural plant communities and ensure no actions degrade the populations or their habitat, and 2) Maintain or enhance the overall biological diversity and richness of the Roan Plateau.

Actions include:

- Utilize CNHP database and expertise on plants and plant communities of concern. Consider CNHP's Potential Conservation Areas in planning to protect ecosystem processes and to identify areas for special management attention.
- Prescribe special management actions and mitigating measures to reduce potential negative effects to plants and plant communities, such as; applying surface use stipulations, riparian grazing utilization stipulations, fencing creek bottoms, closing roads or restricting surface disturbances.
- Acquire biologically important properties.
- Designate ACECs to highlight and protect the biologically significant resources (Table 7.5-1).

Table 7.5-1 Potential ACECs

Area	Rationale
Anvil Points Rim	Protect two candidate plants, Parachute penstemon and Debeque phacelia; two sensitive plants, Southwest stickleaf and Debeque milkvetch; and several significant natural plant communities. This area is probably the most unique and biologically important site. Ranked B-2 by CNHP, "Very high significance".
East Fork of Parachute Creek	Protect BLM Sensitive, Colorado River cutthroat trout and Boreal owls, Southwest stickleaf, Hanging garden sullivantia, and significant natural plant communities. Ranked B-2 by CNHP, "Very high significance".
Northwater Creek	Habitat for Colorado River cutthroat trout, Hanging garden sullivantia and boreal owls. Ranked B-3 by CNHP, "High significance".
Trapper Creek	Growing population of Colorado River cutthroat trout that is considered a "conservation population".
Magpie Gulch	Protect several excellent old-growth stands of Douglas-fir as well as several breeding pairs of three-toed woodpeckers.
Parachute Creek	Protect elements of biodiversity including; CO River cutthroat trout, Arapien stickleaf, Hanging garden sullivantia, and several unique or significant plant communities.

AMS-8 SUMMARY FOR LIVESTOCK MANAGEMENT

8.1 Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) and the WRRA RMP of 1996 were amended on February 12, 1997, by the Colorado Standards for Public Land Health for all BLM lands in Colorado. Standards describe the conditions needed to sustain public land health and apply to all uses of public lands.

The livestock grazing management objective within the WRRA as described in the 1996 WRRA RMP is to; *Provide a healthy public rangeland condition capable of supplying forage on a sustained yield to meet the demand for livestock grazing, 2) Provide for adequate forage plants growth and/or regrowth opportunity necessary to; a) replenish the plants food reserves; and b) produce sufficient seed to meet the production needs necessary to maintain an ecological presence in the plant community, and 3) Manage livestock grazing to maintain or enhance a healthy rangeland vegetative composition, species diversity, and other resource values.*

The livestock management objectives, as outlined in the OMP, for NOSR 1 and 3 is; *"Livestock management will be permitted to provide effective distribution and control of livestock to maintain good watershed conditions and avoid excessive erosion and damage."*

8.2 Current Management

Livestock management was permitted under the OMP with DOE providing it did not interfere with DOE programs or management objectives. Grazing was managed to maintain and prevent deterioration of the NOSR soils, vegetation, watershed, and wildlife habitat.

Since 1997, livestock are being managed to meet or exceed Colorado Land Health Standard # 3 (see Appendix B Figure 1). Appendix B Figure 4 displays documents addressing livestock management.

Within the WRRA, livestock grazing is managed as described in 1981 Rangeland Program Summary. Forage allocations from the Summary will continue until sufficient data exists to require their modification. Monitoring studies will continue on 81 allotments to evaluate livestock grazing levels. Range improvements continue to be used to improve rangeland conditions. Integrated activity plans, including NEPA analysis, will be developed for all allotments within the activity plan boundaries.

Facilities. Three cow camp cabins, are located in allotments above the rim. Two of the cabins are located in the East Fork Common Allotment and one in the JQS Common Allotment. The Bureau of Land Management has title to these cabins since they are facilities built on public lands but assigns maintenance responsibility to permittees through either cooperative agreements or section 4 permits.

8.3 Characteristics and Setting

There are 20 grazing permittees authorized on 16 allotments, including the Government Creek Common Allotment to the east of Highway 13, (Appendix A Map 7) both above and below the Roan Plateau rim, most of which are small family farm operations. The area is grazed by approximately 3550 cattle and 4700 sheep with a total of 10,783 AUMS available for grazing (Appendix B Figure 5). The amount of revenues received varies from year to year depending upon the grazing fee and the amount of active use but averages about $14,500 per year. Most permittees have cow/calf and ewe/lamb operations and are highly dependent on the forage resources on the allotments above the rim as summer range for their livestock operation. The areas below the rim have cow/calf and ewe/lamb operations. These areas serve as spring/early summer/fall/winter ranges for their livestock operations.

Livestock grazing allotments are administered under three selective management categories designed to concentrate public funds and management efforts on allotments with the most significant resource conflicts and the greatest potential for improvement. Improve (I) category allotments are managed to improve current unsatisfactory resource conditions and will receive the highest priority for funding and management actions. Maintain (M) category allotments are managed to maintain current satisfactory resource conditions and will be actively managed to ensure that resource values do not decline. Custodial (C) category allotments are managed custodially while protecting existing resource values. In the Roan Cliff RMP Amendment area, 11 allotments are in "I" category, 1 is in the "M" category, and 3 are in the "C" category.

8.4 Resource Condition and Capabilities Evaluation

The allotment information is summarized from monitoring data and land health assessments (also see AMS - 17 Summary for Vegetation - Riparian & Wetlands and AMS - 18 Summary for Vegetation – Upland).

8.4.1 Allotments Below the Roan Plateau Rim

Magpie Gulch Allotment. The 2001 land health assessment data indicates that standard # 3 was met at all locations. This indicates the range condition is moving towards a mid to late seral stage. No other monitoring data is available.

Hubbard Mesa Allotment. An allotment evaluation written in 1996 describes concerns with vegetation resources, particularly with browse conditions and utilization levels on sagebrush species. The utilization levels were attributed to both mule deer and sheep. The evaluation also expressed concerns of low diversity of grass and forb species. Browse utilization, poor browse recruitment and understory diversity on public land parcels surrounding private land and portions of Cook Gulch is still a concern in the allotment. The poor browse recruitment and understory diversity may be the results of past livestock practices, the allotment being a heavy deer wintering area and the low potential of these sites. In December 1996, a Livestock Use Agreement, which governs sheep use in the allotment, was signed by the BLM and the permittee.

The 2001 permit renewal environmental assessment (EA) noted that widespread and increasing vehicle use is concern in the allotment, especially in Home Ranch and Cook Gulch. The EA also noted sagebrush stands are decadent and encroachment by Utah juniper and pinyon pine trees, probably due to fire suppression

The 2001 land health assessment, available monitoring data, and the 1996 Allotment evaluation indicate the seral stage range condition has stayed static or declined since the 1981 Soil and Vegetation Inventory Method (SVIM) inventory.

Rees Allotment. This allotment is meeting public land health standards. In 1990, the allotment was converted from sheep grazing to cattle grazing during a transfer of grazing privileges. The land health assessment data indicates the range condition is moving towards mid to late seral stage. No other monitoring data is available.

Doodlebug Allotment. The upland assessment site in the Doodlebug Allotment had good vegetative community diversity. Grasses and forbs looked healthy and productive, but the shrubs were heavily hedged and showed signs of stress from big game use. Standard # 3 for public land health was met in this allotment. The land health assessment data indicates the range condition is moving towards mid to late seral stage. No other monitoring data is available.

Sharrard Park Allotment. This allotment has not been grazed since 1990 when the permittee gave up the permit due to the landfill and gas developments. The GSRA RMP (Revised 1988) indicates 23 AUMs are an appropriate stocking level for this allotment due to suitability factors such as forage condition and terrain available for grazing. A land health assessment has not been completed for this allotment and there is no

other available monitoring data to indicate range condition. SVIM data and the GSRA RMP (Revised 1988) indicate the allotment is in early to mid-seral stage.

Wheeler Gulch Allotment. No recent monitoring data is available for the Wheeler Gulch Allotment. Browse monitoring data collected in 1994 and 1995 indicate that browse is in unsatisfactory condition and slight to light utilization is occurring on key browse species such as black sagebrush. Heavy utilization was noted on scattered individuals of Ceanothus. This was attributed to deer use since cattle grazing has not occurred since 1986. Utilization studies conducted in 1985 and 1986 indicated that slight to light utilization occurred on key forage plant species. Allotment inspections at the time indicated that the forage condition in the allotment was poor. Prior to 1986, 37 cows and 56 AUMs were allocated for the allotment. However, the GSRA RMP indicates 8 AUMs are an appropriate stocking level for this allotment due to suitability factors such as forage condition and terrain available for grazing.

A land health assessment has not been completed. Available monitoring data plus the SVIM inventory indicates the allotment is in early to mid-seral stage.

Cottonwood Gulch. Some sagebrush benches in the allotment had some perennial grasses but undesirable plants such as cheatgrass and snakeweed were abundant. The allotment shows evidence of poor grazing management in the past, and problems have been noted with cattle trespassing from the adjoining private land. However, in recent years, the grazing management has improved and the vegetative condition appears to be improving as well. A 1995 riparian survey indicates the riparian areas are in static to improving condition. The allotment is grazed from 05/11 to 06/05, which provides an adequate regrowth period for upland and riparian vegetation. In the sagebrush and salt desert scrub communities, the understory is still dominated by annuals, but perennials are present in the interspaces and appear to be y. Utilization levels in 2001 vary from slight to moderate, which is meeting the utilization standard of 50%. A Land Health Assessment has not been completed but available monitoring data indicates that range condition is moving towards mid to late seral stage.

Webster Park. Utilization data collected in 1996 and 2001 indicates the 50% utilization standard for upland vegetation is being met with the exception of heavy utilization levels occurring near or at a gas well in 2001. A 1992 apparent trend study indicated static trend at one key area. In addition, 1993 browse studies indicates slight to light utilization on sagebrush with the exception of heavy utilization occurring at one study site. The age classes ranged from young to mature to decadent with some recruitment. A 1995 riparian survey indicates an intermittent gulch is in declining condition. This was contributed to the gulch being limited in terrain, soil and subject to flashy runoff.

A 2001 land health assessment completed in the Goodrich Park area plus available monitoring indicates range conditions in this portion of the allotment are moving towards a mid to late seral stage. A land health assessment has not been completed in the remaining areas of the allotment. Goodrich Park is grazed from 11/01 to 02/28 so no grazing occurs during the growing season.

8.4.2 Allotments on the Roan Plateau

East Fork Common Allotment. A lack of upland water sources have contributed to poor livestock distribution in the past, with livestock grazing concentrated in the riparian zones along the streams. A 1984 AMP set utilization and basal coverage objectives for key upland areas of the allotment. In 1986, pasture configurations changed from a four-pasture rest rotation system to a three pasture deferred rotation system. The three-pasture system was preferable because it eliminated the pasture fence that ran down the middle of Ben Good Creek allowing grazing in the riparian zone from two different pastures. Permit renewals conducted in 2001 established utilization objectives for riparian areas and adjusted utilization objectives for uplands. Monitoring data indicates that utilization objectives have been met with current management with slight to light moderate utilization on key species occurring.

Changes in riding and salting practices, removing fences along creek bottoms, and developing upland water sources have helped to bring about some improvement in upland and riparian conditions. Apparent trend observed in 1986 and 1990 indicated the trend was static, but some evidence of upward trend was apparent

in 1992. The land health assessment indicated the creeks are either at proper functioning condition (PNC) or functioning at risk with an upward trend. The land health assessment and monitoring indicates that range conditions have improved since the 1981 SVIM inventory for both upland and riparian vegetation. Seral stages within the allotment appear to be in good to excellent condition.

The Mahaffey Summer Allotment. Due to limited water sources and the steep topography of the drainages, proper livestock distribution has been difficult to achieve. A series of pit reservoirs constructed in the uplands have helped to improve livestock distribution. The grazing period on the allotment is from 7/6-10/15. The allotment is divided into 3-4 pastures and season-long grazing on any one area is not allowed, so the grazing system should provide for adequate rest and recovery periods to maintain vegetative health. 1992 apparent trend data indicates trend is upward in the allotment. Inspections indicate that utilization levels were within acceptable limits. The land health assessment and other monitoring indicates that range condition has improved since the 1981 SVIM inventory for both upland and riparian vegetation. Seral stages within the allotment appear to be in good to excellent condition (or towards late to PNC seral stage).
The riparian zone on First Anvil Creek, Sheep Trail Hollow, and Trail Gulch were all evaluated in proper functioning condition (PNC) in 1999. East Fork Parachute Creek, Pump House Gulch, Forked Gulch and Cottonwood Gulch were not evaluated in 1999. Generally riparian areas seemed to be recovering although not in proper functioning condition yet. The riparian areas are infested with bull thistle and houndstongue. Kentucky bluegrass is also abundant.

JQS Common Allotment. A lack of upland water sources have contributed to poor livestock distribution in the past, with livestock grazing concentrated in the riparian zones along the streams. An allotment management plan (AMP) completed in 1985 and revised in 1993 changed the grazing rotation system and set utilization and basal coverage objectives for key upland areas of the allotment.

A PFC evaluation occurred in 1994. Riparian objectives were added to the AMP and numerous measures were implemented to improve livestock management on riparian zones on the JQS Common Allotment. It appears that these measures have been successful. Riparian monitoring conducted in 1998 indicates that almost all of the riparian areas are improving. Middle Trapper Creek and Golden Castle Gulch had the only riparian zones evaluated in 1998 as static and no riparian zones were found to be declining.

The 1999 land health assessment noted that range condition has improved since the 1981 SVIM inventory for both upland and riparian vegetation. The creeks are either at PFC or functioning at risk with an upward trend that indicates improvement has occurred in the riparian areas. Seral stages within the allotment appear to be in good to excellent condition (or towards late seral stage or PNC).

Recent allotment inspection reports indicate that livestock distribution has improved, upland forage utilization has improved, and the riparian zones are improving.

Old Mountain Allotment. The allotment was rested in 2001. The allotment contains riparian areas along Forked Gulch and West Forked Gulch. A 1999 PNC assessment of both riparian areas rated them as functioning at risk with an upward trend. Although the Old Mountain Allotment shows a four month period of grazing use, rotational grazing use in conjunction with private land is practiced and grazing use only occurs for a period of one month between June 16 and Oct. 15. The one-month period of grazing allows ample grazing rest and recovery time for riparian plant species. The upward trend rating is probably indicative of the current grazing management on the allotment. The grazing permit also has a utilization limit stipulation that further protects the riparian area.

The land health assessment and other monitoring indicates that range condition has improved since the 1981 SVIM inventory for both upland and riparian vegetation. Seral stages within the allotment appear to be moving towards good to excellent condition (or towards late seral stage). Livestock drift has been a concern in the riparian areas. Better fence maintenance is required on allotment boundary fences and more compliance checks should help alleviate cattle drift.

Clough-Alber Allotment. Monitoring data indicates light utilization levels have occurred in the past on upland sites. Apparent trend studies indicate static to upward trends throughout the allotment.

The 1999 land health assessment and other monitoring indicates that range condition has improved since the 1981 SVIM inventory for both upland and riparian vegetation. Seral stages within the allotment appear to be in good to excellent condition.

Cow Creek Allotment. An Ecological Site Inventory was conducted and the results from this inventory indicates that 159 acres, or 2% of the allotment was at PNC (Potential Natural Community), 1853 acres or 24% of the allotment was at late seral, 4756 acres or 63% of the allotment is at mid seral, and 800 acres or 11% of the allotment is at early seral. In addition, a land health assessment indicates that 3439 acres of the allotment is achieving or moving towards meeting the upland health standard and 4129 acres are not meeting standards under current conditions. Riparian areas of Cow Creek and their current status; 8.5 acres functioning, 16.5 acres functioning at risk and 4.4 acres non-functioning.

Gordon Gulch/Naval Oil Shale Allotment. Upland areas in the allotment are meeting the standard for upland sites. The Naval Oil Shale pasture has the most productive rangeland sites due to a combination of well-developed soils and higher precipitation. Riparian standards are being met with current management.

8.5 Opportunities

- Continue current grazing management strategies within those allotments where monitoring or land health assessments indicate standards are being met.
- Change, reduce, eliminate livestock grazing in sensitive areas such as riparian areas and areas with land health issues.
- Review existing range projects to determine if they are needed or if they can be eliminated.
- Implement new range projects, reconstruct and maintain existing projects to reduce impacts to upland and riparian areas by redistributing livestock.
- Developing management strategies to improve the health of the land including prescribed burns, mechanical vegetation treatments, along with reseeding of native or other desirable species.

AMS-9 SUMMARY FOR WILDERNESS SUITABILITY

9.1 Management Plans and Documents

The wilderness management objective in the GSRA RMP of 1984 (revised 1988) is: "*To determine the suitability or non-suitability of wilderness study areas for wilderness designation.*"

The wilderness objective for the WRFO portion of the planning area as described in the 1996 WRRA RMP is to: *"Manage the wilderness study areas to avoid impairment of their suitability until they are either designated as wilderness or released for other uses. Manage designated wilderness areas to preserve ecosystems and wilderness qualities in perpetuity."* However, no wilderness study areas currently exist in that portion of the planning area.

9.2 Current Management

The 1997 jurisdiction transfer to the BLM directed that the lands be managed in accordance with the Federal Land Policy and Management Act (FLPMA) of 1976. FLPMA, in turn, directed BLM to conduct a wilderness inventory of all public lands. Being newly acquired lands, NOSR 1 and 3 were not part of the original wilderness inventory of public lands that was performed under authority of Section 201 of the FLPMA. Subsequently, the BLM conducted a roadless review inventory on all existing routes and analyzed the area to determine the presence or absence of wilderness character (Colorado Wilderness Review Procedures, June 1997).

The BLM studied the transferred NOSR lands that were 5,000 acres or more in size, starting with 3 units within the production area. Those units were determined to not contain wilderness character and the 3 units were released for other uses. The remaining 4 units (Appendix A Map 8) were inventoried in the summers of 1999 and 2000 to determine if the remaining transferred lands (including public lands administered by the WRFO) contained wilderness characteristics as defined by the Wilderness Act of 1964 (http://www.co.blm.gov/gsra/rpwildinventory.htm).

Areas found have Wilderness Character. Currently, the GSFO is managing East Fork, Northeast Cliff and the Southeast Cliff Units to prevent irreversible and irretrievable impacts and to maintain present natural and supplemental values. Under state policy the above areas will be managed so as not to impair suitability until the RMP amendment is completed.

Areas found not to have Wilderness Character. The BLM with notify all interested parties on all proposed actions within the Trapper Creek Unit.

This planning process will determine whether or not the inventoried lands should be designated as WSA's under section 202 of FLPMA. This study will evaluate the wilderness values along with other resource values to determine the most appropriate management of each of the units. All lands designated as WSA's through the land use plan will be managed under the Interim Management Policy for Lands Under Wilderness Review (IMP) Handbook H8550-1, so as not to impair suitability for wilderness designation. If designated as WSA's, those areas will remain under IMP until Congress makes a decision on designating the area as wilderness or releasing it for other purposes or the management plan is amended to remove or modify the WSA designation. For those units found not to be suitable, no wilderness study area designation would apply.

9.3 Characteristics and Setting

Table 9.3-1 displays the findings for the four units inventoried in 1999 and 2000.

Table 9.3-1 Wilderness Character and Roadlessness Inventory Findings

Inventory Unit	Total Area Inventoried	Roadless Area	Area with Wilderness Character	Area without Wilderness Character
East Fork	14,342	12,403	8,330	4,073
Trapper Creek	11,373	9,073	0	9,073
Northeast Cliffs	5,825	5,823	5,779	46
Southeast Cliffs	5,338	5,336	5,193	145

The **Northeast Cliff Inventory Unit** contains 5,847 acres of federal land. The roadless review team found that 5,845 acres met the roadless criteria. Most of the unit (5,799 acres) was found to have wilderness character except one small portion (46 acres) in Magpie Gulch between the access road for the ditch and the ditch itself.

The unit is long and narrow in nature. It is about 2 miles wide (east to west) at its widest point and approximately 7 miles long. Despite the narrowness, the unit's rugged terrain offers visitors outstanding opportunities for solitude and primitive and unconfined recreation. Access is limited due to private land bounding the unit on the east and the steep bluff on the west. This along with the difficult terrain restricts visitors to undeveloped recreational activities.

The rugged terrain has limited impacts by man. The majority of the area appears to have been affected primarily by the forces of nature and retains its natural character. Human imprints are undetectable. The Northeast Cliff inventory unit provides visitors a variety of outstanding opportunities for solitude throughout the mid to lower reaches of the unit. The topography, which is made up rugged ridges and draws sloping to the east, provides natural screening and the ability to find secluded spots, and it yields entry to only the hardiest of hikers and hunters.

Supplemental values found include: 1) Excellent examples of an old-growth Douglas-fir community; 2) Habitat for Three-toed woodpecker; 3) Excellent scenic opportunities; 4) Big game refuge during hunting season.

The **East Fork Inventory Unit** contains 14,342 acres of federal land of which 12,403 acres are roadless. Within the roadless area 8,330 acres were found to have wilderness character. This includes approximately 7½ miles of East Fork of Parachute Creek and 11 of its small tributaries. The steep topography and vegetative cover in the East Fork of Parachute Creek drainage offers outstanding opportunities for solitude and primitive and unconfined recreation in the mid to lower portions of the canyon.

Much of the East Fork drainage and its 22½ miles of tributaries are natural and appear to have been affected primarily by the forces of nature. The creek drainage has created a deep and scenic canyon that provides topographic and vegetative screening. At most locations boundary roads, ridge roads and livestock developments are substantially unnoticeable.

Eleven separate areas within the unit have substantially noticeable imprints that detract from naturalness and therefore lacked wilderness character (total: 4,073 acres). These areas are bounded by or bisected by roads, ways, fences, stock ponds, and spring developments. Although some of these developments might be substantially unnoticeable on their own, the cumulative impacts of numerous imprints in close proximity to one another detracted from the naturalness.

Outstanding opportunities for solitude can be found in most of the lower portions of the 7 1/2 miles of East Fork drainage and along portions of the side drainages. The stream bottoms with their adjoining steep sidewalls, dense riparian vegetation and adjacent spruce and aspen stands, allows one to find seclusion and isolation away from sights and sounds of man.

Excellent opportunities also exist for other unconfined types of recreation including hiking, hunting, wildlife viewing, camping, and sightseeing.

This unit was identified as a “Very Significant” conservation site by the CNHP in 1996. This biologically diverse site hosts 21 elements tracked by the CNHP including: Nine significant natural plant communities, one BLM sensitive fish, five rare species of birds, four rare plants, one rare butterfly, and one rare mammal. The unit also contains cliff seeps that support one of the best-known populations of Hanging Garden Sullivantia. Other supplemental values include a 200 ft. high waterfall on East Fork, paleontological resources in the Green River Formation and historic land uses including prehistoric Indian hunting grounds, and ranching related structures from the late 1800's.

The **Trapper Creek Inventory Unit** contained 11,373 acres of federal land of which 9,073 acres were found to be roadless. Two small portions (approximately 2,700 acres in the west and 1,300 acres in the east) were found to be natural in character but were separated by a two-mile stretch of Trapper Creek that was not natural because of numerous range developments, roads/ways, exclosure fences and other man-made developments that dominated the landscape.

The two areas that were natural in character were the western portions of Trapper and Northwater Creeks, and the headwaters of Trapper Creek. In conclusion, the Trapper Creek unit does not contain wilderness character. The areas that were predominantly natural in character were significantly less than 5,000 acres in size.

However, portions of the unit offer the visitor outstanding opportunities for solitude. Outstanding opportunities were found in the drainage bottoms of the western portions of both Trapper Creek and Northwater Creek and the headwaters of Trapper Creek. The remainder of the unit lacked outstanding opportunities for solitude due to the collective impacts from numerous and noticeable roads/ways, a lack of vegetation for concealment and range developments.

Outstanding opportunities for primitive and unconfined recreation exist, particularly when exploring the western drainages. The canyon bottoms support wonderful opportunities for undeveloped types of recreation including hunting, fishing, backpacking, hiking, sightseeing, and wildlife viewing.

Several supplemental values exist in this area including ten “Significant” elements. These elements are: two rare plants, two population of Colorado River cutthroat trout, several wetland plant communities and one raptor and two bird species of concern. Other noted supplemental values included scenic values in the western portions of Trapper and Northwater Creeks, paleontological resources, and historic and prehistoric land uses.

The **Southeast Cliff Inventory Unit** retains it primeval character and offers visitors outstanding opportunities for solitude and primitive and unconfined recreation despite its narrow configuration. The total area within the inventory boundary was 5,338 of which 5,336 was found to be roadless. The total area found to have wilderness character was 5,193 and 145 acres without wilderness character:

With the unit’s steep and rugged terrain, the area is undeveloped and has very few impacts created by man. The few human imprints found were undetectable and do not detract from the area’s overall naturalness.

The Southeast Cliff inventory unit provides visitors a variety of outstanding opportunities for solitude throughout most of the unit. The diverse topography, which is made up of gently rolling grass and aspen parks on top of the Plateau, to extremely rugged sheer and shale barren cliffs, giving way to ridges and draws sloping to the southeast, provides natural screening and the ability to find secluded spots.

The Southeast Cliff inventory unit offers visitors outstanding opportunities for primitive and unconfined types of recreation. Access is limited due to private land bounding the unit on both the south and southwestern portions of the unit. The difficult terrain restricts most visitors to undeveloped recreational activities on the western half of the unit excluding the lands on top of the Plateau. However, once in the area visitors have excellent opportunities to disperse and enjoy undeveloped types of recreation such as hiking, backpacking, camping, sightseeing, wildlife watching, and hunting.

The Anvil Points Rim site supports 14 elements tracked by CNHP. One element, the Parachute penstemon, has been found in only one other location in the world. The unit also includes Yellow Slide, which has been claimed to be a meteor impact site. Supplemental values found include: 1) the Federally endangered American peregrine falcon, 2) Columbian sharp-tailed grouse, 3) two watchlisted butterfly species, 4) several oil shale endemic plants including the Parachute penstemon, 5) aesthetic and scenic qualities, 6) big game refuge during hunting season, 6) geological values

9.4 Resource Condition and Capabilities Evaluation

Increasing population predictions (see AMS 12 Summary for Social and Economic Factors) and visitation are likely to increase demands on resources and negatively impact wilderness character, supplemental values, and natural resource elements identified by the CNHP. Surface use activities could have permanent irreversible and irretrievable impacts to natural resources. Without protective measures, maintaining; the current state of naturalness, roadlessness, healthy plant and animal communities, opportunities for solitude, social benefits, will be difficult to achieve.

9.5 Opportunities

Opportunities exist to

- Safeguard natural and social and economic values through wilderness study area designation.
- Designate of some or all of the units as "WSA" could lead to congressional designation of the area as wilderness.
- Designate of some or all of the units as ACEC, a BLM administrative designation, could also protect supplemental values.

AMS-10 SUMMARY FOR WILD & SCENIC RIVER SUITABILITY

10.1 Management Plans and Documents

Wild and Scenic Rivers Act (WSRA) of 1968 (as amended 1972, 1974-1976, 1978-1980, 1984, 1986-1994 and 1996) established a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic or recreational. The Act designates specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added.

The Act and Interagency Guidelines provide the following direction for establishing preliminary classifications for eligible rivers. All eligible river segments must be tentatively classified and management measures instituted as necessary to ensure appropriate protection of the values supporting the eligibility and classification determinations. Actual classification is a Congressional legislative determination and is only interim until Congressional action.

Section 2 (b) of the WSRA specifies three classification categories for eligible rivers; wild rivers (W), scenic rivers (S), and recreational rivers (R). Classification is based on the type and degree of human developments associated with the river adjacent lands, as they exist at the time of the evaluation.

10.2 Current Management

Directives in BLM Manual 8351 and *"The Wild and Scenic River Study Process"* technical report prepared for the Interagency Wild and Scenic Rivers Coordinating Council, 1999, were followed for integrating a wild and scenic river study within the resource management planning process.

As part of the planning process, a BLM interdisciplinary study team completed a Wild and Scenic Rivers (WSR) study under Section 5(d)(1) of the Wild and Scenic Rivers Act (WSRA). This study reviewed all BLM administered public land surface along rivers and streams within the planning area. It evaluated and made determinations regarding river/streams eligibility and gave preliminary classifications to those river/streams that were found eligible as identified in the WSRA. This assessment will not complete the suitability portion of the study process on any of the rivers/streams. A suitability study will be conducted at a later date with separate NEPA analysis. Trapper Creek, under the administration of the DOE, was not inventoried during the WRFO land use planning process.

This study report: 1) discusses the definition of free-flowing and whether or not the study rivers fits that definition; 2) gives the criteria for evaluating outstandingly remarkable values; and describes resource values and, assess each of them, and determines what resource values are outstandingly remarkable 3) determines preliminary classification for all eligible rivers.

10.3 Characteristics and Setting

All rivers within the Roan Plateau planning unit were evaluated under the eligibility criteria, but only those that meet the free flowing criteria and that had the presence of outstandingly remarkable values received intensive study. The study analyzed 31 perennial streams (64 miles).

The eligibility study looked at all free-flowing rivers that had one or more Outstandingly Remarkable Value (ORV). The eligibility analysis consists of an examination of the river's hydrology, including any man-made alterations, and an inventory of its natural, cultural, and recreational resources. ORVs may include; scenery, recreation, geology, fish, wildlife, cultural, historic, and or other values. In order to be assessed as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. Only one such value is needed for eligibility.

The river's special values were assessed as to whether they are unique, rare or exemplary within the state, physiographic province, eco-region, or other area of comparison. For the purpose of the Roan Plateau planning unit and in order to better define the evaluation criteria" regionally significant" the "region" the following eco-regions were used: Utah High Plateau's and the Southern Rocky Mountains.

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 Roan Plateau planning area, analysis has been limited to that boundary on all river segments, except on the western portions of East Fork of Parachute Creek were the boundary was increased to include "outstandingly remarkable" scenic values.

10.4 Resource Condition and Capabilities Evaluation

Wild and Scenic River designation is a Congressional action. The planning process will look at eligibility requirements only. Suitability will not be looked at, at this time. Table 10.4-1 (also see Appendix A Map 9) displays eligibility determinations of streams.

Table 10.4-1 Eligibility Determination Summary

Stream	Free-flowing Criteria	Outstanding Remarkable Values*	Eligible	Eligible Miles
Government Creek	NO		NO	0
Trapper Creek	**YES**	**F**	**YES**	**6.1**
Northwater Creek	**YES**	**B, F**	**YES**	**3.2**
1. Northwater Branch	YES		NO	0
2. Northwater Branch	YES		NO	0
3. Northwater Branch	YES		NO	0
4. Northwater Branch	YES		NO	0
Tichner Creek	YES		NO	0
Yellow Jacket	YES		NO	0
Raspberry Creek	YES		NO	0
Ben Good Creek	YES		NO	0
East Fork of Parachute Creek	**YES**	**B, F, S**	**YES**	**7.5**

Table 10.4-1 Eligibility Determination Summary				
Stream	**Free-flowing Criteria**	**Outstanding Remarkable Values***	**Eligible**	**Eligible Miles**
JQS Gulch	**YES**	**B, F**	**YES**	**1.1**
JQS Branch	YES		NO	0
Golden Castle Creek	**YES**	**B, F**	**YES**	**1**
First Anvil Creek	**YES**	**B, F**	**YES**	**2.2**
First Anvil Branch	NO		NO	0
Second Anvil Creek	**YES**	**B, F**	**YES**	**1.8**
East Middle Fork Parachute Cr.	**YES**		**YES**	**1.1**
Second Water Creek	YES		NO	0
Third Water Creek	YES		NO	0
Timber Gulch	YES		NO	0
JV Gulch	YES		NO	0
Sheep Trail Hollow Creek	NO		NO	0
Bull Gulch	YES		NO	0
Forked Gulch	NO		NO	0
West Forked Creek	YES		NO	0
Cottonwood Creek	YES		NO	0
Goodrich Creek	YES		NO	0
Thirty-two Mile Creek	NO		NO	0

* B = Botanical/Ecological Values, F = Fish, S = Scenic
Source: BLM GSFO Roan Plateau Preliminary Findings Wild and Scenic Eligibility Review, May 2002

10.5 Opportunities

When a river segment is determined to be eligible and given an tentative classification, its identified outstandingly remarkable values shall be afforded adequate protection, subject to valid existing rights, and until the eligibility determination is superseded, management activities and authorized uses shall not be allowed to adversely affect either eligibility or the preliminary classification from a wild area to a scenic area or a scenic area to a recreational river area.

AMS-11 SUMMARY FOR VISUAL RESOURCES

11.1 Management Plans and Documents

Current Visual Resource Management (VRM) objectives for the GSRA were established in the GSRA RMP (1984, Revised 1988). VRM classes range from Class I (highest degree of protection) to Class V. The VRM designations were generally aimed at protecting the most scenic public lands, especially those that receive the greatest amount of public viewing. The RMP VRM objective is: *"To maintain existing visual quality throughout the resource area and protect unique and fragile resources values".*

The visual management objective within the WRRA as outlined in the 1996 WRRA RMP is; *"Manage public lands in a manner which would protect the quality of the scenic or visual resource values of these lands."*

11.2 Current Management

Visual resource management (VRM) classes (Appendix A Map 10) are assigned to the various parts of the landscape. Management actions or projects should repeat the basic elements of line, form, color, and texture to help them blend in with the landscape and maintain the VRM class or level of change to the landscape.

The VRM process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. An area's visual resources are then assigned to management classes (Figure 11.2-1). These classes correspond to the management objectives in an area and indicate the level of acceptable change that could occur within the class.

Figure 11.2-1. BLM VRM Classes

Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
Class IV Objective: To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Below the Rim. For NOSR 1, the 1999 GSRA Oil and Gas Leasing and Development ROD and RMP Amendment deferred decisions on surface use stipulations to this planning process. Visual standards, in the GSFO portion of the planning area below the Roan Plateau rim, are met through the application of mitigation measures as identified in the ROD. These include:

- NSO 18 - Interstate 70 Viewshed.
  The stipulation was put in place to protect the Interstate 70 viewshed. This stipulation is on slopes over 30% with high visual sensitivity in the Interstate 70 viewshed. Lands with high visual sensitivity are those lands within 5 miles of Interstate 70, of moderate to high visual exposure, where details of vegetation and landform are readily discernible and the casual observer could easily notice change in visual contrast.
- CSU 5 - Visual Resource Management Class II.
  CSU 5 was applied to all VRM Class II areas identified in the 1984 RMP. The objective of this stipulation was to protect VRM Class II areas and retain the overall landscape character.

Most all of the southern and eastern cliffs below the rim have VRM Class II objectives. 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 found in the predominant natural features of the characteristic landscape.

Below the steepest portions of the cliffs and above the low lands there is a band of VRM Class III that runs along the cliffs for the entire eastern portion of the unit. There are also four isolated parcels within the southwestern portion of the unit. The objective of this class is to partially retain the existing character of the landscape. The level of change to the character of the landscape should be moderate.

The remaining lower lands are Class IV, the objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Two areas along the Roan Cliff have a Class V objective, which is applied to areas where the characteristic landscape has been so disturbed rehabilitation is needed. These areas encompass the old and new JQS routes and the Anvil Points mine and adjacent infrastructures and disturbances. This Class is generally considered an interim short-term classification until rehabilitation or enhancement is completed.

Above the Rim. Most of the lands above the rim are VRM Class III. The objective of Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

East Fork Falls, the scenic canyon to the west, and public lands north of Trapper Creek are VRM 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.

Within the WRRA, public lands are managed to protect the quality of the scenic or visual resource values of these lands. VRM classes are designated in the 1996 RMP ROD. Visual resources are protected through the application of mitigation measures as listed in Appendix C - Conditions of Approval (Best Management Practices) and stipulations listed in Appendix B of the WRRA RMP. These would be applied to all surface-use activities and include:

- NSO 1. Landslide Areas.
- CSU 1. Fragile Soils.

11.3 Characteristics and Setting

The Roan Plateau's overall landscape is highly diverse and contains many outstanding features. The Roan Cliffs are a prominent backdrop for the communities of Parachute, Battlement Mesa, Rifle, Silt and New Castle and to travelers on Interstate 70. The topography relief is considerable, with the skyline rising over three to four thousand feet above the valley floor. The stark contrast of the vertical outcrops of the shale bearing Green River and Wasatch formations to the heavily vegetated slopes accentuates its rugged and scenic qualities.

The overall landscape variety is high and contains many outstanding features. Numerous drainage's and gulches dissect the landforms adding to the topographic texture. The NOSRs were identified as one of six high quality scenic areas in the 1988 GSRA RMP. Scenic quality is defined as the degree of harmony, contrast and variety that influences the overall impression of a landscape. Scenic quality was rated Class B and A in visual resource inventories conducted by the BLM in 1979.

Visual sensitivity is the degree of public concern toward a scenic quality and toward existing or proposed visual change within a landscape. Sensitivity levels are high because the Roan Cliffs are the prominent viewshed for the communities of Parachute, Battlement Mesa, Rifle, Silt and New Castle, the amount of tourism, the Colorado River Valley, and to the large volume of travel on Interstate 70.

Lands above the Roan Plateau rim are made up of a diverse vegetative cover typical of the region. Spruce-fir and douglas fir cover the north facing slopes, while aspen woodlands dot the higher elevations with mountain sagebrush. Mountain grasslands and shale barrens dominate the south facing slopes. The Roan Plateau consists of long ridgelines that are separated by valleys that turn into spectacular canyons dissecting the western side of the Plateau. Some of the drainage's/ canyons are of highly scenic quality containing scenic waterfalls and hanging gardens.

The East Fork of Parachute Creek has cut a deep and scenic canyon in the western portion of the Roan Plateau. A magnificent waterfall, plunging 200 feet over white shale cliffs, greets visitors on the eastern end of the canyon.

The Anvil Points oil shale mine area has had some rehabilitation work done since the close of the mine. The mine itself and much of its supporting infrastructure has been removed. The only evidence of the operation after the final rehabilitation is completed will be the 3 openings to the mine itself and the access road to it.

A "new" JQS road was built in the mid-1960s to access the Roan Plateau. The old JQS road was not rehabilitated and evidence of the old JQS route is still visible.

11.4 Resource Condition and Capabilities Evaluation

Above the Rim. Surface disturbance has occurred on the landscape above the rim in VRM Class III areas, however, these areas have generally maintained VRM Class III characteristics. Modifications are the result of livestock developments, which includes 4 cabins, ponds, stock tanks, roads and/or fence lines. The topography and vegetation types allows for a limited amount of management activities along the top of the main ridges and on the north facing slopes. However, human impacts on ridges and on shrub covered south facing slopes draws attention and can dominate the landscape.

The VRM Class II classification has protected the existing character of the landscape for the scenic East Fork falls and canyon.

Large portions of the lands above the rim were designated as Class III in the Glenwood Springs RMP of 1988. The designation allows for moderate change in the landscape from management activities. Adjacent and similar public lands within the WRRA portion of the planning area were classified as the more restrictive VRM Class II in the more recent 1996 WRRA RMP. The landscape however, has very similar visual values and scenic qualities. This management inconsistency needs to be addressed in the planning process.

Below the Rim. Visual qualities and VRM class objectives have been maintained below the Roan Plateau rim due to the topography and ruggedness of the cliffs and foothills. The lower lands and front country have incurred visual impacts on both public and adjacent private lands due to development, urbanization and recreational uses.

The VRM Class II classification has protected the existing character of the landscape for the portions most visible from I-70, Hwy 13 and from the communities of Parachute, Battlement Mesa, Rifle, Silt and New

Castle. Cumulative changes in the landscape due to continued gas field development and increases in recreational use are threatening VRM Class II management objectives.

The BLM also needs to address VRM classification of two VRM Class V areas (Anvil Points area and the area around the old JQS Road). BLM Manual H-8410-1 "Visual Resource Inventory", states that VRM Class V is no longer an appropriate designation. This planning process needs to amend the VRM classification of these areas to reflect current Bureau guidance described in BLM Manual H-8410-1. Additionally, the isolated VRM Class III tracts in the southwest portions of the planning area should be reviewed for management consistency.

11.5 Opportunities

Public scoping comments included the need to analyze the visual affects of increased gas development, urbanization, and increasing recreational use.

Respondents suggested the opportunity to:

- Manage all the Roan Cliffs under consistent visual designations by addressing the two VRM Class V areas.
- Manage the five isolated VRM Class III polygons consistently with the adjacent lands.
- Manage the lands above the rim consistently between the two resource areas.
- Acquire the western end of East Fork of Parachute Creek and protect a highly scenic canyon and enhance visual resources.
- Preservation of a special viewshed.
- Preserve the natural setting, scenic views, and unique fauna, flora and geologic features "like it the way it is".
- Designate ACECs to protect visual and aesthetic qualities.

AMS-12 SUMMARY FOR SOCIAL AND ECONOMIC FACTORS

12.1 Management Plans and Documents

Unlike the physical resources, socioeconomic resources are not specifically managed under the BLM management plans. These resources are the characteristics (demographic, social, and economic) of the population affected to various degrees by the management of physical resources.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-income Populations." requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, on minority populations and low-income populations" (Executive Order 12898, 59 FR 7629 [Section 1-101]).

12.2 Current Management

BLM management of public lands focuses on oil and gas development in the production area (see Appendix A Map 3 and Map 4). Outside the production area, BLM custodial management strategies have supported traditional ranching and outfitting livelihoods and dispersed recreation opportunities (hunting, fishing and off-highway vehicle driving). All provide positive economic contributions to local communities. Marketing of public land opportunities is currently done by private sector businesses.

12.3 Characteristics and Setting

Public lands are important to people in several ways: for cultural, spiritual, and historical reasons; as a setting for recreational activities; and as a source of life-sustaining products and economic well-being. Comments from small group discussions (Results from Several Small Discussions, 1999) described the Roan Plateau as a particularly special place for a variety of social and economic reasons. The landscape supported livelihoods and local economies through; ranching, oil and gas development, mining, and recreation especially hunting. The area draws mostly local visitors, but hunting season brings visitors from across the United States.

Scoping has indicated interest, regionally and nationally, in the management of the Roan Plateau area. Some people suggest a low level of development, emphasizing recreation and amenity values, provides social benefits as well as comparable economic contributions as grazing, timber and gas development. Others suggest the BLM should emphasize commodity production, make available natural gas resources, and support the better paying commodity-related jobs.

The communities and economies of Garfield County, then Mesa County, and to a lesser degree Rio Blanco County will have the most social and economic implication from how the area is managed. Conversely, the demographics, social structure, and values within the three counties influence the demand for recreation and other resources provided by the public lands.

Table 12.3-1 shows geography quickfacts for Garfield, Mesa and Rio Blanco Counties.

Table 12.3-1
Geography Quickfacts

	Garfield County	Mesa County	Rio Blanco County
Persons per square mile	14.9	34.9	1.9
Land area (square miles)	2,947	3,328	3,221
Land area (acres)	1,886,080	2,129,920	2,061,440
BLM - Public Lands (surface acres)	667,096	983,384	1,157,413

Source: http://quickfacts.census.gov (2000) and BLM

BLM administers Payments in Lieu of Taxes (PILT), which enables the federal government to offset tax revenues lost because of tax-exempt federal land in county jurisdictions. PILT monies (Table 12.3-2) are essential to support vital community services such as firefighting, police protection, and healthcare in rural communities. BLM calculates the amount of payments using a formula based on population and the amount of federal land in a local jurisdiction. These payments are in addition to federal revenues transferred to local government under other programs, such as income generated from the use of federal land for livestock grazing, timber harvests, and mineral receipts.

Table 12.3-2
Colorado's 2001 and 2002 PILT payments

County	2002 Payment	2001 Payment
Garfield	**810,487**	**1,097,302**
Mesa	**1,305,746**	**1,347,658**
Rio Blanco	**241,554**	**229,171**

Source: BLM

Population. The majority of residents of Garfield County reside in communities along I-70. Glenwood Springs is the largest community in Garfield County. Grand Junction, located in Mesa County, is the largest community on the western slope of Colorado and is located about one hour west on Interstate 70.

Population growth can be driven by economics and jobs or by the amenity, scenic and lifestyle assets of an area. Both factors probably play important roles in the local population trends (Table 12.3-1).

Table 12.3-1 2000 Census Population Data for surrounding Communities		
	2000 Population	**Change from 1990**
State of Colorado	4,301,261	30.6%
Garfield County	43,791	45.9%
Carbondale	5,196	73.0%
Glenwood Springs	7,736	17.9%
New Castle	1,984	192.2%
Parachute	1,006	52.9%
Rifle	6,784	46.3%
Silt	1,740	58.9%
Mesa County	116,225	24.8%
Grand Junction Urban Area	103,583	-
De Beque	451	-
Rio Blanco	5,986	-1.1%

Source: http://www.garfield-county.com and http://quickfacts.census.gov/qfd/states/08000.html

Since 1970 population in Garfield County has grown faster than the State and faster than the nation (Sonoran Institute, 2002). Table 12.2-2 shows population projections for Garfield, Mesa and Rio Blanco are for continued and stead growth. Public scoping has indicated that the effects of population growth and private land development to public lands are a foremost concern.

Table 12.3-2 Preliminary Population Projections for Colorado Counties, 1990 - 2025								
Year	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
COLORADO	3,304,042	3,811,074	4,324,920	4,731,144	5,162,179	5,600,477	6,042,949	6,495,766
Garfield	30,151	36,417	44,032	50,580	57,978	65,535	73,457	81,483
Mesa	93,577	105,406	116,894	128,965	142,871	159,001	177,363	196,020
Rio Blanco	6,061	6,403	6,019	6,732	7,495	8,272	9,026	9,740

Source: U.S. Census Bureau

Table 12.3-3 displays a fairly homogenous population, predominantly white, with a very low percentage of minorities.

Table 12.3-3 2000 Population by Race and Hispanic Origin								
	Total Population	**White-Other Non-Hispanic**	**White-Other Hispanic Origin**	**Black/ African American**	**American Indian & Alaska Native**	**Asian/ Pacific Islander**	**Two or More Races**	**Hispanic Origin of any race)**
COLORADO	4,301,261	3,208,383	661,553	165,063	44,241	99,834	122,187	735,601
Garfield	43,791	35,478	6,777	196	310	226	804	7,300
Mesa	116,255	101,220	10,390	537	1,059	730	2,319	11,651
Rio Blanco	5,986	5,552	256	11	46	17	104	296

Source: http://www.dola.state.co.us/demog/Population/PopulationByAgeRace&H.O/2000Census/CORaceDom.htm

12.4 Resource Condition and Capabilities Evaluation

12.4.1 Economic Considerations

Garfield, Mesa and Rio Blanco have a diversity of economic interests (Table 12.4-1).

Table 12.4-1
Profile of Selected Economic Characteristics: 2000 – Industry

	Garfield County		Mesa County		Rio Blanco County	
Agriculture, forestry, fishing and hunting, and mining	551	2.4%	1,670	3.0%	668	22.7%
Construction	4,674	20.4%	5,715	10.4%	235	8.0%
Manufacturing	700	3.1%	3,989	7.2%	50	1.7%
Wholesale trade	740	3.2%	2,070	3.8%	42	1.4%
Retail trade	3,138	13.7%	7,388	13.4%	324	11.0%
Transportation and warehousing, and utilities	1,257	5.5%	3,055	5.5%	171	5.8%
Information	421	1.8%	1,430	2.6%	16	0.5%
Finance, insurance, real estate, and rental and leasing	1,504	6.6%	3,282	6.0%	76	2.6%
Professional, scientific, mgmt., administrative, and waste mgmt. services	2,029	8.9%	4,399	8.0%	100	3.4%
Educational, health and social services	3,529	15.4%	11,375	20.7%	631	21.4%
Arts, entertainment, recreation, accommodation and food services	2,448	10.7%	5,335	9.7%	291	9.9%
Other services (except public administration)	985	4.3%	2,904	5.3%	91	3.1%
Public administration	923	4%	2,434	4.4%	253	8.6%

Source: http://quickfacts.census.gov/qfd/states/08000.html

Minerals and Energy Development. The 1999 Oil and Gas Leasing and Development Draft SEIS noted "Gas drilling is an economic activity that produces an essential energy fuel and is generally considered to have a positive affect on local economies. The Draft SEIS, Appendix F-2 discusses the fiscal impacts of oil and gas development activities on Garfield County including the revenues that are derived from direct taxation, such as property taxes, severance taxes, motor vehicle taxes and assessments, federal mineral lease payments, vehicle fuel taxes and road permits.

The principle operator in the Roan Plateau planning boundary is Williams Production. Williams Production produces 9 percent of all natural gas production in the state of Colorado. Williams employs 40 full-time employees, with another 400 people employed by contractors (McKibbin, The Daily Sentinel, 2002). Williams Production is Garfield County's largest taxpayer with nearly $3.8 million in property taxes in 2002.

Recreation and Tourism. The three county area features numerous attractions and is a popular year-round tourist destination. Attractions in the immediate area include; the resort Town of Glenwood Springs, Glenwood Caverns, Hot Springs Pool, White River National Forest, Rifle Falls State Park, Rifle Gap and Harvey Gap State Parks, the Colorado River, several golf courses and numerous special events.

Recently tourism has had an expanding role in local economies. As a result of the expanding regional tourism and recreation industry, Garfield County has become a bedroom community for employment in neighboring counties with large ski areas. Large numbers of residents of Garfield County commute to jobs in Pitkin and Eagle Counties. Employment in the construction trades has followed the population trends and the growth of ski area communities.

Colorado's $7.0 billion tourism sector has yet to fully recover from the September 11 terrorist attacks. However, recent trends indicate that this important sector of the state's economy is beginning to improve. Surveys identify Colorado as a top 10 destinations for summer vacations (June 2002 Revenue Forecast - http://www.state.co.us/gov_dir/govnr_dir/ospb/economics/cep/2002/cep2002-06.pdf). Glenwood Springs provides lodging and resort services to over one million visitors annually.

Wildlife. The ecological, aesthetic and recreational values of wildlife are obvious. However, wildlife and wildlife management are important from and economic standpoint as well. The Colorado Division of Wildlife (CDOW) estimates that in 1996, out-of-state hunters and anglers spent $275 million in the State of Colorado. Wildlife is extremely important to Colorado, accounting for well over $2 billion annually in economic activity, and contributing significantly to Colorado's high quality of life (http://wildlife.state.co.us/about/Finances/index.asp). Economic estimates from 1996 indicate that Garfield County received over 46 million dollars from resident and non-resident direct and secondary expenditures (CDOW, 2002).

12.4.2 Social Considerations

Historically, population trends in Garfield County have been tied to resource development activities. Local communities have experienced various boom and bust cycles with energy and mineral development. The degree of activity affects the residential character of the area and can impact local infrastructure.

A high value is placed on quality of life, independence, open space, and outdoor recreational opportunities in Garfield and Rio Blanco Counties (BLM WRRA Draft RMP, 1996). Residents and visitors alike enjoy the recreational activities of; fishing, hiking, hunting, birding, camping, biking, and off-highway vehicle riding provided by local public lands. The remoteness, lack of crowds and quietness of the Roan Plateau were noted setting characteristics (BLM - Results from Several Small Discussions, 1999) during scoping.

Polling by Ciruli Associates indicates that Coloradans overwhelming say wildlife is important to their lives and believe more should be done to protect habitat and restore native species. Three out of four Coloradans say wildlife is of "above average importance" to their quality of life (http://www.dnr.state.co.us/cdnr_news/wildlife/1999311162340.html).

The Roan Cliffs themselves are a scenic amenity and the dominant landscape feature to the surrounding communities and travelers along Interstate 70 and Highway 13.

12.5 Opportunities

Opportunities exist to:

- Support/preserve/change current local quality of life/livelihoods.
- Support/preserve/change traditional uses and activities.
- Address the increasing and changing social and economic demands of public lands.
- Address the cumulative impacts of gas development on local social and economic conditions
- Address how public lands can help support the economic stability of local communities.

12.6 Additional Information

Additional social and economic information can be found for Garfield County at:

http://www.wilderness.org/newsroom/pdf/co_Garfield.pdf
http://censtats.census.gov/data/CO/05008045.pdf#page=2
http://www.garfield-county.com
http://www.glenscape.com/
http://www.glenwoodsprings.net/activitiesinformation.htm

Additional social and economic information can be found for Mesa County at:
http://www.wilderness.org/newsroom/pdf/co_mesa.pdf
http://censtats.census.gov/data/CO/05008077.pdf#page=2
http://www.co.mesa.co.us/
http://www.gjchamber.org/index.htm

Additional social and economic information can be found for Rio Blanco County at:
http://quickfacts.census.gov/qfd/states/08/08103.html
http://www.co.rio-blanco.co.us/

AMS-13 SUMMARY FOR AIR QUALITY

13.1 Management Plans and Guidance

The air management objective in the GSRA RMP of 1984 (revised 1988) for public lands below the Roan Plateau rim is*; "To limit air quality degradation in the resource area by ensuring public land use activities are in compliance with federal, state, and local legislation."*

The air quality management objective within the WRRA as outlined in the WRRA RMP of 1996 is*; "BLM actions shall be implemented in a manner to minimize impacts to air quality."*

13.2 Current Management

BLM is responsible for assuring that all of its activities (either directly or through use authorizations) comply with local, state, and federal air quality laws, regulations, and standards.

Three Class I air quality areas are adjacent to public land in the Glenwood Springs Resource Area (Flat Tops, Eagles Nest, and Maroon Bells-Snowmass Wilderness Areas). Limitations on the additional amount of pollution allowable in these areas from new major emitting facilities are strict. The BLM must consider these limitations when air quality impacts are anticipated from proposed actions. The remainder of the resource area is classified as a Class II air quality area, where similar but less stringent incremental pollution standards apply.

Within the WRRA, existing air quality is maintained through compliance with applicable federal, state, and local air quality laws, regulations and implementation plans. Mitigating measures are incorporated into project proposals as necessary. Air quality standards are met through the application of mitigation measures as listed in Appendix C - Conditions of Approval (Best Management Practices).

13.3 Characteristics and Setting

The terrain is generally rugged with deep narrow valleys. Air inversions regularly develop within these drainages. During the summer months, higher temperatures usually break up the inversions by mid-morning. In the wintertime these inversions can persist for days causing localized problems with some pollutants.

The air quality within the GSRA is generally typical of undeveloped regions in the western United States. Under the Clean Air Act, the US Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six "criteria pollutants": lead, ozone, sulfur dioxide, oxides of nitrogen (NO_X), carbon monoxide (CO), and particulate matter smaller than 10 microns in diameter (PM10). Ambient levels of most pollutants are usually well within the set limits.

The Colorado Air Quality Control Commission initiated a series of monitoring stations throughout the GSRA. These stations operated from 1979 to 1986. The only pollutant found to be a problem was total suspended particulates (TSP). All stations exceeded either the annual or 24-hour standards for particulates. The particulates were primarily generated from two sources wind blown dust and combustion. The wind blown dust is primarily a summer problem. The sparse vegetative cover and numerous dirt roads all contribute significantly. During the winter months the particulates are primarily from home heating combustion and vehicle exhaust. The stronger inversions common in winter limits dispersion and increases the ambient pollutant levels. Winter is also the ski season and results in a large influx of people driving on roads. The combination of home heating units, fireplaces and vehicles into strong inversions increases TSP levels considerably. To date all areas except Rifle are in compliance.

13.4 Resource Condition and Capabilities Evaluation

Emissions discharged from the wellhead in venting and flaring activities and dust and exhaust from construction and maintenance activities continue to be a public concern. In addition the nuisance (odor, dust, smoke, exhaust emissions, poor visibility) posed by oil and gas activities. In addition, formal complaints in which citizens experienced breathing difficulties; eye irritation and nausea have been noted. Since operations on public land are often removed from residences, most such complaints involve operations on private lands (GSRA Oil and Gas Leasing and Development DSEIS, 1998).

The Rifle area is the only area where a high probability for violation of the PM 10 standard occurs. All other areas are generally in full compliance. The TSP problem in the Rifle area results from numerous sources. There are numerous dirt roads through areas of sparse vegetative cover. Snow cover can be light especially on the south slopes. There is more dispersed construction and development work going on year round. The large, flat mesas are farmed extensively some dry farming but most is irrigated hay land.

13.5 Opportunities

- Review current impacts to air quality and current mitigation measures.
- Establish mitigation measures above the Roan Plateau rim for affecting activities.

AMS-14 SUMMARY FOR SOILS

14.1 Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) doesn't have an objective for soils. The soil management objective in the WRRA as outlined in the WRRA RMP of 1996 is; *"Prevent impairment of soil productivity due to accelerated soil erosion and physical or chemical degradation resulting from surface use activities. Stabilize and rehabilitate watersheds where accelerated erosion and degradation have resulted in unacceptable resource conditions."*

The soil, water and vegetation management objectives, as outlined in the OMP, for NOSR 1 and 3 are; "*1) Prevent significant increases in soil erosion or deterioration in surface water quality on the NOSRs while exercising prudent use of funds, and Protect NOSR water resources by monitoring of water-rights filings and keeping DOE informed of filings or other actions which may affect the quantity or quality of water on the NOSRs."*

14.2 Current Management

Soils are being managed to meet or exceed Colorado land health standard # 1 (see Appendix B Figure 1).

Minimizing accelerated soil erosion and maintaining soil productivity are common goals on lands administered by BLM. Soil standards with in the GSFO portion of the planning area below the Roan Plateau rim are met through incorporating best management practices to land disturbing activities and the application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. These include:

- NSO 15 Steep Slopes
- CSU 4 Erosive soils and slopes greater than 30 percent

Within the WRRA, soil and water resources are monitored to define problem areas and the effectiveness of applied mitigation measures as listed in Appendix C - Conditions of Approval (Best Management Practices) and stipulations listed in Appendix B of the WRRA RMP. These would be applied to all surface-use activities and include NSO 15 Steep Slopes.

14.3 Characteristics and Setting

Soils in the planning area can be grouped into four major mapping units. The primary unit "above the rim" is comprised of soils that are underlain by and formed in material weathered from Green River shale and Uinta sandstone. Elevation ranges from 7,500 to 9,300 feet, and the annual precipitation averages about 20 inches. The soils occur on moderately sloping to steep mountainsides and ridges. Surface textures are generally loams with loam to clay loam subsoils, the soils range from shallow to deep, are well drained and are highly permeable. These soils have slight to moderate erosion hazard, with exception of the occasional steep phases of soil series which have severe erosion hazard ratings.

The escarpment, known as the Roan Cliffs, marks the boundary between "above the rim" and "below the rim" soils. Below the west and south sides of the plateau a near vertical cliff of exposed Green River shales and talus slopes form the transition for soils formed from colluvium and the Wasatch Formation. The area is characterized by; steep rock outcrops and badlands, moderately sloping valleys and fans draining into the Colorado River. Average precipitation is 12-14 inches. The soils range from shallow to moderately deep and are well drained. Soils developed from the Wasatch formation often have loam, clay loams, or silty clay loams surface textures, and are moderately alkaline. Subsoils often have a higher clay content, and are often calcareous. Erosion hazard is generally severe. The badlands are steep and very steep, nearly barren land dissected by many intermittent drainage channels that have cut into the soft shale and sandstone of the

Green River formation and into the soft shale and siltstones of the Wasatch. Typically 85% of these areas are unvegetated. High natural erosion and elevated salinity are common with this these soils.

The soils "below the rim" on the east side are highly variable. The area includes very steep mountains, mesa breaks, and alluvial fans ranging down to mesas, terraces and benches. These soils are generally formed in alluvium, with a few formed in residuum, derived from shales and sandstone, and some formed from eolian material. Average precipitation ranges from 12-14 inches per year. The soils range from shallow to deep, are well drained, and have very slow to moderate permeability. Most have loam surface textures underlain by textures ranging from sandy loam to clay loams. These soils are mildly to strongly alkaline, and are often calcareous. Erosion hazard of these soils range from moderate to severe.

The last map unit "below the rim" includes soils adjacent to the rivers and streams, including Parachute Creek, the Colorado River and Government Creek. These are formed in alluvium from sandstones and shales. They are deep, well drained to somewhat poorly drained, nearly level to gently sloping soils on benches, terraces and floodplains. Surface textures range from strongly alkaline loams, sandy loams, to clay loams underlain by sandy loam to clay textures. Precipitation ranges from 12 to 14 inches. Soils are calcareous and moderately alkaline. Permeability ranges from very slow to moderately rapid, and erosion hazard for most soils is moderate however a few are severe. Some of these soils are highly saline.

A complete description and mapping of the soils in the Roan Plateau area can be found in the "Soil Survey of Rifle Area, Colorado" completed by the Soil Conservation Service in 1985, and the "Rio Blanco County Area, Colorado" completed by the Soil Conservation Service in 1982.

14.4 Resource Condition and Capabilities Evaluation

A land health assessment was performed above the rim 1999. Physical indicators of soil health and function were addressed as part of the upland site evaluations. Upland soils were assessed at 25 locations, which included all of the livestock allotments on the Plateau. Ten indicators were used to determine upland soil health. Those were surface litter, soil movement by water, flow patterns, soil movement by wind, soil crusting and surface sealing, compaction layer, rills, gullies, cover-amount, and cover-distribution.

Upland soils were generally found to be in excellent condition. Insect and burrowing animals appeared to be mixing the soils increasing aeration and mineral recycling. Vegetative cover was excellent. No signs of soil movement, soil pedestals, rills, or litter accumulation were observed. At many sites, the combination of vegetation, rock, and litter cover was at or near 100% of the soil surface. This assessment indicates soils were properly functioning at all of the assessment sites

The interdisciplinary team evaluated land health on the east side of the planning area "below the rim" in 2001. This is an area where soils are highly variable. Parent material in the higher elevation consists of Green River Shale. This formation weathers easily to form loamy soils. Just below the Green River Shale is the Wasatch Formation. This formation is made up of sandstone, shale, and conglomerate layers of various depth and composition. Areas of exposed Wasatch are often sources of elevated sediment and salinity. The lower elevations, including those along Government Creek, consist of soils derived from alluvial and colluvial deposits. These soils vary in texture, are often permeable, and are often easily eroded by water.

Upland soils were assessed at 16 locations, which included at least one site in each of the livestock allotments, including the Rees, Magpie Creek, Doodlebug, Webster Park, and Hubbard Mesa allotments. Generally, lower elevation areas on the south were not functioning as well as those to the north. Some of lower ratings occurred because of natural conditions, that being limited site potential. However, many of lower soil ratings in the Hubbard Mesa Allotment are a result of human activities including; OHV use, illegal trash dumping, livestock grazing, wildlife use, and drainage from roads, trails, and constructed facilities. Of these, OHV use (around the JQS Road and to the south) and livestock grazing (Government Creek and lower Thirty Two Mile Gulch) appear to have the greatest negative impact on soils. As a result of these disturbances, soils are not meeting land health standard # 1. The Webster Park, Doodlebug, Magpie Creek and the Rees allotments are in good shape and are meeting standard # 1.

No land health assessment has been done below the rim in the southern portion of the planning area. As indicated above, much of this area is badlands with poorly developed soils, low precipitation, poor vegetative cover, and subject to erosion. Extensive oil and gas development is occurring within this area.

14.5 Opportunities

- The Hubbard Mesa area, area near and to the south of the JQS Road, along Government Creek and lower Thirty Two Mile Gulch should be evaluated for opportunities to reduce negative impacts from OHVs and livestock grazing.
- Vegetative treatments could be initiated in areas with decadent sagebrush.
- Establish mitigation measures above the Roan Plateau rim for affecting activities.

AMS-15 Summary for Surface Water

15.1 Management Plans and Documents

The water quality management objective for in the GSRA RMP of 1984 (revised 1988) for public lands below the Roan Plateau Rim is; *"To maintain or improve existing water quality in the resource area where possible."* The objective for water yield management is; *"To increase water yield throughout the resource area through forest management practices and through treatment of mountain brush vegetation types to improve livestock and big game forage."*

The surface water management objective for the WRRA as outlined in the WRRA RMP of 1996 is; *"Maintain and improve both water quality and quantity to be compatible with existing and anticipated uses and to comply with applicable state and federal water quality standards".* The water rights objective is*; "Protect water sources that support BLM resource programs by obtaining legal water rights as necessary. Continue to work with the State of Colorado to identify and survey streams having high public values".* The general water depletion objective is; *"Assure BLM administered projects are in compliance with USFWS Programmatic Biological Opinion for minor water depletions in the Colorado River Basin".*

The soil, water and vegetation resource objectives, as outlined in the OMP, for NOSR 1 and 3 are; "*1) Prevent significant increases in soil erosion or deterioration in surface water quality on the NOSRs while exercising prudent use of funds, and Protect NOSR water resources by monitoring of water-rights filings and keeping DOE informed of filings or other actions which may affect the quantity or quality of water on the NOSRs."*

15.2 Current Management

Water quality is being managed to meet or exceed Colorado land health standard # 5 (see Appendix B Figure 1).

Quality standards are met through application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. These include:

- NSO 3 Major River Corridors
- CSU 4 Erosive soils and slopes greater than 30 percent

Surface water standards, within the WRRA, are met through the application of mitigation measures as listed in Appendix C - Conditions of Approval (Best Management Practices) and stipulations listed in Appendix B of the WRRA RMP.

General policy on BLM administered lands is to file water rights on water sources needed for current and future land management activities.

15.3 Characteristics and Setting

The climate is semi-arid, with annual precipitation ranging from10 inches on the “below the rim” area to over 20 inches “above the rim”. The precipitation difference is due to the elevation variation between the areas. Peak flow usually occurs in May on the rivers and streams. Large snow pack typically delays the peak flow and low snowpack usually results in an early runoff. Intense summer cloudbursts are common and can lead to substantial stream flows. Often peak flows on smaller perennial and intermittent streams are a result of summer thunderstorms.

Water quality in streams varies throughout the resource area depending largely on the annual precipitation patterns, vegetative cover, and geology of the watershed. Sediment and salinity are the primary pollutants. In general, surface water quality in the GSRA is good. The GSRA RMP designated watersheds that have characteristics requiring special management considerations to protect water quality. None of these designated watersheds lie within the planning area.

15.4 Resource Condition and Capabilities Evaluation

The planning area lies within the Upper Colorado River drainage basin. There are three distinct hydrologic areas. Those are the Parachute Creek watershed, the Government Creek watershed, and the south trending ephemeral and intermittent streams and washes that flow directly into the Colorado River.

Above the Rim. The area lies within the Parachute Creek basin. Perennial streams include East Middle Fork Parachute Creek and East Fork Parachute Creek and their associated tributaries. Review of discharge data shows seasonal stream flow variation with high flow typically occurring in May from snowmelt, and base flows or no flows occurring during the fall and winter months. Water quality data collected at gaging stations, and supplemented by data collected by BLM, indicate surface waters are generally of high quality.

Water quality was tested during the 1999 land health assessment. Stream flows varied from 0.012 cubic feet per second (cfs) on Camp Gulch to 1.50 cfs on the East Fork of Parachute Creek. Since the sites were monitored during base flow conditions, springs contributed much of the flow in some streams. Temperatures varied from 12.5 degrees Celsius on Golden Castle Gulch and JQS Gulch to 24.5 degrees Celsius on Second Anvil Creek. At many of the sites temperatures measured were rather high for cold-water trout streams. On smaller streams temperatures varied greatly depending on the time of day.

The BLM coordinates with the State of Colorado in the location and identification of non-point water pollutant sources and in maintaining the established water quality reporting process pursuant to section 305(b) of the Clean Water Act. None of the water quality parameters measured show a violation of the water quality standards. All waters on the Roan Plateau appear to be meeting the standards for water quality established by the State of Colorado. Additionally, none of these streams are included on the 303(d) list or 305(b) report for Colorado. These documents include impaired water bodies, those streams that do not meet water quality standards with technology based controls alone. The water quality measurements do not indicate that there are any problems with management on the Roan Cliffs assessment area.

Below the Rim – Government Creek. The Government Creek watershed is located on the east side of the planning area. Intermittent and ephemeral tributaries, including Thirty Two Mile Gulch, carry the runoff from the east trending land mass. The lower sections of these drainages are generally dry. The exception is the

flow resulting from snowmelt, which typically occurs in April or early May, and from summer convective storms. Government Creek is an intermittent stream with similar flow characteristics to its tributaries. Channel stability is rated poor. Natural flow characteristics are affected by irrigation withdrawals. Water quality samples indicate slightly basic waters that are high in total dissolved solids and sediment loads. Calcium, magnesium, and sulfate are the major ions. The water quality parameters measured on the streams "below the rim" area are limited.

Land uses have impacted the vegetative component in localized areas. OHV use and sheep grazing in some areas has increased the sediment and salinity loading in the Government Creek watershed.

Data collected do not show a violation of the water quality standards established to protect the classified uses. Additionally, Government Creek and its tributaries are not included on the 303(d) list or 305(b) report for Colorado

Below the Rim – South. The third hydrologic area consists of ephemeral and intermittent streams and washes that flow directly into the Colorado River. These drainages are generally dry, but do flow in response to snowmelt and convective storms. Water quality data have not been collected in these specific drainages, but are projected to be similar to other waters in the lower portion of the Colorado River basin. These have high sediment levels during high flow conditions, total dissolved solids levels of 1,000 mg/l or more, and are of a sodium-magnesium-sulfate type. Calcium may also be predominant at certain levels of discharge. Water pH is slightly basic.

The Colorado River, Roaring Fork to Parachute Creek reach, is included on the 303(d) preliminary monitoring and evaluation list for sediment. Inclusion on this list indicates that information suggesting impairment is available, but additional information is needed for a final determination.

There is a spent shale disposal pile within this area that was generated during the operation of the Anvil Points Research and Development facility. The spent oil shale was deposited adjacent to West Sharrard Creek. The State of Colorado has issued an evaluation of the pile identifying concerns related to pile stability and elevated arsenic levels detected during monitoring activities.

Water Rights. More than 125 springs have been located within the planning area. Mapping of locations, measurement of flow, collection of water quality data including pH, specific conductance, temperature has been completed. Application for water rights on these water sources has been prepared and they will be submitted the Solicitor's Office for filing this month. Additionally, assessment of instream flow required to support fisheries for perennial streams has been completed. BLM instream flow recommendations utilizing the R2Cross model, was forwarded to the Colorado Water Conservation Board in October 1999. Those instream water right applications were published in the July 2000 resume.

15.5 Opportunities

Opportunities exist to:

- Establish mitigation measures above the Roan Plateau rim for affecting activities.
- Evaluate the Hubbard Mesa area, area near and to the south of the JQS Road, along Government Creek and lower Thirty Two Mile Gulch for opportunities to reduce sediment and salinity impacts from OHVs and livestock grazing.
- Vegetative treatments could be initiated is areas with decadent sagebrush to improve vegetative cover. Improved cover would offer good watershed protection and minimize sediment yields.
- Review current impacts to surface water and current mitigation measures.
- Amend the GSRA RMP to remove the water yield objective.

AMS-16 SUMMARY FOR GROUND WATER-

16.1 Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) has no objective for ground water. The ground water management objective for the WRRA as outlined in the WRRA RMP of 1996 is; *"Ensure the integrity of aquifer systems in both quantity and quality."*

16.2 Current Management

Water quality is being managed to meet or exceed Colorado land health standard # 5 (see Appendix B Figure 1).

Water quality standards in the GSRA for public lands below the Roan Plateau rim are met through application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. Water quality standards within the WRRA are met using the conditions of approval in Appendix C of the RMP to prevent degradation by toxins and other impurities from BLM projects and commodity extraction activities that may affect usable subterranean water.

16.3 Characteristics and Setting

Above the Rim. The ground water resource on top of the Roan Plateau is contained within the Uinta Formation, which outcrops above the rim, and the underlying Parachute Creek Member of the Green River Formation. Based on hydrologic studies conducted on NOSR 1 and 3, there is potentially usable ground water within four persistent water-bearing zones. The uppermost zone includes the Uinta and upper Parachute Creek Member. The other water zones are located just above and below the oil-shale rich Mahogany zone. Ground water quality is good to excellent, with a slight decrease in quality with depth. The hydrologic studies have also shown that the topographic surface water drainage divide between the NOSR streams and Piceance Creek drainage to the north is also is a ground water divide. The ground water system underlying NOSR 1 and 3, for about the first 2,000 feet in depth, is nearly an island unto itself, having very little interaction with the rest of the Piceance structural basin. There is an abundance of springs above the rim, but very few wells on public lands, and little utilization of the ground water resource.

Below the Rim. The surface geology below the rim consists of the lower part of the Green River Formation (below Parachute Creek Member) and underlying Wasatch Formation. These formations are not known to contain significant usable water zones. There is a slight potential for minor water zones in the lenticular sandstones of the Wasatch. Hydrologic information from the Garfield County landfill studies indicates that there are no usable water zones within the landfill area. The BLM administered lands have few exposures of shallow water-bearing surface deposits or alluvial aquifers. Nearly all of the water wells are located on private lands. Many of those wells are less than 100 feet deep and generally intersect the alluvial aquifers along the Colorado River, Parachute Creek and the other streams and tributaries throughout the area. The deeper wells range in depth from about 100 to 250 feet, with a few in excess of 400 feet. These wells are largely located on the slopes and benches south of the Colorado River and south of the planning area.

16.4 Resource Condition and Capabilities Evaluation

With the exception of some undeveloped springs used by livestock and wildlife, and springs developed for livestock waters, little to no use of ground water is occurring on public lands.

The overall potential for contamination of usable water zones and domestic groundwater from BLM-approved gas drilling operations is considered to be very low for several reasons; the requirements that operators

isolate and protect usable water zones, the relatively few domestic water wells on or near public lands, and the limited amount of water-bearing zones on public lands (GSRA Oil and Gas Leasing and Development DSEIS, 1998).

16.5 Opportunities

Opportunities exist to:

- Review current impacts to ground water and current mitigation measures.
- Establish mitigation measures above the Roan Plateau rim for affecting activities.
- Amend current GSRA and WRRA RMP objectives.

AMS-17 SUMMARY FOR VEGETATION - RIPARIAN & WETLANDS

17.1 Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) has no objective for riparian and wetland management.

The riparian management objective for the WRFO portion of the planning area as described in the 1996 WRRA RMP is to; *"Achieve an advanced ecological condition on all high and medium priority riparian habitats except where resource management objectives, including proper functioning condition, require an earlier successional stage. The goal would be to have 75 percent of all riparian areas in the Resource Area in proper functioning condition within five years of approval of the RMP, Record of Decision."*

17.2 Current Management

Riparian vegetation and wetlands are being managed to meet or exceed Colorado land health standard # 2 (see Appendix B Figure 1).

Within the GSRA, riparian vegetation and wetland standards are met through allotment management plans and the application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment. These include:

- NSO 2 Riparian and Wetland Zones
- NSO 3 Major River Corridors
- CSU 2 Riparian and Wetland Zones

Within the WRRA, vegetation resources are managed to enhance and maintain sustainability for ecological condition within plant communities. Specific desired plant communities (DPC) goals are identified and considered during activity plan development. Ecological status is determined using BLM ecological site inventory procedures. Noxious weeds would be managed to reduce negative impact to environment, aesthetics, and economics. Riparian areas are inventoried and protected in accordance with RMP objectives, and in cooperation with Colorado Natural Area programs and other interested parties.

17.3 Characteristics and Setting

Riparian refers to vegetation and habitats that are dependent upon or associated with the presence of water. Riparian areas comprise the transition zone between permanently saturated soils and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water. Examples of riparian areas include lands along perennially and intermittently flowing rivers and streams and the shores of lakes and reservoirs with stable water levels. Riparian areas are some of the most productive,

diverse, ecologically valuable, and utilized resources. The habitat islands provided by springs are of special significance, because they often provide the only habitat diversity in uniform desert systems.

Riparian vegetation along streams is dependent on the stream channel type, duration of water availability, soil type and depth, climate, and management history. As water availability decreases, herbaceous vegetation will shift from sedges to grasses. The grasses will change from wetland obligates, plants that occur almost always in wetlands under natural conditions, to wetland facultative, plants that usually occur in wetlands but occasionally found in non-wetlands. Lower elevation sites often have alder and dogwood along with willow as the predominant woody vegetation. Willow and aspen dominate higher elevation sites.

17.4 Resource Condition and Capabilities Evaluation

The "Riparian-Wetland Initiative for the 1990s" established national goals and objectives for managing riparian-wetland resources on public lands. The Initiative lead to a Proper Functioning Condition (PFC) Assessment method of analyzing a riparian-wetland areas' capability and potential. The process of assessing whether a riparian-wetland area is functioning properly requires an interdisciplinary team of resource professionals familiar. The team looks at three components: (1) vegetation, (2) landforms/soils, and (3) hydrology. The riparian area is then placed in one of four categories: Functional-At-Risk (FAR), Non-Functional (NF), or Unknown. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy during high water flows.

Above the Rim. Conditions of riparian areas were reviewed in 1994 and during land health assessments conducted in 1999 and 2001. In 1994 and 1999, a PFC inventory was conducted along creeks on the Roan Plateau. Table 17.4-1shows a comparison of the inventories. In 1999, 8.6 miles (40%) of the sites were evaluated as PFC, 24.6 miles (55%) had a FAR rating, and .6 miles (5%) had a NOT (non-functioning) rating. All of the sites that received a FAR rating were considered to be improving in condition or making significant progress towards meeting Colorado land health standard # 2. Table 17.4-2 displays causal factors noted in the 2001 Roan Cliffs land health assessment.

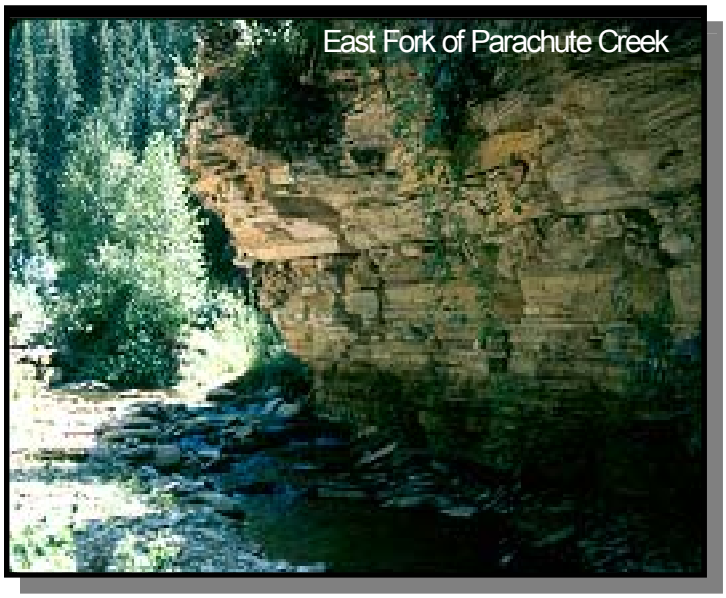


Table 17.4-1 1994 and 1999 Roan Cliffs PFC Assessment Comparison								
Riparian Name	**1994 Rating**				**1999 Rating**			
	PFC	**FAR**	**NF**	**TREND**	**PFC**	**FAR**	**NF**	**TREND**
Ben Good Pasture (Middle), 2.2 mi.		X		Down		X		Up
Buck Gulch, 0.6 mi.			X				X	
Bull Gulch, 0.8 mi.		X		Not Apprnt	X			
Camp Gulch, 2.3 mi.	X					X		Up
East Fork Parachute Creek, 1.6 mi.		X		Up	X			
Forked Gulch (Old Mtn Allot), 1.2 mi.						X		Up
Forked Gulch (Mahaffey Summer Allot), 0.6 mi.						X		Up
Golden Castle, 1.1mi.		X		Down	X			
JQS Gulch-Anvil Pasture, 1.0 mi.		X		Down	X			
JQS Gulch-JQS Pasture, 0.4 mi.		X		Down		X		Not Apprnt
Northwater Creek-Lower, 2.0 mi.		X		Not Apprnt		X		Up
Northwater Creek-Upper, 5.3 mi.		X		Up		X		Up
Raspberry Creek, 1.8 mi.		X		Not Apprnt		X		Up
Second Anvil Creek-Upper, 0.5 mi.		X		Static		X		Up
Second Anvil Cr-Lower/Middle, 1.1 mi.		X		Down	X			
Sheep Trail Hollow, 1.1 mi.	X				X			
Third Water Gulch, 1.4 mi.		X		Down	X			
Trapper Cr (outside exclosure), 6.8 mi.		X		Not Apprnt		X		Up
Trapper Cr-Lower Exclosure, 0.5 mi.		X		Up	X			
West Forked Gulch, 0.4 mi.						X		Up
Yellowjacket Creek, 1.1 mi.			X	Static		X		Up

Source: BLM GSFO

Table 17.4-2 Causal factors noted in the Roan Cliff Land Health Assessment	
Stream/Drainage Name	**Causal Factor**
Ben Good Creek - (Middle)	Grazing, Weeds
Buck Gulch	Natural causes (may be too dry to have the potential to support riparian vegetation, Weeds
Camp Gulch	Bank trampling by elk (No cattle grazing), Weeds.
Forked Gulch (Mahaffey Summer Allotment)	Dam, Grazing.
Forked Gulch (Old Mountain Allotment)	Trespass grazing from adjacent private lands and allotments.
Northwater Creek - Lower	Major flood event 15+ years, Grazing, Weeds.
Northwater Creek - Upper	Riparian vegetation lacking.
Raspberry Creek	Old beaver dams breaching & causing downcutting of channel. Roads close to creek causing the stream banks to slough.
Second Anvil Creek (Upper)	Headcuts & nick points formed prior to fencing, High stream flow events.
Trapper Creek (outside exclosure)	Lack of woody riparian, Cattle drift.
West Forked Gulch	Low vegetative cover and lack of willow.
Yellowjacket Creek	Old beaver dams breaching causing downcutting, raw banks, and excessive sediment.

Source: BLM 2001 Roan Cliff Land Health Assessment and Determination Document

Monitoring data such as utilization, photo-points, and general observations, along with the land health assessment, indicates that riparian conditions on creeks and meadows appears to be improving throughout the area and significant progress is being made in meeting land health standards and guidelines. Virtually all the riparian zones assessed show definite signs of improvement since the 1994 assessment, with widening of the riparian zone evident, a decrease in the amount of bare soil or cut banks and recruitment of young woody and herbaceous riparian species. However, grazing distribution continues to be a concern. Changes in riding and salting practices, developing upland water sources, constructing other water sources such as springs and pipelines, implementing utilization limits, and adjusting and implementing grazing systems have also helped to bring about improvement of riparian conditions and land health.

Riparian standards in the Gordon Gulch/Naval Oil Shale Allotment administered by the WRFO are being met with current management. Table 17.4-3 displays the riparian areas and their current status.

Table 17.4-3 Riparian areas and status in the Gordon Gulch/Naval Oil Shale Allotment			
Stream	**Acres Functioning**	**Acres Functioning at Risk**	**Acres Non-Functioning**
Cow Creek	0	14.6	0
West Branch Cow	0	.5	0
No Name Gulch	1.1	1.4	1.4
Trapper	5.0	0	0
Bear	0	0	3.0
Piceance Creek	2.4	0	0
TOTAL	8.5	16.5	4.4

Below the Rim. A Proper Functioning Condition (PFC) assessment was conducted in 2001 (Table 17.4-4) as part of the Rifle Creek land health assessment. Of the creeks assessed in the Hubbard Mesa, Rees, Doodlebug, Magpie Creek, and Webster Park (Goodrich Park area) Allotments, 3.3 mile (48%) were considered in proper functioning condition, 2.6 miles (38%) were considered functioning at risk with no apparent trend and 1 mile (14%) of the creeks surveyed were at functioning at risk with a downward trend. In addition, Favert Reservoir was assessed and 2 acres, or 100% was considered at PFC.

Table 17.4-4 PFC Assessment as part of the Rifle Creek Land Health Assessment

Stream/Drainage Name	Miles Assessed	Condition (Functional Rating)	Trend	Causal Factor
Goodrich Gulch	1.3	PFC		
Thirty-two Mile Gulch	0.6	PFC		
Doodlebug Gulch	0.3	FAR	Not apparent	Probably natural causes.
Government Creek Lower Reach 1	0.6	FAR	Downward	OHV use. System is limited due to flashy runoff, poor water quality, and intermittent flow.
Government Creek Lower Reach 2	2.3	FAR	Not apparent	System is limited due to flashy runoff, poor water quality, and intermittent flow.
Government Creek Upper Reach 1	0.4	FAR	Downward	Trailing use along the riparian zone by sheep resulting in bare ground.
Government Creek Upper Reach 2	0.4	PFC		
Magpie Gulch Upper Reach	0.4	PFC		
Magpie Gulch Lower Reach	0.6	PFC		
Fravert Reservoir	2.0	PFC		

Source: BLM land health assessment

The Cottonwood Gulch and Webster Park Allotments have not yet been evaluated for proper functioning condition. The 1995 riparian evaluation (Table 17.4-5) found Cottonwood Gulch to be a healthy, well-functioning riparian system with a good diversity of riparian species and age classes. Cottonwood and Hayes Gulches have perennial streams with riparian zones of cottonwoods, willows, and box elder. Invasion of salt cedar appears to be a problem in riparian areas as is the naturally high sediment yield from upland erosive soils.

Table 17.4-5 Riparian Habitat Survey for Cottonwood Gulch and Webster Park Allotments

Riparian Area	Allotment	Stream Length (feet)	Riparian Zone Width (Feet)	Riparian Zone Length (mile)	Riparian Condition
Hayes Gulch	Cottonwood Gulch	2.5	15	2	Improving
W & N Forks of Cottonwood Gulch	Cottonwood Gulch	20	15	1.75	Stable
Cottonwood Gulch	Cottonwood Gulch	4	30	3.25	Stable
Webster Park Gulch	Webster Park	1	0	.75	Declining

Riparian zones in the Cottonwood Gulch allotment are in stable condition but areas of heavy grazing and weeds were noted. Hayes Gulch was found to be improving. Webster Park Gulch in the Webster Park Allotment was declining condition due to flashy runoff, terrain, and poor water quality. The drainage has numerous steep gulches with floodplains and alluvial valleys that limit the potential of the creek.

17.5 Opportunities

- Construct new range projects, reconstruct and maintain existing projects to reduce impacts to riparian areas by redistributing livestock.
- Developing management strategies to improve the health of riparian areas.

17.6 Additional Information

The 1999 Oil & Gas Leasing and Development Final SEIS and the 1996 WRRA RMP has additional information for many streams.

AMS-18 SUMMARY FOR VEGETATION - UPLAND

18.1 Existing Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) has no objective for upland vegetation management.

The vegetation management objective within the WRRA as described in the 1996 WRRA RMP is to; "1) *Maintain healthy, diverse and sustainable rangeland and woodland plant communities which provide food, fiber and enjoyment for human use and well being commensurate with the lands capabilities to produce and which conserve healthy, diverse populations of native plants, and 2) Maintain a landscape composed of a plant community mosaic representing successional stages and distribution patterns consistent with the natural disturbance and regeneration regimes. Conserving a site's ability to produce vegetation is key to sustainability."*

18.1 Current Management

Upland vegetation is being managed to meet or exceed Colorado land health standard # 3 (see Appendix B Figure 1).

Within the GSRA, upland vegetation standards are met through allotment management plans and the application of mitigation measures as identified in the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment.

Within the WRRA, upland vegetation resources are managed to enhance and maintain sustainability for ecological condition within plant communities. Specific desired plant communities (DPC) goals are identified and considered during activity plan development. Ecological status is determined using BLM ecological site inventory procedures. Noxious weeds are managed to reduce negative impact to the environment, aesthetics, and economics. Upland vegetation is inventoried and protected in accordance with RMP objectives. The WRRA RMP lists specific DPC goals for some types of plant communities.

18.3 Characteristics and Setting

Table 18.3-1 Vegetation Types	
Vegetation Type	Acres
Aspen	10,111
Bare Ground	7,243
Disturbed Ground	104
Douglas Fir	3,584
Gambel Oak	3,576
Irrigated Agriculture	3
Mountain Shrub	13,267
Pinyon/Juniper	16,586
Riparian	124
Sagebrush/bunchgrass	11,116 4
Subalpine Fir	1,128
Water	23

The variability of elevation, topography and aspect combined with the unusual geology, has resulted in a great diversity of plant community types (Table 18.3-1).

Above the Rim. Elevations for areas above the rim range from 7,600 to 9,250 feet. The landscape contains a diverse mosaic of mesic and xeric montane vegetation dominated by shrublands and aspen stands. Coniferous forests and grasslands occur in lesser amounts. Mountain big sagebrush and mixed mountain shrubs occupy the ridgetops and the drier south and west facing slopes. Aspen stands generally occur on north and northeast facing slopes and appear to be climax communities. Solid stands of spruce/fir and Douglas-fir forests are confined to the cliff rims and the steep north-facing slopes along drainages. Mountain grasslands are distributed along a narrow band along the eastern rim and are scattered along ridges and hilltops elsewhere. A small percentage of the landscape consists of sparsely vegetated shale slopes. These occur along steep, south-facing slopes within this unit. For additional information on vegetation refer to AMS 6 - Summary for Special Status Species Plants and AMS 16 - Summary for Riparian Vegetation.

Below the Rim. The lower elevations, above the Colorado River floodplain, consist of a semi-desert vegetation type with elevations between 5,200 and 6,400 feet. The vegetation here includes sagebrush, greasewood, saltbush and pinyon-juniper woodlands.

The upper reaches contain the scenic escarpment referred to as the Roan Cliffs. This zone is steep, eroded, and largely devoid of plant growth. This especially pertains to the exposed, variegated soils of the Wasatch formation and the steep slopes and cliffs of the overlying Green River formation. Juniper woodlands occur on the gentle west, south and east slopes. Shrublands of mountain mahogany and Gambel oak occur on the northeast slopes and along ravine cuts. Immediately below the cliff face, sub-mesic conditions permit an extension of the Gambel oak community and isolated stands of Douglas fir and aspen. The escarpment vegetation forms a transition between the xeric vegetation typical of the Colorado Plateau and the mountain vegetation of the middle Rocky Mountains.

18.4 Resource Condition and Capabilities Evaluation

Above the Rim. A 1999 land health assessment (Table 18.4-1) found plant communities to be in good to excellent condition. Native plant communities are adequately distributed across the landscape to ensure sustainability. Plants are present in mixed age classes sufficient to sustain recruitment. However, across the landscape, the age-class diversity between and within communities could be improved. The shrublands are healthy, diverse and productive. Good species diversity was noted with a mix of age classes. Kentucky bluegrass, an aggressive, nonnative species, was recorded on over 25% of the assessment sites, but was rarely a dominant component.

Many aspen stands in this landscape are beyond late seral stage and the mature trees are becoming decadent. However, numerous aspen sprouts and saplings were evident at several sites. On all sites, the understory vegetation was quite productive and diverse. Conifer stands also appear healthy.

Table 18.4-1 Upland Vegetation – Land Health Assessment					
Allotment	**Pasture**	**Site ID #**	**Biotic Integrity Rating (Std 3)**	**Ecological Site**	**Vegetation type**
East Fork	NW	RC1	Functioning	Loamy Slopes	Mountain Browse
	NW	RC4	Functioning	Mtn Loam	Mountain Browse
	NE	RC5	Functioning	Mtn Loam	Sagebrush
	NE	RC7	Functioning	Loam	Aspen
	Grassy	RC10	Functioning	Mtn Loam	Snowberry/sagebrush
	Grassy	RC12	Functioning	Mtn Loam	Snowberry/sagebrush
Old Mountain		RC14	Functioning	Mtn Loam	Douglas fir
		RC15	Functioning	Mtn Loam	Sagebrush/grass
		RC16	Functioning	Mtn Loam	Sagebrush/snowberry
Mahaffey Summer		RC19	Functioning	Mtn Loam	Sagebrush/grass
		RC21	Functioning	Loam	Aspen
		RC22	Functioning	Mtn Loam	Mixed mtn shrub/grass
		RC25	Functioning	Loam	Aspen
Clough-Alber		RC27	Functioning	Mtn Loam	Shrub/Grass
		RC28	Functioning	Mtn Loam	Grass/Forb
		RC31	Functioning	Loam	Aspen
		RC32	Functioning	Mtn Loam	Sagebrush/snowberry
JQS	Trapper	RC34	Functioning	Mtn Loam	Grass/shrub
	Trapper	RC35	Functioning	Mtn Loam	Grass/shrub
	Trapper	RC36	Functioning	Loam Slope	Grass/shrubs
	JQS	RC37	Functioning	Mtn Slope	Sagebrush/snowberry
	JQS	RC38	Poorly Functioning	loam	Grass/shrubs
	Anvil	RC41	Functioning	Mtn Loam	Grass/shrubs
	Anvil	RC44	Functioning	Mtn Loam	Grass/shrubs

Causal factors, noted in the 2001 Roan Cliff Land Health Assessment and Determination for not meeting Colorado land health standard # 3, are shown on Table 18.4-2.

Table 18.4-2 Upland Vegetation – Causal Factors - Land Health Assessment		
Allotment Name and Site Write-Up Number	**Causal Factor**	**Possible Management Actions**
JQS Common RC38	The lower end of the site is a livestock bedding area and this has caused a decline in sagebrush and native perennial grasses. Sagebrush seedlings are starting to reinvade the site. A preponderance of Kentucky bluegrass, an exotic, rabbitbrush and sagebrush seedlings are in the area.	Enforcing utilization standards implemented through permit renewals. Additional upland waters. Continue with riding and salting programs implemented through the AMP and AMP amendments.

An Ecological Site Inventory was conducted by the WRFO in the Cow Creek Allotment and the results from this inventory indicates that 159 acres, or 2% of the allotment was at PNC (Potential Natural Community), 1853 acres or 24% of the allotment was at a late seral stage, 4756 acres or 63% of the allotment is at a mid seral stage, and 800 acres or 11% of the allotment is at an early seral stage. A land health assessment indicated that 3439 acres of the allotment are achieving or moving towards meeting upland health standards and 4129 acres are not currently meeting land health standards.

Upland areas in the Gordon Gulch/Naval Oil Shale Allotment are meeting the standard for upland sites. The Naval Oil Shale pasture has the most productive rangeland sites due to a combination of better-developed soils and higher precipitation.

Below the Rim. Table 18.4-3 displays the results of the land health assessment that was conducted in the Hubbard Mesa, Doodlebug, Magpie Creek, the Goodrich Park area of the Webster Park Allotment, and the Rees Allotment in 2001 (see Appendix A Map 7). The assessment noted that the lower elevation salt desert shrub and sagebrush steppe habitats tend to be in poor to fair condition. The shrubs are old, decadent, and even-aged with little evidence of recruitment. Pinyon and juniper trees are encroaching into the sagebrush parks. Herbaceous cover is mixed, with some areas having a fair to good understory of perennial grasses and other areas having little but prickly pear cactus, cheatgrass and annual forbs. Perennial forbs and cool-season grasses are often lacking or found only in protected areas.

The pinyon-juniper woodlands were variable in condition. Many stands at lower elevations and on south-facing hillsides consisted of mature to old trees with little understory vegetation. Other stands had a fairly good cover of grasses and forbs. Shrubs are lacking in many areas, or where present, are in poor to fair condition. Shrubs are old, decadent and severely hedged with little or no recruitment. Localized areas of light to moderate cheatgrass infestations were observed. These were closely associated with surface disturbances such as roads or woodcutting.

At the higher elevations and north-facing hillsides, the pinyon-juniper stands had a dense canopy and a thick understory of shrubs and grasses. A large portion of this habitat appears ready to burn. Ladder fuels were readily available and the canopy density appears sufficient to carry a crown fire.

In general, the higher elevations, north facing hillsides and steeper slopes of the watershed tend to be in good condition with evidence of regeneration common. These areas generally have good diversity, cover and productivity of the vegetative community. They receive higher precipitation and have better vegetative cover and greater resiliency to and ability to recover from disturbances than the lower elevations. The higher elevations are also covered in snow a greater portion of the year and therefore receive less grazing use by both livestock and wildlife.

Oakbrush and mixed mountain shrub communities exhibit good to excellent diversity and productivity of shrubs, grasses, and forbs. Many sites are almost completely covered by vegetation or litter. Shrubs show little to moderate amounts of hedging and regeneration is evident. The herbaceous community is diverse and productive. Kentucky bluegrass is frequently the dominant grass and dandelions are common on nearly half of the mountain shrub sites.

Aspen stands are generally in good condition, with mixed age classes present, and good to excellent regeneration. The sites assessed showed a good diversity of shrubs and forbs and a fair diversity of grasses.

Table 18.4-3 Upland Vegetation –Land Health Assessment				
Allotment	**Site ID #**	**Physical Rating (Std 3)**	**Ecological Site**	**Vegetation type**
Doodlebug	RCK-8905-01	Achieving	Brushy Loam	Mtn Browse
Magpie Creek	RCK-8901-01	Achieving	Rolling Loam	Sagebrush
	RCK-8901-02	Achieving		Sagebrush/juniper
	RCK-8901-03	Achieving	Brushy Loam	oakbrush
Rees	RCK-8907-01	Achieving	Deep Clay Loam	Sagebrush/snowberry
	RCK-8907-02	Achieving	Brushy Loam	Oakbrush
Hubbard Mesa	RCK-8903-01	Extreme Departure	Rolling Loam	Sagebrush
	RCK-8903-02	Moderate Departure	Alkaline Soil	Sagebrush/grass
	RCK-8903-03	Achieving		PJ/sagebrush
	RCK-8904-04	Moderate Departure	Salt Flats	Sagebrush/greasewood
	RCK-8904-05	Moderate Departure	Alkaline slopes	Sagebrush/greasewood
	RCK-8904-06	Extreme Departure	Alkaline Slopes	Sagebrush
	RCK-8904-07	Moderate Departure	Salt Flats	Sagebrush/galleta grass
	RCK-8904-08	Moderate Departure	Rolling Loam	Sagebrush
	RCK-8904-09	Moderate Departure	Rolling Loam	Sagebrush
Webster Park (Goodrich Park area)	RCK-8902-01	Achieving	Brushy Loam	Oakbrush

Source: BLM GSFO - Land Health Assessment and Determination Document

Causal factors, noted for not meeting Colorado land health standard # 3 below the rim, are shown on Table 18.4-4.

Table 18.4-4 Upland Vegetation – Causal Factors Land Health Assessment	
Allotment & Site #	**Causal Factor**
Hubbard Mesa RCK-8903-01	Sagebrush is severely hedged, many decadent plants but recruitment is occurring. Very few perennial grasses, forbs, and PJ encroachment is occurring with older trees.
Hubbard Mesa RCK-8903-02	Mature classes with little recruitment dominate sagebrush. Sagebrush was some what hedged. Cheatgrass at site.
Hubbard Mesa RCK-8903-04	Sagebrush and greasewood are dominated by older age classes and are severely hedged by sheep. Galleta grass is healthy but cool season grasses are sparse. Cheatgrass and burr buttercup is at site. The site has low potential.
Hubbard Mesa RCK-8903-05	Old decadent plants dominate sagebrush stands but some recruitment is occurring. There is a good diversity of grasses but fair density and production of plants. Cheatgrass is present but not dominant. OHV use is the primary factor in not meeting this standard at this site and is causing a downward trend of vegetation condition.

Table 18.4-4 Upland Vegetation – Causal Factors Land Health Assessment	
Allotment & Site #	**Causal Factor**
Hubbard Mesa RCK-8903-06	Sagebrush density is declining due to dead and decadent plants, some recruitment was evident but not sufficient to replace present stand. Annuals are dominant and perennial grasses are only found within protected areas (i.e. cactus and shrubs). Cheatgrass is present and a concern and juniper is encroaching. The site has low potential that may make rehabilitation difficult.
Hubbard Mesa RCK-8903-07	Sagebrush is older, decadent and hedged by sheep. Greasewood is also hedged, heavily stressed and low vigor. Cheatgrass is prevalent
Hubbard Mesa RCK-8903-08	Sagebrush is severely hedged, many decadent plants but recruitment is occurring. Good diversity of perennial grasses, but poor forbs population, and PJ encroachment is occurring with older trees.
Hubbard Mesa RCK-8903-08	Sagebrush is severely hedged, many decadent plants but recruitment is occurring. Good diversity of perennial grasses, but poor forbs population, and PJ encroachment is occurring with older trees. Proximity to private land that the permittee uses for feeding and shearing.

Source: BLM GSFO - Land Health Assessment and Determination Document

18.5 Opportunities

- Implement new range projects, reconstruct and maintain existing projects to reduce impacts to upland areas by redistributing livestock.
- Develop management strategies to improve the health of the land including: changing grazing management to conform with Guidelines for Grazing Management, prescribed burns, mechanical vegetation treatments, along with reseeding of native or other desirable species.

18.6 Additional Information

The 1999 Oil and Gas Leasing and Development FSEIS provides narratives of broad vegetative communities and includes a discussion of wildlife dependence with each community below the rim.

AMS-19 SUMMARY FOR WEEDS

19.1 Management Plans and Guidance

Two Federal laws direct weed control on Federal lands: the Federal Noxious Weed Act of 1974 as amended by Sec 15, Management of Undesirable Plants on Federal Lands, 1990 and the Carson-Foley Act of 1968.

Weed management follows the direction and the priorities established by the 1991 Final EIS - Vegetation Treatment on BLM Lands in Thirteen Western States (http://www.blm.gov/weeds/VegEIS/).

The GSRA RMP of 1984 (revised 1988) has no objective for weed management. The noxious and problem weed management objective within the WRRA as described in the 1996 WRRA RMP is to; "*Manage noxious weeds in the White River Resource Area so that they cause no further negative environmental, aesthetic or economic impact.*"

19.2 Current Management

The BLM has weed management/pesticide use coordinator in each Field Office. The BLM, in concert with private landowners and state and local governments, use all available integrated pest management techniques including biological, mechanical and chemical methods for the management of noxious weeds.

Colorado BLM's Weed Management Program is based on the BLM's National Strategy, *Partners Against Weeds*. This national document outlines seven goals and actions that are required to implement the goal. The goals are: prevention and detection; education and awareness, inventory, planning, integrated weed management, coordination, and monitoring, evaluation, research and technology transfer.

BLM's National Weed Team has developed the BLM National List of Non Native Invasive Species (http://www.co.blm.gov/botany/invasiweed.htm) that BLM tries to manage. The list focuses on exotic species that are highly invasive in natural systems.

The BLM has an emphasis on preventing weeds from spreading to new locations in the actions BLM permits, and in the way BLM performs our duties everyday. Colorado BLM requires use of weed-free hay for domestic livestock to reduce the spread of weeds in areas where forage or mulch is used.

19.3 Characteristics and Setting

Noxious weed species including: thistles, houndstongue (*Cynoglossum officinale)*, burdock (*Arctium minus*), knapweed (*Centaurea)* toadflax (*Linaria vulgaris)*, Salt Cedar or tamarisk *(Tamarix ramosissima)*, and cheatgrass *(Bromus tectorum)* are found throughout the landscape.

19.4 Resource Condition and Capabilities Evaluation

Noxious weeds are present and spreading and are a threat to multiple use land management. The negative impacts of weeds are well documented and include; a loss of rangeland productivity, increased soil erosion, reduced species richness, reduced aesthetics and structural diversity, loss of wildlife habitat, and wildlife species, and contribute to human health hazards such as allergies.

19.5 Opportunities

Opportunities exist for more aggressive weed control included as part of management strategies and management actions.

19.6 Additional Information

For additional information consult:

http://www.co.blm.gov/botany/weedhome.htm
http://www.blm.gov/weeds/VegEIS/index.htm

AMS-20 SUMMARY FOR FORESTRY

20.1 Management Plans and Documents

The forest management objective in the GSRA RMP of 1984 (revised 1988), which included the Roan Plateau, is; *"To manage all suitable commercial forest land and woodland to meet sawtimber and fuelwood demand and maintain stand productivity."*

The forest management objectives in the WRRA as described in the 1996 WRRA RMP are to; *"(1) Determine the sustainable animal allowable timberland harvest level on suitable commercial and non-commercial timberlands, (2) Manage all timberlands to maintain productivity, extent, forest structure and for the enhancement of other resources, (3) Provide special management consideration for special or unique forest/woodland areas."*

The woodlands objectives in the WRRA as described in the 1996 WRRA RMP are to*; 1) Determine annual allowable woodland harvest level on suitable/commercial woodlands, 2) Determine allowable use levels on non-commercial woodlands, 3) Manage all woodlands to maintain productivity, extent, forest structure and for the enhancement of other resources".*

The forest management objective, as outlined in the OMP, for NOSR 1 and 3 is; "*NOSR timber resources shall be managed to prevent deterioration of the soils and vegetation and the visual resources of the NOSRs, and shall be consistent with good fire pre-suppression techniques."*

20.2 Current Management

Under Priorities of Implementation (GSRA RMP, 1988), is: "Prepare forest management plans on the two remaining forest management units (Castle Peak and NOSR). Measures were taken in mid-1980's to draft a forest management plan for the Naval Oil Shale Reserve. Discussions with DOE during 1980's and early 1990's were focused on funds to actively manage the forest on NOSR. Despite various meetings with DOE and requests for funds, monies were never allocated for forest mgmt. DOE funding was focused on fire protection and livestock grazing management exclusively. A timber sale prospectus was developed in 1990 to potentially harvest various stands of aspen. Again with no funds obligated to carry manpower costs of such sale, the idea faded. There was also speculation that the CDOW easement granted to BLM across Cow Creek properties did not specifically allow for timber hauling. Easement allows for hunting and recreation purposes specifically, though. (Explore)

Historically, there are files in GSFO that detail tree planting efforts in Golden Castle Gulch with objective of establishing Ponderosa Pine, White Fir and Douglas-fir during the late 1960's. Discussions with former BLM employee indicated that contract was issued and planting occurred. Problems did exist with fencing the planting and protecting it from livestock. Field review of the site in 2000 found no evidence of any introduced planting stock or tree establishment.

In summary, there are few records of active or even passive forest management occurring on Roan Plateau. A USFS forest management plan written in mid-1960's recommended an intensive tree planting program with the objective of establishing Ponderosa pine. A sale of Douglas-fir saw logs (45 MFB) was made to Ray Lyons in 1983 with access from Woodard's private road off Piceance Creek (Section 28, T4S, R94W). A public fuelwood area offering only live/dead juniper has been open for permit since early 1990s on 32 Mile Mesa off Highway 13 6 miles north of Rifle.

Within the WRRA, timber and woodlands are managed to maintain productivity, extent, structure and enhancement of other resources. All permitting for harvests are subject to BLM handbooks and Conditions of Approval listed in Appendix C.

20.3 Characteristics and Setting

The Roan Plateau supports aspen, and mixed conifer species primarily at the upper elevational reaches. North-facing slopes generally support subalpine fir/Douglas-fir stands. Below the rim, pinyon-juniper occupies the lower elevations, Gambel oak is found particularly on the eastern mid-slopes, and Douglas-fir is established on north aspects along the deep ravines below the eastern edge of the rim. The 1999 Oil and Gas Leasing and Development FSEIS provides narratives of broad vegetative communities and includes discussion of wildlife dependence with each community.

20.4 Resource Condition and Capabilities Evaluation

The aspen resource can be found in varying stages of growth although overall decline with many stands exhibiting signs of rot and breakdown is not uncommon. Merchantability of many stands is suspect with amount of rot and decay present. Aspen stands exhibit strong evidence of self-sustaining, although on better sites conifer in-growth and understory establishment can be found. Conifer forests are generally multi-aged and self-sustaining.

In general the forest resource on the Roan Plateau is in a mature condition with expanding signs of decay and mortality rising. Fir aphids were recognized as a pest problem since late 1970's. Subalpine fir and aspen decline along with mortality from Douglas-fir beetle were identified in1996 USFS aerial monitoring of the plateau. Pockets of fir and aspen decline were identified in the headwaters of Northwater and Trapper Creeks. Douglas-fir mortality was noted within the steep slopes along the eastern rim and within Ben Good Creek.

Timber harvest potential exists although optimum yield most likely passed some 15-30 years ago. The better aspen sites where conifer establishment is occurring in the understory would be “choice” stands for management if maintenance of aspen sites is a vegetative objective. Most conifer sites, being multi-aged in structure, possess marginal yield capacity and high percentages of low-valued subalpine fir. Very few spruce trees are found on the Plateau, and to preserve species diversity should not be targeted for harvest. The highest and best use for most forested stands is riparian protection, wildlife cover/habitat and soil protection/stabilization.

The pinyon-juniper resource below the rim of the Plateau offers very limited potential for fuelwood harvest primarily because of a lack of public access and rough topography

20.5 Opportunities

- Primary beneficial practice for the forest from resource use standpoint would be harvest and regeneration of mature/over-mature stands. Selective tree removal would be best with conifer stands while small openings (<15 acres in size) would benefit aspen’s regenerative capabilities. Dilemma from an economic view would be the overall viability of any harvest program given (1) relatively long haul over substandard road system (no surfacing on Cow Creek), (2) lack of active market for low-value species like subalpine fir and aspen, and (3) general declining health of aspen/conifer resource.
- Meet forestry objectives during other implementation actions such as improving wildlife habitat and reducing fuel loading.
- Pinyon-juniper treatments seem most beneficial for big game when openings are created in extensive stands and trees less than 6-8 inches in diameter are retained from harvest to help establish new regeneration and cover.
- Few treatment opportunities exist in the Gambel oak type because of the small tree size (diameter and height) and general “brushy” nature of the typical stand found on BLM.

AMS-21 SUMMARY FOR CULTURAL RESOURCES

21.1 Management Plans and Documents

The cultural resource management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau rim, is; "To protect cultural and historic values in the resource area from accidental or intentional destruction and give special protection to high value cultural resource sites.".

The cultural resource management objective within the WRRA, as described in the 1996 WRRA RMP is to*; "Encourage responsible scientific utilization of cultural resources. Protect and preserve examples of cultural and historical resources in accordance with existing laws and regulations. Develop a program for recreational/educational use of cultural resources.".*

The cultural resource objectives, as outlined in the OMP, for NOSR 1 and 3 are; "*1) Cultural resources shall be managed to prevent deterioration or vandalism of the significant historical values of the NOSRs, 2) Antiquities permits will be issued and managed in support of other DOE programs and to prevent cultural resource degradation and assure compliance with applicable laws.".*

21.2 Current Management

Within the GSRA and the WRRA, cultural resource management encourages responsible scientific utilization of cultural resources, by protecting, and preserving examples of cultural and historical resources by continuing to identify, and evaluate cultural resources in accordance with existing laws, regulations, and guidelines (36CFR800.2, Antiquities Act of 1906 (16U.S.C.432, 433); Historic Sites Act of 1935 (16U.S.C.461); National Historic Preservation Act (NHPA) of 1966 [16U.S.C.470, as amended]; National Environmental Policy Act (NEPA) of 1969 (42U.S.C.4321); Executive Order 11593(36 CFR.8921); Historical and Archaeological Data-Preservation Act (AHPA) of 1974 (16U.S.C.469); Federal Land Policy and Management Act of 1976 (43U.S.C.1701); Archaeological Resources Protection Act (ARPA) of 1979 (16U.S.C.470a et seq.) as amended, American Indian Religious Freedom Act of 1978 (42 USC 1996); Native American Graves and Repatriation Act of 1990 (25 USC 3001-3013).

All federal undertakings, as defined by 36 CFR 800, on BLM administered lands, are subject to review of cultural resources and require adequate cultural inventories within the area of potential effect. The purpose of the inventory is to identify and evaluate cultural resources using 36CFR60 criteria of properties that may be impacted by the proposed undertaking. The level of inventory is determined by the State Historic Preservation Officer (SHPO) /BLM programmatic agreements, policy, and laws.

New planning directive requires: all cultural properties, whether already recorded or projected to occur, will be allocated according to their nature and relative preservation value (BLM Manual 8110.4). These uses include; Scientific Use, Conservation for Future Use, Traditional Use, Public Use, Experimental Use or Discharged from Management.

Consultation. The BLM continues Native American consultation to identify any Traditional Cultural Properties, Sacred/Religious sites, or Special Use Areas. If such areas are identified or become known through the Native American notification or consultation process their concerns are addressed through planning. The BLM will take no action that would adversely affect these areas or location without consultation with the appropriate Native Americans. At present no such properties have been identified by the Native American Tribes. Consultation with the three Ute tribes was initiated on Jan. 25, 2002. As of March only the Southern Ute tribe has responded, in agreement with the pre-plan. Consultation is on going. Consultation with the State Historic Preservation Officer was initiated on Jan. 5, 2002. They responded by phone in January. And are in agreement with the pre-plan, however they are waiting to see the alternatives and the draft before commenting on specifics.

21.3 Characteristics and Setting

For the past 25 years various cultural projects, both large and small, have been conducted in the Roan Plateau planning area. A Class I overview is being written because consolidation of the fragmentary and scattered cultural documentation is necessary.

Cultural resources on the Roan Plateau include prehistoric and historic archaeological and architectural resources, as well as potentially Native American traditional cultural and religious properties. Data suggests that over 150 cultural resource inventories have been conducted. Three large inventories on the NOSR 1 and 3 tracks from 1973 through 1996 have resulted in the inventory of approximately 60,000 acres and the recording of over 270 cultural properties. However, these inventories have indicated that the ground visibility was restricted by heavy undergrowth especially in NOSR 1, thereby limiting the location of sites primarily to disturbed areas where the ground was visible. Numerous smaller inventories have been conducted, mostly on the NOSR 3, recording over 90 cultural properties. The number of inventories and cultural properties continues to expand, as a result of continued energy development. Prehistoric properties include: lithic scatters, quarries, temporary camps, extended camps, wickiups, hunting/kill/butchering sites, processing areas and possibly tree scaffolds, eagle traps, vision quest sites, caves, rock art panels, trails, and isolated finds.

During initial consultation, the Ute Tribe indicated that the Plateau is part of their ancestral homeland, thereby increasing the potential of traditional cultural properties and sacred sites, although none are currently known. Historic properties include: trails and roads, oil shale extraction and production facilities, irrigation ditches, reservoirs, mining sites, corrals, line camps, cabins, trash scatters, aspen art, and isolated finds. Together these properties represent use of the area by Archaic, Ute, and Euro-American cultures, covering a time frame from the Archaic period (6400 BC) through the present.

At present no Traditional Cultural Properties, Sacred/Religious sites, or Special Use Areas have been identified by the Native American Tribes.

21.4 Resource Condition and Capabilities Evaluation

Direct impacts to cultural properties occur when they are disturbed either naturally or by human intervention. Any activity which potentially could disturb the natural environment may have a direct impact to cultural sites and continued disturbance may cause substantial and cumulative, long term, irreversible adverse effects to historic properties. Direct effects can be held to a minimum by identifying cultural properties early in the planning process. There are several kinds of mitigation ranging from moving the activity away from the site to data recovery (excavation, recording, and analysis). Avoidance of historic properties has been and remains the preferred alternative of the BLM.

Indirect impacts occur when secondary activities affect cultural properties. Indirect impacts range from erosion to vandalism. For example, opening a road may lead to increased recreational use, which may result in unauthorized collection or vandalism of cultural resources. While on the other hand closing a road could result in the protection of a cultural resource.

Increasing demand by various user groups has for the most part proved to be detrimental to cultural resources, particularly on Hubbard Mesa. Direct impacts by energy development have been minimal because of consistent application of the prescribed identification, avoidance and mitigation measures. Recreational activities, and in particular the exponentially increased use of OHV's has lead to an increasing number of sites being impacted and in some cases destroyed. Indirect impacts have not been evaluated.

21.5 Opportunities

Opportunities exist to:

- Mitigate/salvage/encapsulate cultural properties/features and/or recovery/analysis/evaluation of data
- Have the developer/operator do a 100% Class III cultural inventory early in the planning stages of a GAP to allow for the developer to better plan where roads, well pads, and pipelines could be placed to avoid significant sites. Perform 100% Class III inventory of all Geographic Area Plans
- Test single occupation sites to refine NRHP determinations and allocate sites to specific uses.
- Work with Native Americans to redevelop traditional ties to the landscape and identify/protect areas.
- Protect sites by implementing new monitoring stipulations of all new construction in undisturbed areas, in high site potential areas (Potential area maps will be developed in 2002).

AMS-22 SUMMARY FOR PALEONTOLOGICAL RESOURCES

22.1 Management Plans and Documents

The paleontological resource management objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau rim, is*; "To manage the paleontological resource program as required by law and policy to protect significant paleontological values".*

The resource management objectives within the WRRA as described in the 1996 WRRA RMP are to; *"Protect scientifically noteworthy paleontological resource values from indiscriminate loss and make paleontological resources available for scientific, educational, and appropriate recreational purposes".*

22.2 Current Management

For public lands administered by the WRFO, in addition to Appendix C - Conditions of Approval (Best Management Practices), stipulations listed in Appendix B of the WRRA RMP are applied to all surface-use activities.

Within the WRRA, significant fossil resources are protected on public lands. Inventories are completed for locations of significant fossil locations, and appropriate fossil bearing formations would be identified (Condition I). Paleontological resources are made available for scientific and educational purposes. All authorizations would comply with laws and regulations.

22.3 Characteristics and Setting

The Wasatch (Debeque) Formation and the Parachute Creek Member of the Green River Formation within the region, primarily below the rim, have produced significant fossilized resources which have been collected and studied by the Field Museum of Natural History in Chicago, the University of Colorado Museum in Boulder, the Smithsonian Institute, the Carnegie Museum of Natural History in Pittsburgh and the Museum of Western Colorado. Scientifically significant vertebrate specimens have been identified, collected and studied. These areas have been identified as Condition I zones with high potential paleontological resource densities.

Paleontological resources found on the NOSRs are less well documented and inventories are limited in scope. The Smithsonian Institution has conducted studies within the Green River Formation. Most of the paleontological resources from NOSRs consist of invertebrate fossils, although a number of scientifically significant vertebrates have been documented in the proximity. Additional sample inventories could be

necessary prior to approval of surface disturbing activities on the NOSR within the Condition I formations and in some Condition II conditions.

Fossils in the Green River have included fossil insects and plants, gar and other fish, turtles and crocodilians. The Wasatch has produced vertebrates such as mammals, including horses and deer-like animals, some carnivores, marsupials, rodents, gar and other fish, lizards, turtles, crocodilians, birds, fresh water clams, gastropods (snails) and invertebrates, such as petrified wood, leaves and other plant fragments.

22.4 Resource Condition and Capabilities Evaluation

The area has known potential for Condition I and II paleontological resources. Some of these resources are considered Type localities and contain articulated vertebrates. All are protected under current laws and regulations.

22.5 Opportunities

Protect scientifically noteworthy paleontological resource values from indiscriminate loss and make paleontological resources available for scientific, educational and appropriate recreational purposes.

AMS-23 SUMMARY FOR LANDS AND REALTY ACTIONS

23.1 Management Plans and Documents

The land tenure objective in the GSRA RMP of 1984 (revised 1988), for public lands below the Roan Plateau Rim, is; *"To increase the overall efficiency and effectiveness of public land by identifying public land suitable for disposal through public sale (Category I lands) and suitable for continued management under multiple use concepts (Category II lands)".* The utility and communication facility management objective is; "*To respond, in a timely manner, to requests for utility and communication facility authorizations on public land while considering environmental, social, economic, and interagency concerns."*

The special land use objective, as outlined in the OMP, for NOSR 1 and 3 is; *"Only special land use permits that comply with applicable DOE and BLM requirements will be authorized."*

The land use authorizations objective within the WRRA as described in the 1996 WRRA RMP are to*: "To make public land available for the siting of public and private facilities through the issuance of applicable land use authorizations, in a manner that provides for reasonable protection of other resource values". The land tenure adjustments objective is to: "To provide for adjustments in land ownership to' acquire important resources/values, meet local needs, resolve unauthorized uses, and improve efficiency in public and private land management".*
The withdrawals objective is to*: "To eliminate unnecessary segregations of public lands".*

23.2 Current Management

The existing GSRA RMP, as amended by the 1999 Oil and Gas Leasing and Development ROD and RMP Amendment, covers lands below the Roan Plateau rim. It outlines guidelines regarding sensitive resource areas and mitigation and stipulations for rights-of-ways. Land tenure adjustments would be consistent with existing land use planning with emphasis on acquiring land with high public resource values such as lands

within ACECs or WSAs, T&E species habitat, or riparian/wetland areas, etc. New utility rights-of-way are not granted in WSAs. New rights-of-ways avoid ACECs, but they could be granted under strict guidelines.

A summary of current management in the WRRA entails:

- Public lands are made available for siting of public and private facilities through issuance of permits and applicable land use authorizations. NEPA documentation is prepared for all applications and mitigating measures applied to protect public lands. Land use authorizations are denied in exclusion areas, except on short-term permits involving no development.
- Acquisitions of non-Bureau lands are pursued through exchange, purchase or donation where it would enhance BLM objectives and improve efficiency in public and private land management.
- Access continues to be pursued where it would enhance use of public lands and resources. All access plans are analyzed through necessary NEPA documentation.
- Elimination of unnecessary segregation of public lands is pursued to provide protection to at risk resource values as well as better land management.
- Eligible waterpower and reservoir sites are protected from adverse affects to value of the sites.

Withdrawals. A withdrawal is an action that restricts the use of public land and segregates it from the operation of some or all of the public land and mineral law. Withdrawals also are used to transfer jurisdiction of management of public lands to other Federal agencies. NOSR 1 was created and withdrawn by Executive Order on Dec. 6, 1916. NOSR 3 was created and withdrawn by Executive Order on September 27, 1924. The intent of the withdrawal was to protect the oil shale resource from entry until such time as the Navy would develop it.

Prior to the Mineral Leasing Act (MLA) of 1920, oil shale was a locateable mineral. Oil shale is now a leaseable mineral resource (MLA, Section 21, as amended 1982). Current policy and procedures provide adequate protection of the oil shale resource, consequently, there was no reason to continue the NOSR 1 & 3 withdrawals. Public Land Order Number 7516 - Revocation of Oil Shale Withdrawals; Colorado (Federal Register; Volume 67, Number 51; Page 11706-11707; March 15, 2002) revoked an Executive Order and a Public Land Order insofar as they affect the lands withdrawn for protection of oil shale values. New locations would be subject to the 43 CFR 3809 regulations.
This withdrawal revocation does not apply to the NOSR 1 and 3. Management decisions for these lands will be made through this planning process.

Disposal of Public Lands. Approximately 80 acres of public land are currently identified as suitable for disposal (Category I) in the 1988 GSRA RMP by sale or other means. NOSR 1 and 3 were identified as cooperative management – retention. The remaining acreage, outside of the transferred lands, are designated as Category II lands. Category II lands are those public lands that could be disposed of through means other than sales under section 203 of the FLPMA of 1976. Specific tracts within Category II lands have not been identified.

23.3 Characteristics and Setting

There are numerous utility rights-of-way throughout the planning area. There is a potential utility corridor running adjacent to State Highway 13 that is now occupied by several electric transmission lines.

23.4 Resource Condition and Capabilities Evaluation

Within the WRRA, as described in the 1996 WRRA RMP, there are trends to renew developments in older oil and gas fields. Radio -telemetry and cellular telephone services are creating a new demand for new telecommunications sites. The unauthorized use of BLM land occasionally takes place and generally involves agricultural use, occupancy, linear rights-of-way, and small-scale disposal of household trash. The use of, and interest in acquiring leases under the Recreation and Public Purposes Act, has tapered off over the past few years, as has significant community expansion. Continued availability of BLM land for these

types of uses generally remains desirable, particularly for land fill purposes. There has been little, if any, active acquisition program in the past. Much of the same can be said for the GSRA.

23.5 Opportunities

- Expand the area leased to the Rifle Gun Club.
- There is a potential utility corridor running adjacent to State Highway 13 that is now occupied by several electric transmission lines.
- 1951.2 acres of public lands that are Category I in the 1984 RMP could be designated Category II as the result of the transfer of the NOSR. These former isolated parcels are now part of larger-logical management blocks.
- Category I land could be disposed of through a variety of means including but not limited to sale, exchange, and Recreation and Public Purpose Act @ lease or patent.
- Manage the entire unit as Category II Lands. Category II allows exchanges and other land disposal actions, but is not suitable for disposal by public sale. The land pattern on the east side is fractured, some urban interface, with potential for exchanges and consolidation of ownership.
- Identify right-of-way corridors on the Roan Plateau if needed.
- Address telecommunication sites and areas appropriate for future telecommunication sites.
- More active acquisition program in the area.

AMS-24 SUMMARY FOR FIRE MANAGEMENT

24.1 Management Plans and Documents

The fire management objectives, as outlined in the OMP, for NOSR 1 and 3 have been replaced by updated FMPs for the WRFO and the GSFO. The FMPs were completed to comply with the 1995 Federal Wildland Fire Management Policy and the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy. The Policy directs BLM Field Offices to have an approved FMP for every area with burnable vegetation. FMPs define a strategy for managing and prioritizing wildland fire and prescribing vegetation treatments for fuel hazard reduction and resource benefit.

Environmental Assessment (EA) Number CO-140-2001-0051 will amend the GSRA RMP of 1984 (Revised 1988). The FMP will be finalized in August 2002. The FMP EA serves as the analysis for implementing wildland fire management. The EA serves as a programmatic analysis (general guidance) for “fuel hazard reduction” treatments and vegetation treatments that would benefit resources. A future site-specific document that complies with the National Environmental Policy Act will be written for each prescribed vegetation treatment, incorporating the EA and FMP documents by reference.

The WRFO completed a FMP, EA Number CO-017-WR-99-99-EA, in 1999. The FMP identified the appropriate management response on all natural and unplanned ignitions within the White River Resource Area. The fire management objective for the WRFO portion of the planning area as described in the 1996 WRRA RMP is to; *“Manage (using appropriate management response) naturally ignited fires throughout the unit to promote a vegetation mosaic. Conduct prescribed burns or other vegetation treatments on mountain shrub and sagebrush type to achieve age and structural diversity.”*

24.2 Current Management

Public lands are managed under four fire management classes for the purposes of wildland fire and prescribed vegetation management. The fire management classes (A-D) are based on BLM Instruction Memorandum No. 2002-034 (11/15/2001) and Clarification of Fire Management Categories and RMP-Level Decisions; H-1601-1 - Land Use Planning Handbook (Appendix C.I.J.).

The GSRA portion of the planning area is covered by four fire management zones (Appendix A Map 11). Fire management zone (FMZ) B-140-02 is managed as an area where unplanned wildland fire is not desired because of current conditions. FMZ C-140-01 (Hogback area east of Highway 13) and FMZ C-140-01 (Eastern cliffs and foothills) are managed as areas where wildland fire is desired, but there are significant constraints that must be considered for its use. FMZ D-140-01 covers the top of the Roan Plateau and is managed as an area where wildland fire is desired, and there are few or no constraints for its use. The WRFO portion of the planning area north of Trapper Creek (D-05 Cathedral Bluffs/Roan Plateau Zone) is also managed as an area where wildland fire is desired, and there are few or no constraints for its use.

24.3 Characteristics and Setting

For characteristics and setting consult: AMS 16 - Summary for Vegetation (Riparian & Wetlands), AMS 17 - Summary for Vegetation (Upland), the GSFO Fire Management Plan online at http://www.co.blm.gov/gsra/firemgntblcontent.htm and the WRFO EA Number CO-017-WR-99-99-EA (1999).

24.4 Resource Condition and Capabilities Evaluation

Natural historical conditions exist in few areas today. The influences of man's activities have altered the vegetative communities across the landscape. Livestock grazing, water developments, road construction, recreation, 100 years of fire suppression, and the introduction of exotic plant species have all affected the composition of the vegetative communities and their response to fire.

In some plant communities, these activities have created conditions of high fuel loading. Natural fires in these areas may create hotter, more intense conditions than normal that may sterilize the soil and set the plant community back to an early seral stage for a long period of time. Other areas have less understory than they used to and natural fires can no longer carry through these communities. Many areas have invasive, exotic species such as cheatgrass and tamarisk that are adapted to shorter fire intervals than the native species and increase the fire intervals over the natural situation. These invasives also readily resprout following fires and may outcompete native species in the landscape.

24.5 Opportunities

- Positively impact vegetation by the potential increase in the use of natural and prescribed fire and vegetation treatments. Positive impacts include:
    1. Reduce to an acceptable level, the risks and consequences of unwanted wildland fires.
    2. Reduce hazardous fuel loading and the risks of wildland fire escaping public lands.
    3. Allow for the development of vegetation types that natural events would produce.
    4. Maintain or create a vegetation mosaic of diverse seral stages and improve herbaceous understory in mixed mountain shrublands/oakbrush vegetation types.
- Surface disturbances, like gas development, and the inclusion of structures could hinder fire burning naturally. These disturbances would break up continuous fuels and reduce the potential of a natural mosaic burn. Certain alternatives may require review of FMP classifications.

AMS-25 SUMMARY FOR HAZARDOUS MATERIALS

25.1 Management Plans and Documents

The GSRA RMP of 1984 (revised 1988) has no specific objective for hazardous materials management. The hazardous materials management objective in the WRRA as described in the 1996 WRRA RMP is to; *"To protect the public lands from contamination by hazardous materials, and provide for removal/remediation if public lands become contaminated."*

25.2 Current Management

The BLM complies with federal and applicable state environmental laws and regulations pertaining to hazardous substances. Actions are taken to minimize wastes; prevent pollution; and to minimize the generation, transportation, storage and disposal of hazardous wastes resulting from BLM-approved projects.

25.3 Characteristics and Setting

The National Defense Authorization Act for Fiscal Year 1998 (PL 105-85), which transferred administration of NOSR 1 and 3 from the DOE to the DOI, included a provision specifying that receipts from oil and gas leasing at NOSR 3 could be used to pay for the federal government's environmental restoration costs "...subject to specific authorization and appropriation for this purpose". The Act also provides that no monies received from BLM leases may be shared with the State of Colorado until costs – including environmental restoration – incurred by the United States related to the site have been reimbursed. To date, DOI has collected approximately $8.5 million in lease receipts that are currently held in a special Treasury account, but enactment of legislation is needed to provide BLM with access to the funds to begin the restoration work.

The primary environmental concern at the NOSR 3 site is a spent shale pile (about 300,000 cubic yards of material) located in a narrow ravine adjacent to West Sharrard Creek, a tributary of the Colorado River. Ancillary facilities in the area such as: open adits, buildings, sheds, and roads also require remediation.

25.4 Resource Condition and Capabilities Evaluation

The Colorado Department of Public Health and Environment and BLM's contractor, Dynamac, have conducted analyses of the site and have concluded that the spent shale pile is the source of arsenic and other heavy metals leaching into surface and groundwater. The pile also has been determined to be potentially unstable due to its steep slope and lack of vegetation. According to the Colorado Department of Public Health and Environment, these recent findings are considered threats to human health and the environment. The contractor has provided various restoration alternatives and cost scenarios.

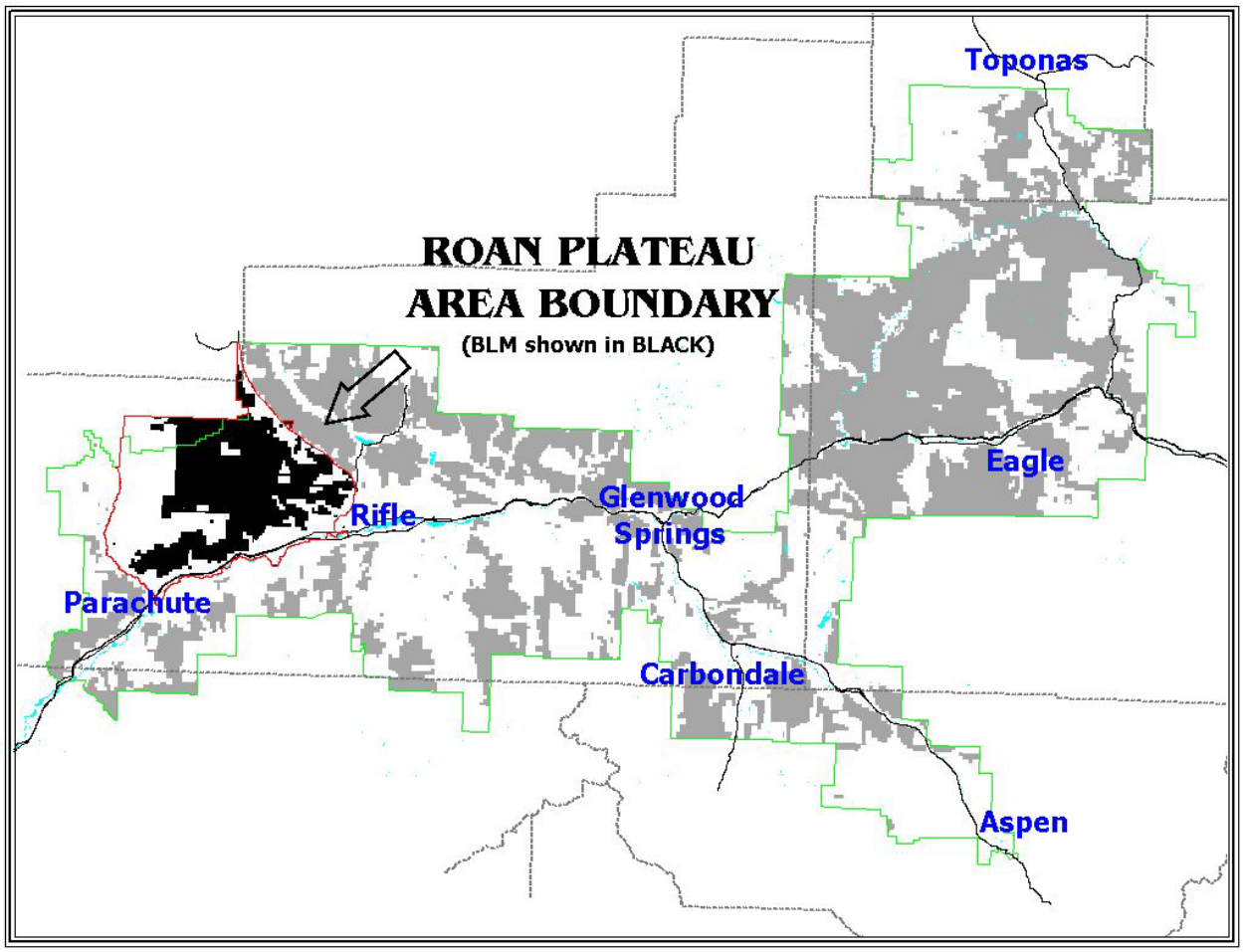
25.5 Opportunities

BLM plans to begin environmental restoration activities as soon as possible, but first needs a legislative remedy to provide access to funds in a special Treasury account. This account was specifically designated for these environmental restoration purposes and does not involve annual appropriations action.

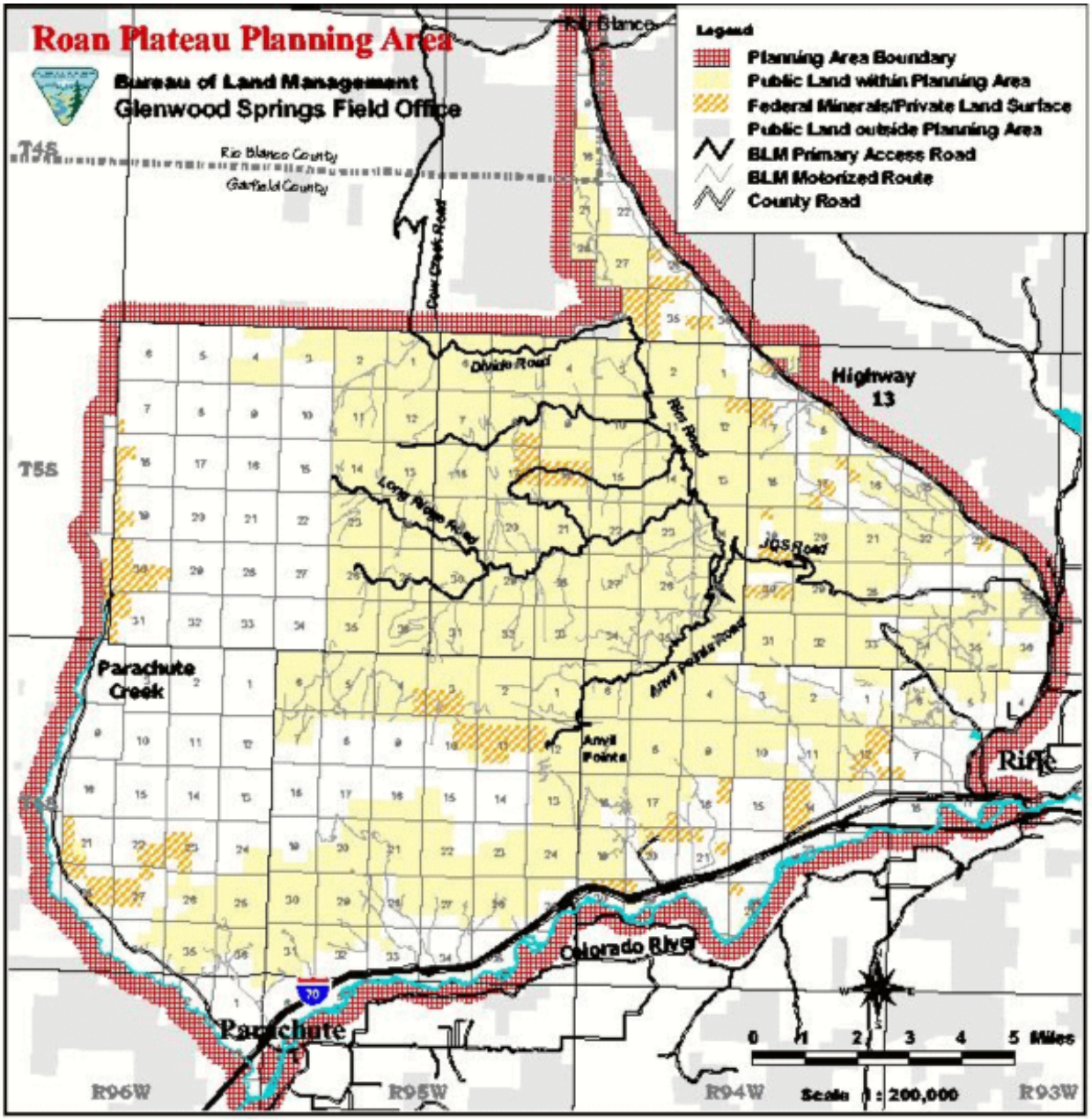
Appendix A

Maps

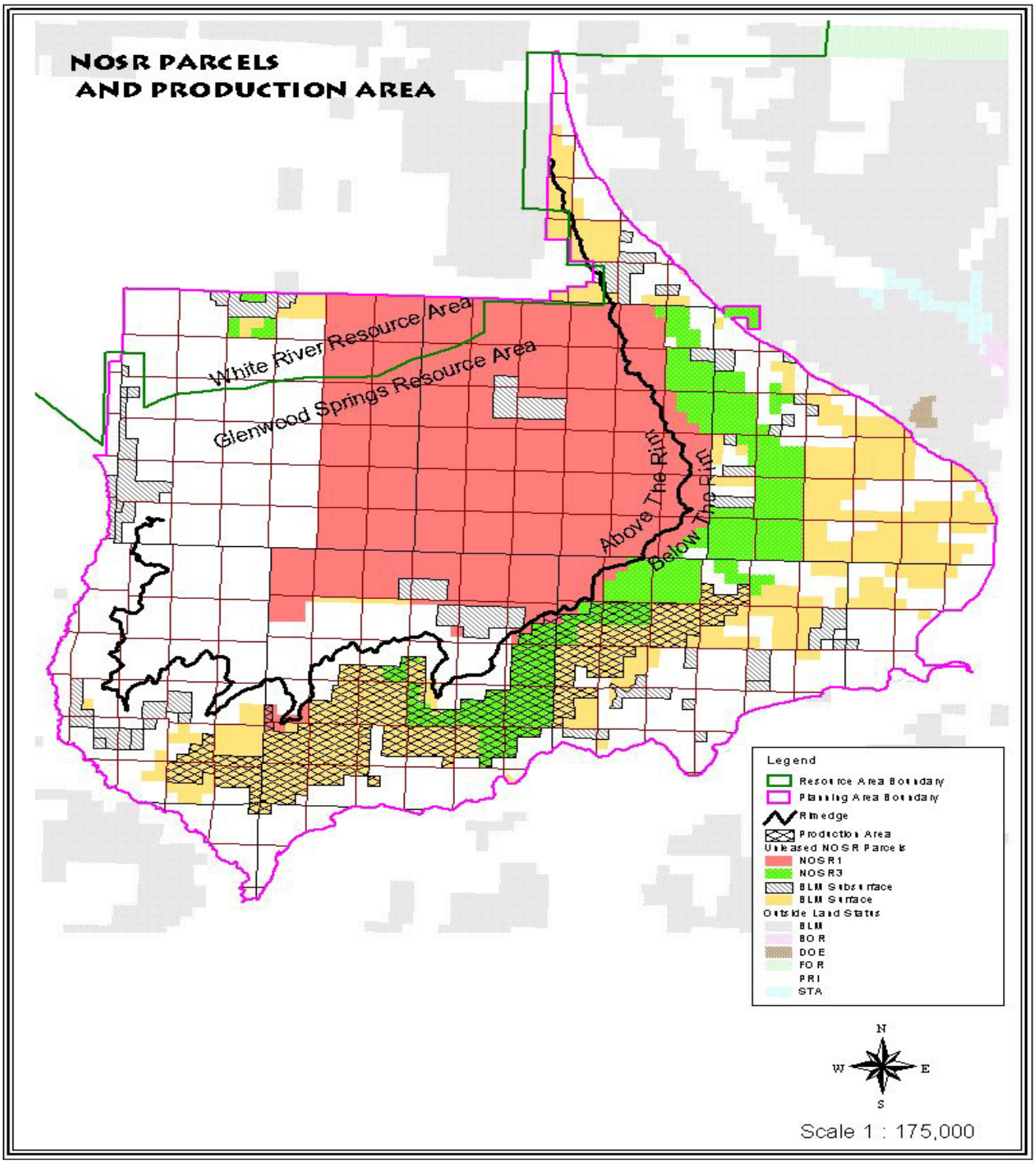
Appendix A Map 1



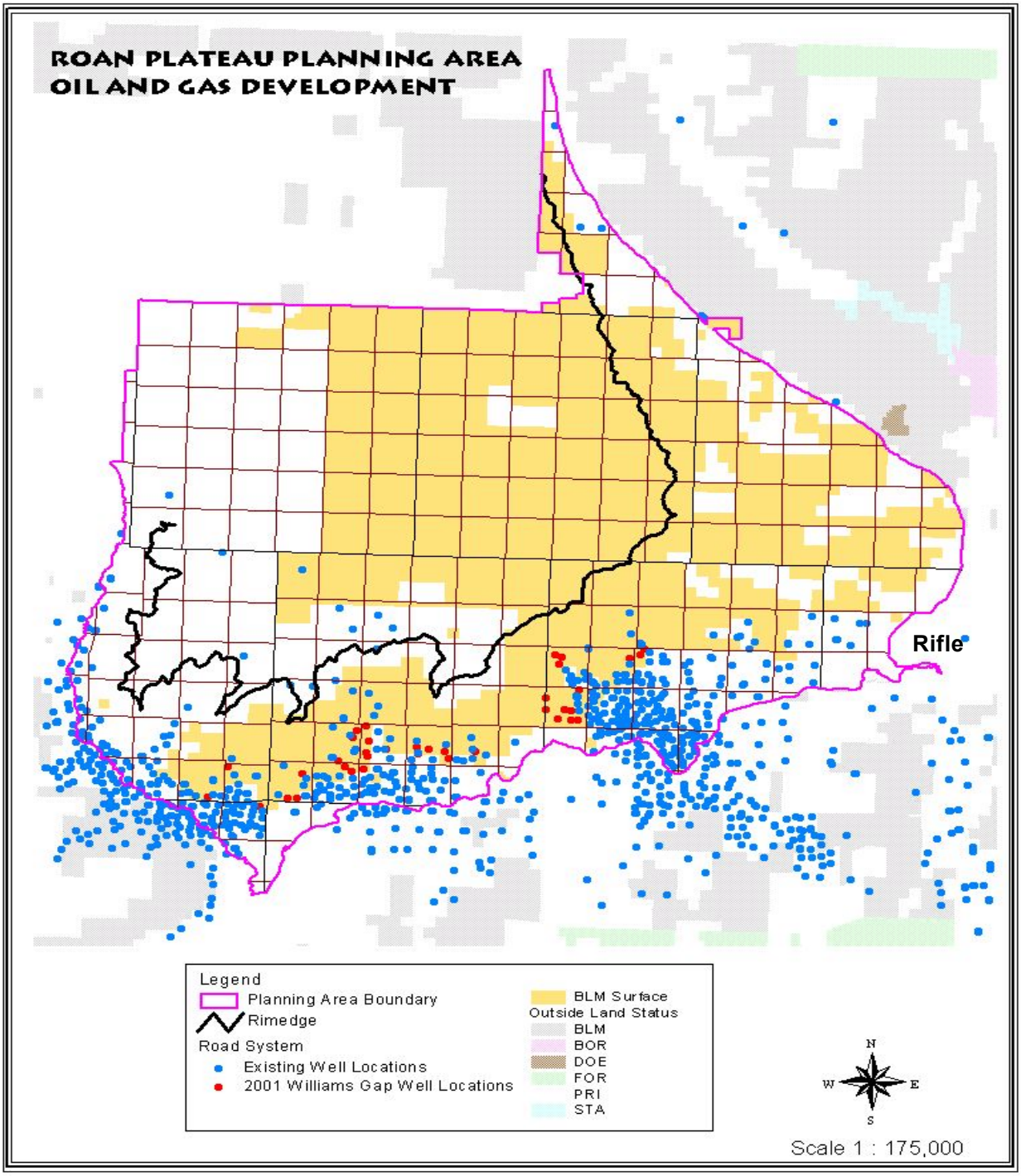
Appendix A Map 2



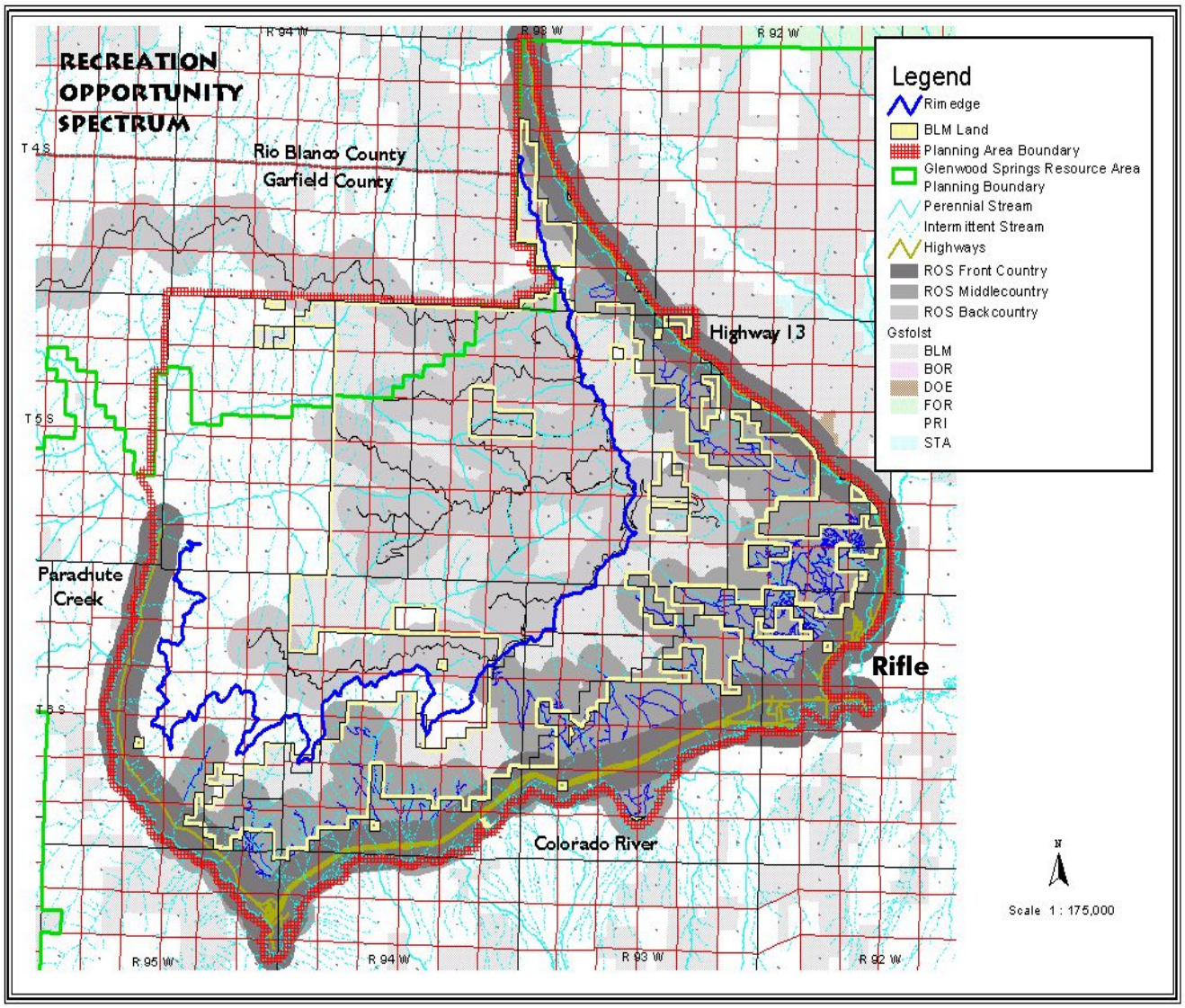
Appendix A Map 3



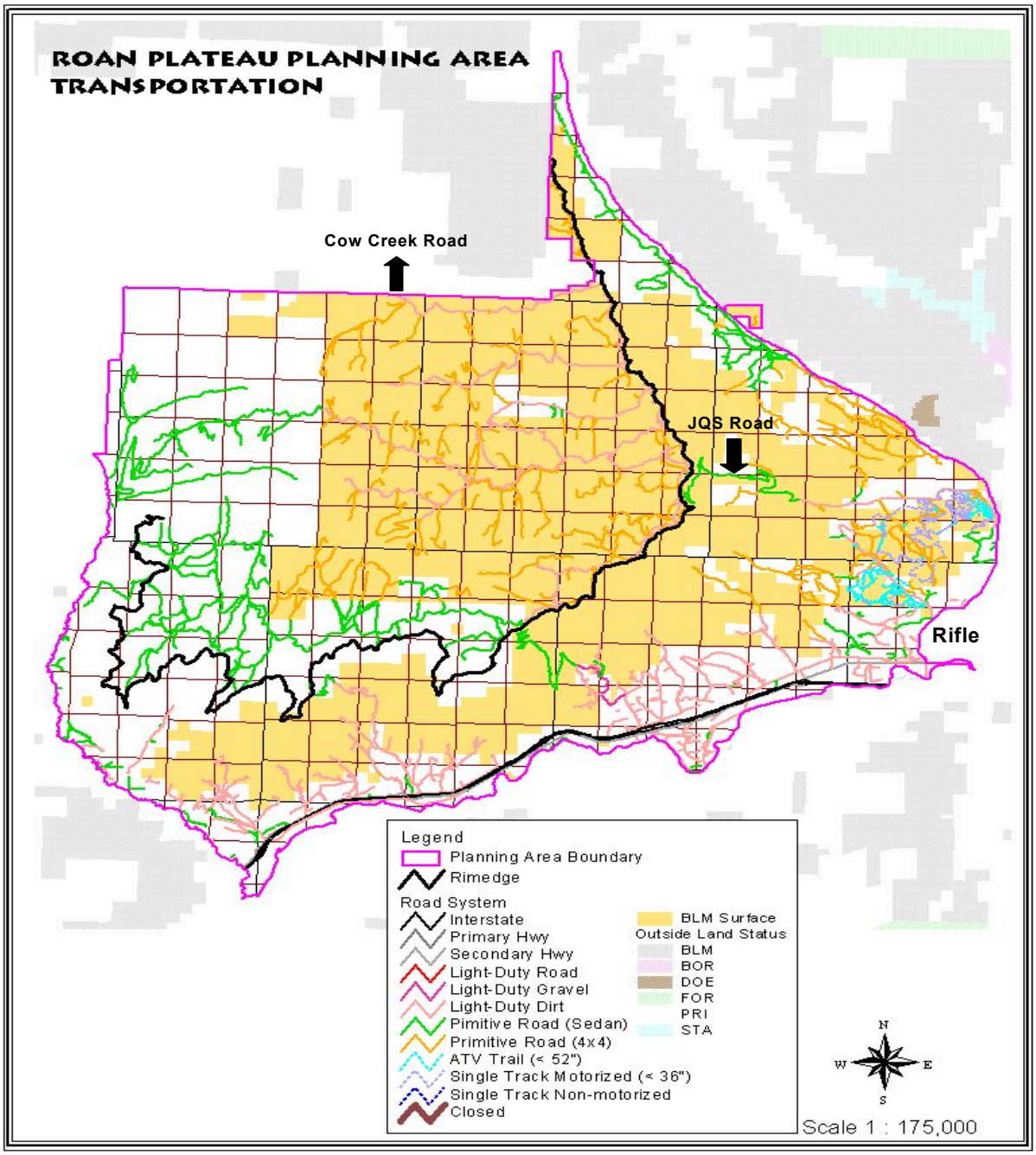
Appendix A Map 4



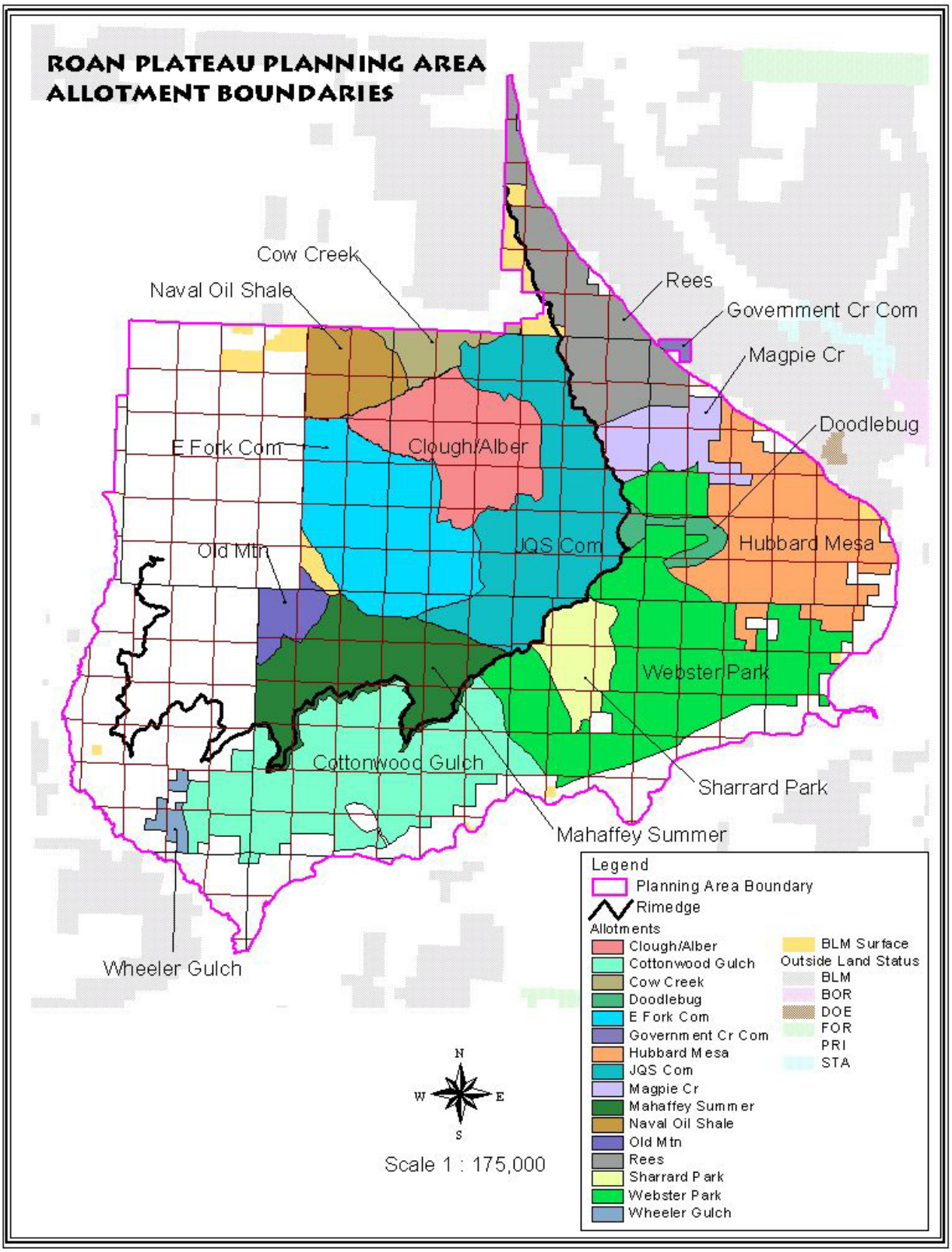
Appendix A Map 5



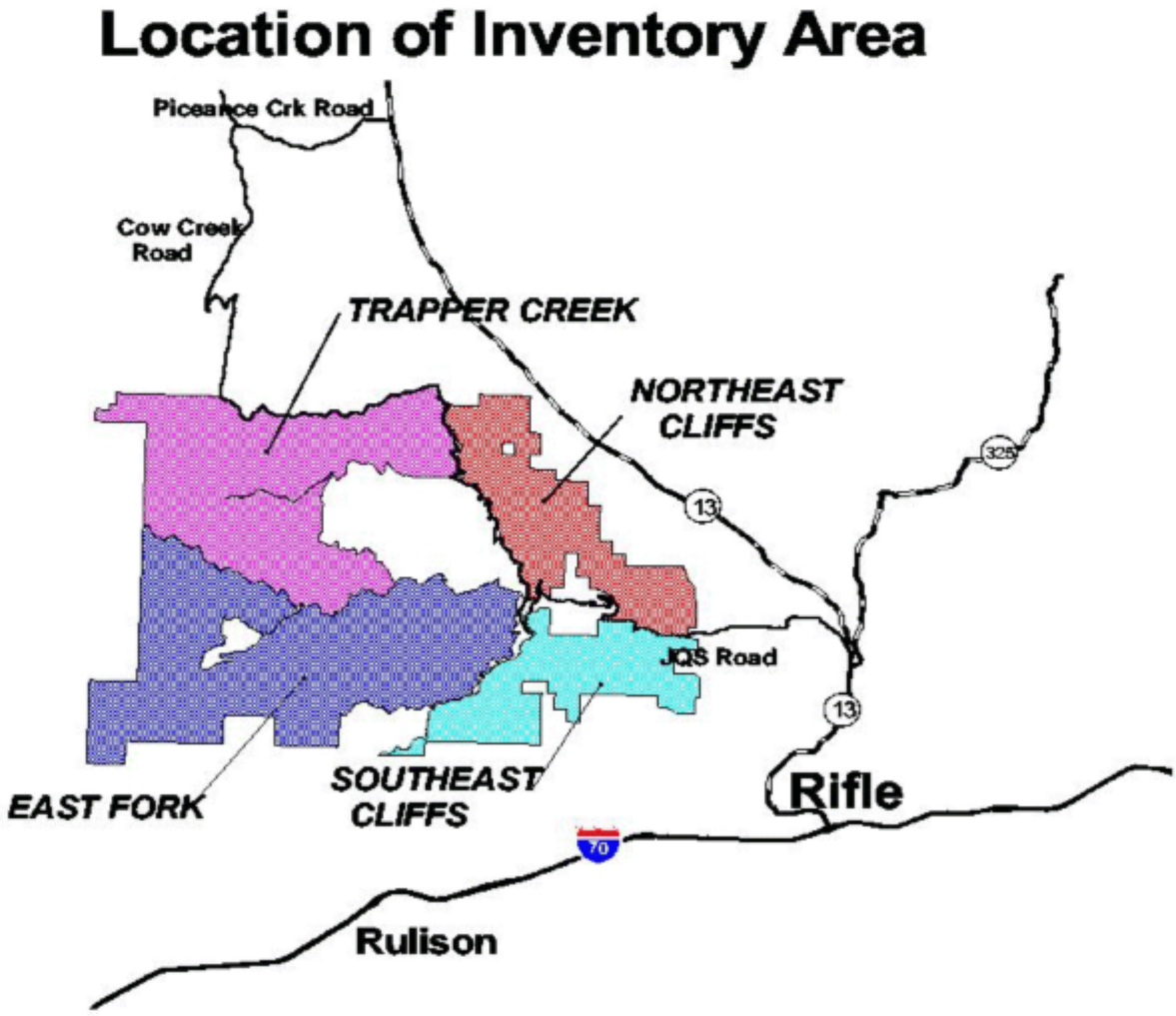
Appendix A Map 6



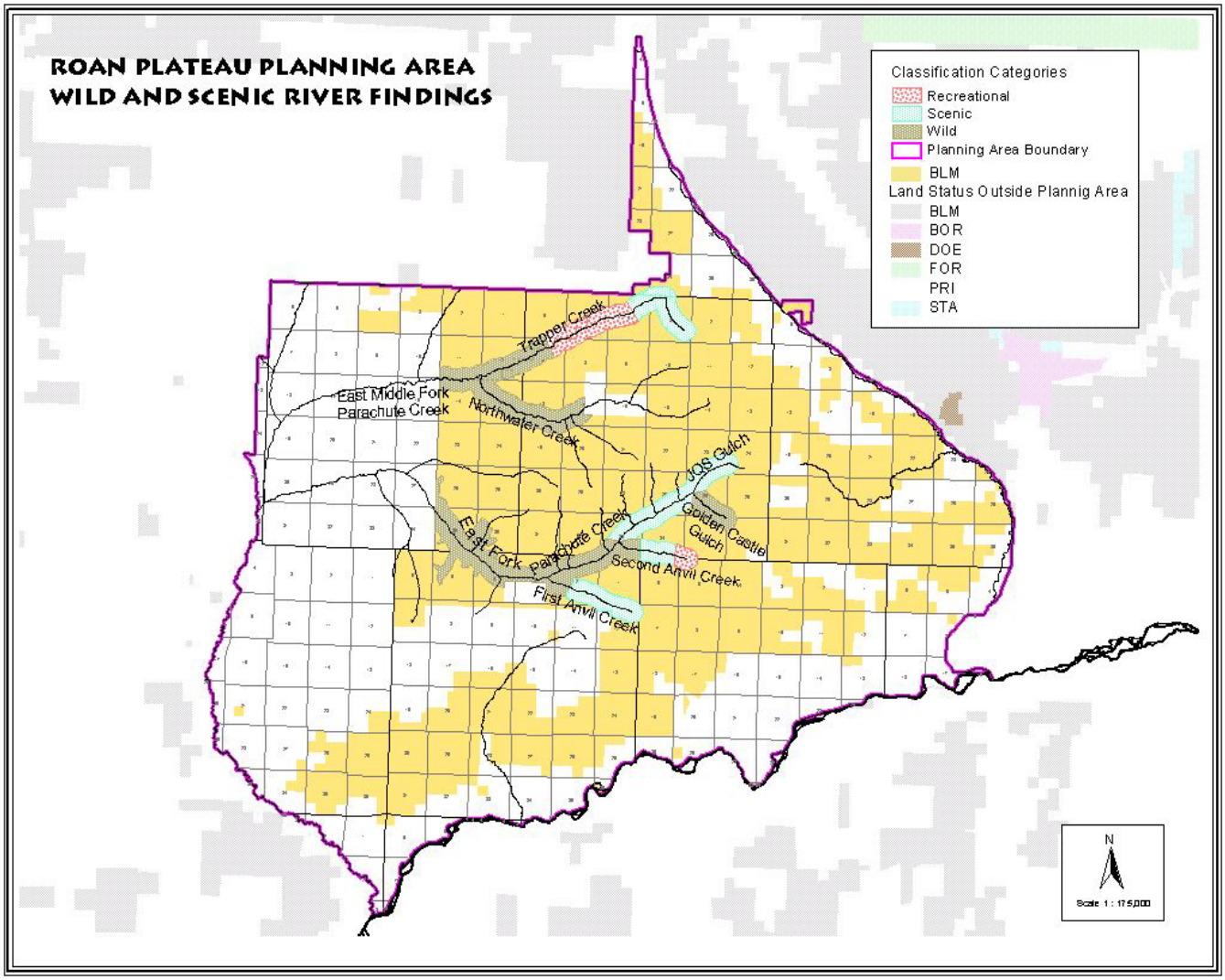
Appendix A Map 7



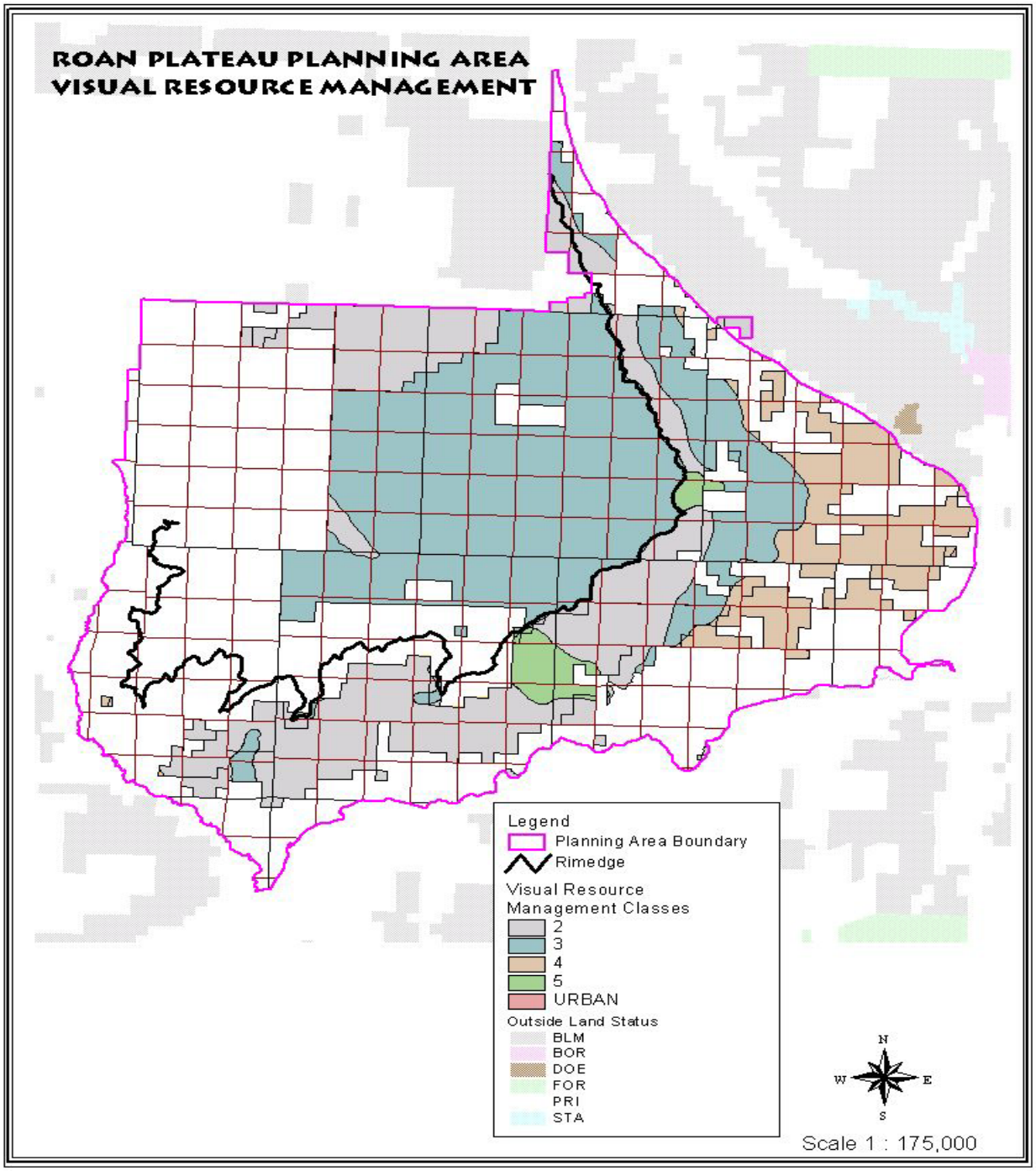
Appendix A Map 8



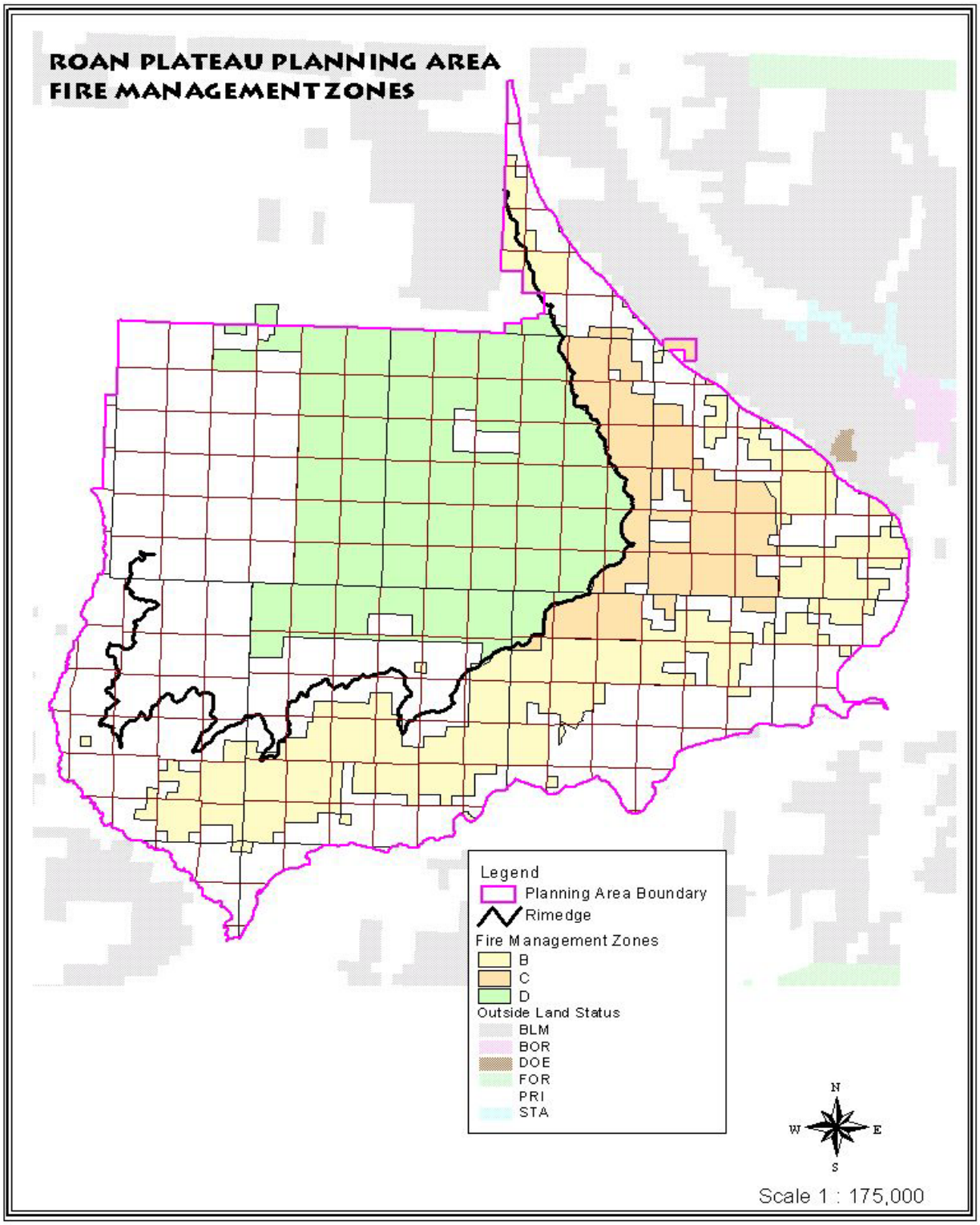
Appendix A Map 9



Appendix A Map 10



Appendix A Map 11



Appendix B

Figures

Appendix B Figure 1

BLM Colorado's Standards and Guidelines

In response to public concern about management of livestock grazing on western public lands, BLM began developing new regulations for livestock grazing administration. This process, which was characterized by the preparation of an environmental impact statement and extensive public involvement, resulted in new livestock grazing regulations that became effective August 21, 1995.

One of the requirements of the regulations was that each BLM State Director, would, in consultation with the Resource Advisory Councils in that state, develop standards for public land health and guidelines for livestock grazing management. The Secretary of the Interior approved BLM Colorado's Standards and Guidelines on February 3, 1997.

Standards for Public Land Health

Standards describe conditions needed to sustain public land health, and relate to all uses of the public lands. Standards are applied on a landscape scale and relate to the potential of the landscape.

Standard 1: *Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, landform, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.*

Indicators:

- Expression of rills, soil pedestals are minimal.
- Evidence of actively eroding gullies (incised channels) is minimal.
- Canopy and ground cover are appropriate.
- There is litter accumulating in place and is not sorted by normal overland water flow.
- There is appropriate organic matter in soil.
- There is diversity of plant species with a variety of root depths.
- Upland swales have vegetation cover or density greater than that of adjacent uplands.
- There are vigorous, desirable plants.

Standard 2: *Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods. Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.*

Indicators:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Streambank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high streamflow events.
- Plant species present indicate maintenance of riparian moisture characteristics.

- Stream is in balance with the water and sediment being supplied by the watershed (e.g., no headcutting, no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.
- An active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels with size and meander pattern appropriate for the stream's position in the landscape, and parent materials.
- Woody debris contributes to the character of the stream channel morphology.

Standard 3: *Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.*

Indicators:

- Noxious weeds and undesirable species are minimal in the overall plant community.
- Native plant and animal communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants and animals are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant and animal species are in balance with habitat/landscape potential and exhibit resilience to human activities.
- Appropriate plant litter accumulates and is evenly distributed across the landscape.
- Landscapes composed of several plant communities that may be in a variety of successional stages and patterns.

Standard 4: *Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.*

Indicators:

- All the indicators associated with the plant and animal communities standard apply.
- There are stable and increasing populations of endemic and protected species in suitable habitat.
- Suitable habitat is available for recovery of endemic and protected species.

Standard 5: *The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.*

Indicators:

- Appropriate populations of macro invertebrates, vertebrates, and algae are present.
- Surface and ground waters only contain substances (e.g. sediment, scum, floating debris, odor, heavy metal precipitates on channel substrate) attributable to humans within the amounts, concentrations, or combinations as directed by the Water Quality Standards established by the State of Colorado (5 CCR 1002-8).

Guidelines for Livestock Grazing Management

Guidelines are the management tools, methods, strategies, and techniques (e.g., best management practices) designed to maintain or achieve healthy public lands as defined by the standards. Currently, the only guidelines for BLM Colorado that have been developed in concert with the Resource Advisory Councils are livestock grazing management guidelines.

1. Grazing management practices promote plant health by providing for one or more of the following:

- periodic rest or deferment from grazing during critical growth periods;
- adequate recovery and regrowth periods;
- opportunity for seed dissemination and seedling establishment.

2. Grazing management practices address the kind, numbers, and class of livestock, season, duration, distribution, frequency and intensity of grazing use and livestock health.

3. Grazing management practices maintain sufficient residual vegetation on both upland and riparian sites to protect the soil from wind and water erosion, to assist in maintaining appropriate soil infiltration and permeability, and to buffer temperature extremes. In riparian areas, vegetation dissipates energy, captures sediment, recharges ground water, and contributes to stream stability.

4. Native plant species and natural revegetation are emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required, on land treatment efforts, emphasis will be placed on using native plant species. Seeding of non-native plant species will be considered based on local goals, native seed availability and cost, persistence of non-native plants and annuals and noxious weeds on the site, and composition of non-natives in the seed mix.

5. Range improvement projects are designed consistent with overall ecological functions and processes with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.

6. Grazing management will occur in a manner that does not encourage the establishment or spread of noxious weeds. In addition to mechanical, chemical, and biological methods of weed control, livestock may be used where feasible as a tool to inhibit or stop the spread of noxious weeds.

7. Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape, including the maintenance, restoration, or enhancement of habitat to promote and assist the recovery and conservation of threatened, endangered, or other special status species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation
corridors, and thus minimizing habitat fragmentation.

8. Colorado Best Management Practices and other scientifically developed practices that enhance land and water quality should be used in the development of activity plans prepared for land use.

Appendix B Figure 2

BLM Colorado Recreation Guidelines to meet Public Land Health Standards
Recreation Guidelines to meet Public Land Health Standards 1 and 2
1. Manage recreational activities to maintain sufficient vegetation on upland areas to protect the soil from wind and water erosion and to buffer temperature extremes. 2. Minimize disturbances and manage recreation use in riparian areas to protect vegetation, fragile soils, springs, and wetlands. 3. Plan and locate routes, trails, and developments away from riparian and wetland areas, and highly erosive soils. 4. Reduce stream crossings to the minimal number dictated by the topography. Reduce sedimentation and compaction associated with stream crossings. 5. Manage watercraft types and uses as appropriate to protect riparian systems and water quality from adverse impacts.
Recreation Guidelines to meet Public Land Health Standards 3
1. Manage recreational use on public lands to promote the survival and health of native plants and animals. 2. Protect against the establishment or spread of noxious weeds. 3. Protect wildlife habitat by preserving connectivity and avoiding fragmentation. 4. Minimize wildlife disturbances and artificial attractions such as feeding wild animals or improper disposal of garbage. 5. Protect plant and animal communities by limiting recreational use by type, season, intensity, distribution, or duration.
Recreation Guidelines to meet Public Land Health Standards 4
1. Protect habitat for federal and state Threatened and Endangered Species and other special status species.
Recreation Guidelines to meet Public Land Health Standards 5
1. Manage recreational uses in coordination with other uses on public lands to achieve or exceed applicable water quality standards. 2. Control water quality impacts resulting from recreational use, such as human waste, trash, and other elements.

Appendix B Figure 3

Recreational Opportunity Spectrum (ROS) Classes			
ROS Class	**Physical Setting Description**	**Social Setting Description**	**Administrative Setting Description**
Urban	Near urban areas. Substantially modified environment. Numerous facilities to manage & accommodate intensive use.	High concentrations of people commonplace. In constant contact with other people.	On-site management controls and regulations are numerous and cannot go unnoticed. Intensively managed. Multiple activities may occur. Regular highway vehicles are present
Rural **(previously Semi-Urban)**	Within ½ of developed areas and primary highways. Substantially modified environment having natural & manmade features (includes agricultural lands). Moderate number of facilities to manage use may exist.	Moderate to high degree co contact with others. Culturally modified landscape. People are almost continually in view.	On-site management controls and regulations are numerous and easy to see. Land uses obvious.
Front Country **(previously Roaded Natural)**	Within ½ mile of light-duty roads and areas with high route density. Resource modifications evident but balanced by the surrounding natural appearing environment.	Moderate to high degree of contact with others. See an average 30 or more groups per day and less when away from roads. Human use alterations may be dominant.	Visitor management controls are noticeable but harmonize with the landscape. Basic visitor information facilities are present. Land uses like grazing are evident but fit into the natural landscape. OHV use occurs.
Middle Country **(previously Semi-Primitive Motorized)**	Within ½ mile of primitive motorized routes (4wd , high clearance). Resource modifications evident but balanced by the surrounding natural appearing environment. Some rustic facilities such as bulletin boards signs and motorized trails.	Moderate to high degree of contact with others. See an average 15 or more groups per day and less when away from roads. Human use alterations easily noticeable	A few subtle management controls or visitor information facilities present. Land uses are still subtle but still easy to see. Motorized use occurs (4wds, ATVs and motorcycles).
Back Country **(previously Semi-Primitive Non-Motorized)**	At least ½ mile from primitive motorized routes but not greater than 3 miles from all motorized routes. Largely unmodified natural appearing environment. Few primitive facilities such as signs and trails.	Little contact with others. See an average 6-15 groups per day. Evidence of others subtly noticeable but not drawing attention when recreating.	A few subtle management controls or visitor information facilities present. Land uses are subtle. No motorized use.
Primitive	Greater than 3 miles from all motorized routes. Unmodified natural environment, at least 5,000. Few to no facilities.	Very little contact with others. See an average 6 or fewer groups per day. Evidence of others unnoticeable.	No on-site visitor management or information facilities. Land uses generally unnoticeable. No motorized or mechanized uses.

Appendix B Figure 4

Documents Addressing Livestock Management by Allotment		
Allotment	**Type of Document**	**Year Completed**
JQS Common*	AMP AMP Amendment Allotment Evaluation Permit Renewals	1986 1993 1994 1999-2001
East Fork Common*	AMP Allotment Evaluation Permit Renewals	1984 1990 1999-2001
Hubbard Mesa	Allotment Evaluation Allotment Evaluation Livestock Use Agreement Permit Renewal	1990 1996 1996 2001
Rees	Allotment Evaluation Grazing Permit	1990 1998
Webster Park	Allotment Evaluation	1990
Sharrard Park	Allotment Evaluation	1990
Cottonwood Gulch	Allotment Evaluation Permit Renewal	1990 1999
Mahaffey Summer	Allotment Evaluation Permit Renewal	1990 1999
Old Mountain*	Allotment Evaluation	1990
Clough-Alber	Allotment Evaluation	1990
Clough Alber	Grazing Permit	1998
Magpie Creek	Allotment Evaluation Permit Renewal	1990 2001
Gordon Gulch/Naval Oil Shale	Permit Renewal	1999
Doodlebug	Allotment Evaluation	1990
Cow Creek*	Draft Permit Renewal Environmental Assessment	2001
NOSR	Bill HR1119 - Transfer of Jurisdiction	1998
NOSR	MOU - BLM/DOE NOSR Surface Management	1987
NOSR	Chapter 641 Naval Petroleum Reserves	1996
NOSR	Roan Cliff Land Health Assessment and Record of Determination	2001
Hubbard Mesa, Doodlebug, Rees, Magpie Creek, Webster Park (Goodrich Park area)	Rifle Creek Land Health Assessment and Record of Determination (not completed)	2002

Source: BLM GSFO *Grazing Permit Renewals on-going for 2002.

Appendix B Figure 5

Current Livestock Use						
Allotment Number	**Allotment Name**	**Allotment Category**	**Public Land Acreage**	**Number & Kind of Livestock**	**Season of Use**	**AUMs**
08905	**Doodlebug**	M	947	53 Cattle	05/16 to 06/15	54
08912	**Sharrard Park**	C	2,424			23
08913	**Mahaffey Summer**	I	1,908	400 Cattle	07/06 to 10/15	510
08914	**Old Mountain**	I	1,308	99 Cattle	06/16 to 10/15	397
08918	**Wheeler Gulch**	C	551			
08924	**Cottonwood Gulch**	C	9,605	180 Cattle	05/11 to 06/05	132
18901	**Magpie Creek**	I	2,083	60 Cattle	06/16 to 10/17	56
18902	**Webster Park**	I	6,155	500 Cattle 500 Cattle	04/20 to 05/25 11/01 to 02/28	118 395
18903	**Hubbard Mesa**	I	6,760	60 Cattle 500 Sheep 1500 Sheep 1500 Sheep 1500 Sheep	05/16 to 06/15 12/20 to 02/05 02/16 to 02/28 03/01 to 04/07 04/19 to 05/31	61 79 64 187 212
18907	**Rees**	I	2,023	416 Cattle 416 Cattle	05/01 to 06/01 10/15 to 11/30	162 238
18908	**JQS Common**	I	10,457	660 Cattle 1200 Sheep	06/16 to 09/30 06/16 to 09/30	2607 559
18909	**Clough-Alber**	I	5,323	1000 Sheep 134 Cattle	06/20 to 10/01 06/16 to 10/15	547 537
18910	**East Fork Common**	I	8,461	634 Cattle	06/16 to 10/15	2542
06015	**Gordon Gulch/Naval Oil Shale (WRFO)**	I	5,446	1000 Sheep	05/03 to 06/30 10/01 to 10/25	344 197
06019	**Cow Creek (WRFO)**	I	10,291	350 C	06/15 to 10/01	795

[1]Sharrard Park is unallotted. [b]The Wheeler Gulch has been unallotted since 1986. A grazing transfer was initiated in 2001.
Source: BLM GSFO

Appendix C

Acronyms

Appendix C - Acronyms

ACRONYMS

ACEC	Area of Critical Environmental Concern
AIRFA	American Indian Religious Freedom Act
AMP	Allotment Management Plan
APD	Application for Permit to Drill
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
bbls	barrels
BCF	Billion cubic feet
BLM	Bureau of Land Management
BMP	Best Management Practices
CDOW	Colorado Division of Wildlife
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CNAP	Colorado Natural Areas Program
CO	Colorado
COA	Condition of Approval
CSU	Controlled Surface Use
DAU	Data Analysis Unit
DEIS	Draft Environmental Impact Statement
DOE	Department of Energy
DOI	Department of the Interior
DRMP	Draft Resource Management Plan
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
GIS	Geographic Information System
gpt	Gallons Per Ton
GSFO	Glenwood Springs Field Office
GSRA	Glenwood Springs Resource Area
HMP	Habitat Management Plan
MLA	Mineral Leasing Act
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOSR	Naval Oil Shale Reserve
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NWPS	National Wilderness Preservation System
OHV	Off-Highway Vehicles (off-road vehicles)
ONA	Outstanding Natural Area
PM-10	Particulate Matter < 10 Microns in size
PNC	Potential Native Community
R&PPA	Recreation and Public Purposes Act
RFD	Reasonably Foreseeable Development
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
ROS	Resource Opportunity Spectrum
ROW	Right-of-Way
SCS	Soil Conservation Service
SRMA	Special Recreation Management Area
SRP	Special Recreation Permits
SVIM	Soil and Vegetation Inventory Method
T&E	Threatened and/or Endangered
TDS	Total Dissolved Solids
TL	Timing Limitation
TSP	Total Suspended Particulates
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
WSA	Watershed Activity Plan
WRIS	Wildlife Resource Information System
WRFO	White River Field Office
WRRA	White River Resource Area
WSA	Wilderness Study Area
W&SR	Wild and Scenic Rivers
W&SRA	Wild and Scenic Rivers Act

Appendix D

References

Appendix D - References

Baker, W. L. 1982. Natural vegetation of the Piceance Basin, Colorado. App.D, in: Inventory of the Piceance Basin, Colorado. J.S. Peterson and Baker, eds. Unpublished report prepared for the BLM, Craig, CO.

Bourgeron, P.S. and L.D. Engelking (eds.). 1994. A preliminary vegetation classification of the Western United States. Unpublished report prepared by the Western Heritage Task Force for The Nature Conservancy, Boulder, CO.

Bureau of Land Management. 1988. Glenwood Springs Resource Area Record of Decision and Resource Management Plan Glenwood Springs Resource Area. Grand Junction District Office, Colorado.

Bureau of Land Management. 1991. Final EIS - Vegetation Treatment on BLM Lands in Thirteen Western States [www page]. URL http://www.blm.gov/weeds/VegEIS/

Bureau of Land Management. 1994. White River Resource Area – Draft Resource Resource Management Plan (DES 94-43). Craig District Office, Colorado.

Bureau of Land Management. 1996. White River Resource Area – Proposed Resource Resource Management Plan and Final Environmental Impact Statement. Craig District Office, Colorado.

Bureau of Land Management. 1996. Rangeland Standards and Guidelines for Livestock Grazing [www page]. URL http://www.co.blm.gov/standguide.htm.

Bureau of Land Management. 1997. 1997 Instruction Memorandum No. CO-97-044. Denver, Colorado.

Bureau of Land Management. 1998. Glenwood Springs Resource Area Oil and Gas Leasing and Development Draft Supplemental Environmental Impact Statement. Denver, Colorado.

Bureau of Land Management. 1998 (Revised 1999 and 2000). Roan Plateau Map and Visitor Guide. Glenwood Springs, Colorado. Glenwood Springs Field Office.

Bureau of Land Management. 1999. Glenwood Springs Resource Area Oil and Gas Leasing and Development Final Supplemental Environmental Impact Statement. Denver, Colorado.

Bureau of Land Management. 1999. Glenwood Springs Resource Area Oil and Gas Leasing and Development Record of Decision and RMP Amendment. Denver, Colorado. 17pp.

Bureau of Land Management. 2000. BLM Handbook, H-1601-1 – Land Use Planning Handbook [www page]. URL http://www.blm.gov/nhp/efoia/wo/handbook/h1601-1.pdf.

Bureau of Land Management. 2000. Results from Several Small Group Discussions Regarding the Roan Plateau Area of Western Colorado. Glenwood Springs, Colorado.

Bureau of Land Management. 2000. Recreation Guidelines to meet Public Land Health Standards [www page]. URL (http://www.co.blm.gov/rguideline/guidrv12.htm.

Bureau of Land Management. 2000. Wilderness Character and Roadlessness Inventory Findings [www page]. URL http://www.co.blm.gov/gsra/rpwildinventory.htm.

Bureau of Land Management. 2002. BLM National List of Non Native Invasive Species [www page]. http://www.co.blm.gov/botany/invasiweed.htm.

Bureau of Land Management. 2002. GSFO Fire Management Plan [www page]. http://www.co.blm.gov/gsra/firemgntblcontent.htm.

Bureau of Land Management. 2002. BLM Manual 8110.4 [www page]. URL http://www.blm.gov/nhp/efoia/wo/woerr.html.

Byrne, G. 2002. Colorado Division of Wildlife, Glenwood Springs, Colorado. Personal Communication.

Colorado Department of Local Affairs. 2000. 2000 Population by Race and Hispanic Origin Colorado Counties - Total Population [www page]. URL http://www.dola.state.co.us/demog/Population/PopulationByAgeRace&H.O/2000Census/CORaceDom.htm.

Colorado Division of Wildlife. 2000. 1997 - 2000 Financial Snapshot [www page]. URL http://wildlife.state.co.us/about/Finances/index.asp.

Colorado Division of Wildlife. 1999. Wildlife Report [www page]. URL http://www.dnr.state.co.us/cdnr_news/wildlife/1999311162340.html [www page].

Colorado Oil and Gas Conservation Commission. 2002. Colorado Oil and Gas Conservation Commission GIS Data. Denver, Colorado. Colorado Oil and Gas Conservation Commission.

Garfield County. 2002. Garfield County, Colorado [www page]. URL http://www.garfield-county.com.

Mckibbin, Mike. 2002. The Daily Sentinel newspaper article of July 28, 2002 - William Grows in Garfield County. Grand Junction, Colorado. The Daily Sentinel.

O'Kane, S.L. and J.L. Anderson. 1987. *Penstemon debilis* (Scrophulariaceae): a new species from Colorado endemic to oil shale. *Brittonia* 39 (4):412-416.

Reid, M. S., L.D. Engelking, and P. S. Bourgeron. 1994. Rare Plant Communities of the Conterminous United States: Western Region. In Grossman, D. H., K. L. Goodin, C. L. Reuss eds. Rare Plant Communities of the Conterminous United States: An initial survey. The Nature Conservancy, Arlington, VA.

Reveal, J.L. 2001. An Array of Botanical Images. University of Maryland. College Park, MD.

Rondeau, R. 2001. Colorado Natural Heritage Program, Fort Collins, Colorado. Personal communication.

Rondeau, R.J., M. B. Wunder, A. Meredith, C. A. Pague, and S. Spackman. 1997. Biological Survey of Naval Oil Shale Reserve No. 1 (NOSR-1) 1996 Final Report. Colorado Natural Heritage Program, Fort Collins, CO.

Tucker, P. 2002. Colorado Division of Wildlife, Glenwood Springs, Colorado. Personal Communication.

State of Colorado. 2002. June 2002 Revenue Forecast [www page]. URL http://www.state.co.us/gov_dir/govnr_dir/ospb/economics/cep/2002/cep2002-06.pdf.

Sonoran Institute. 2002. Population, Employment, Earnings and personal Income Trends – Garfield County. Sonoran Institute Northwest Office. Bozeman, Montana.

U.S. Census Bureau. 2002. State & County QuickFacts [www page]. URL http://quickfacts.census.gov/qfd/states/08000.html.

U.S. Geological Survey. 2000. Minerals Yearbook–2000 [www page]. URL http://minerals.usgs.gov/minerals/pubs/state/980801.pdf.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Intergency Memorandum of Agreement (MOA) for Programmatic Endangered Species Act Section 7 Consultations [www page]. URL http://endangered.fws.gov/consultations/s7hndbk/toc-glos.pdf.

U.S. Forest Service and National Park Service. 1999. The Wild and Scenic River Study Process [www page]. URL http://www.nps.gov/rivers/publications.html.

U.S. Fish and Wildlife Service. 2002. U.S. Fish and Wildlife Service's Endangered Species List [www page]. URL http://endangered.fws.gov/wildlife.html#Species.