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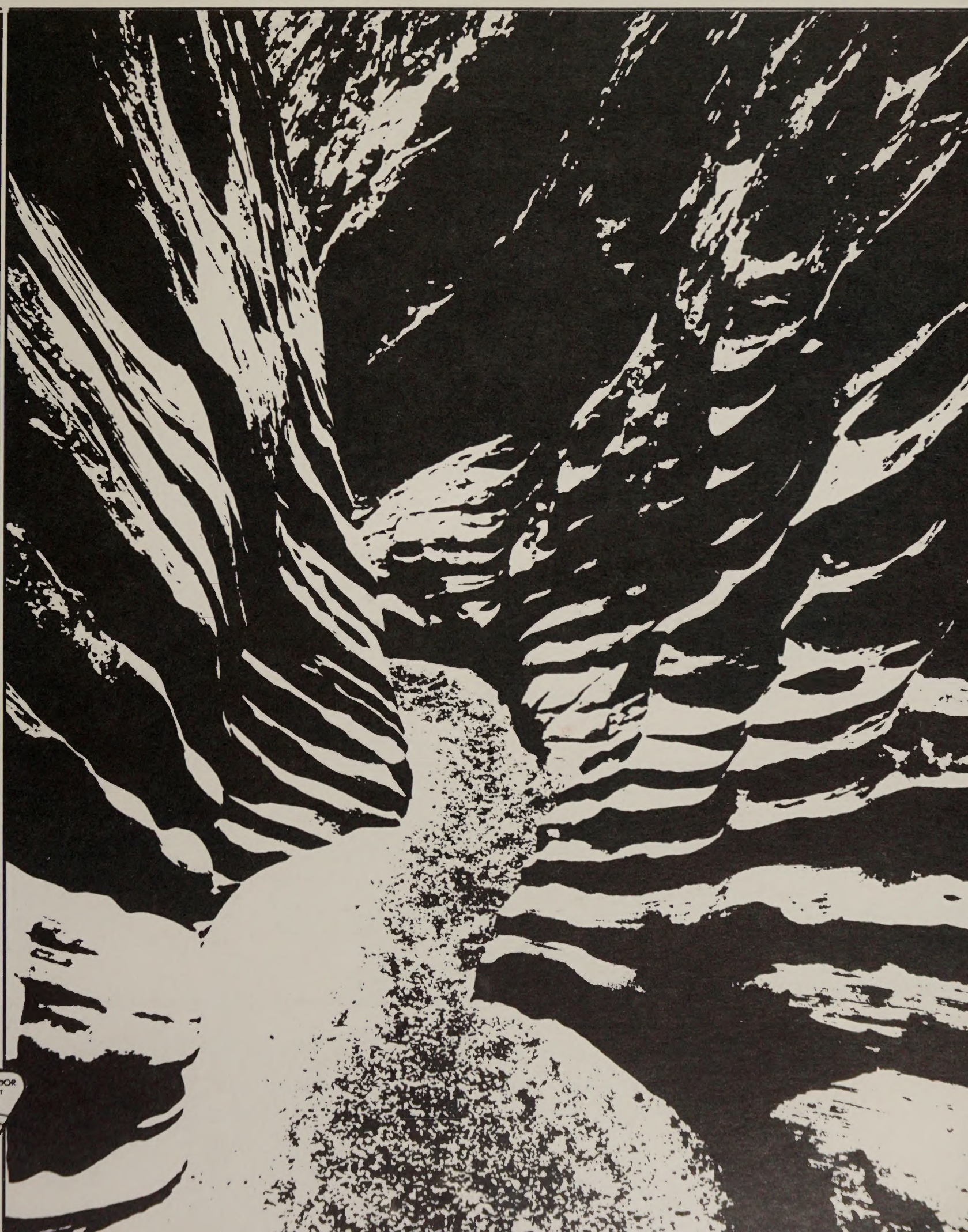
Utah BLM Statewide Wilderness Final Environmental Impact Statement

Volume VI East-Central Region



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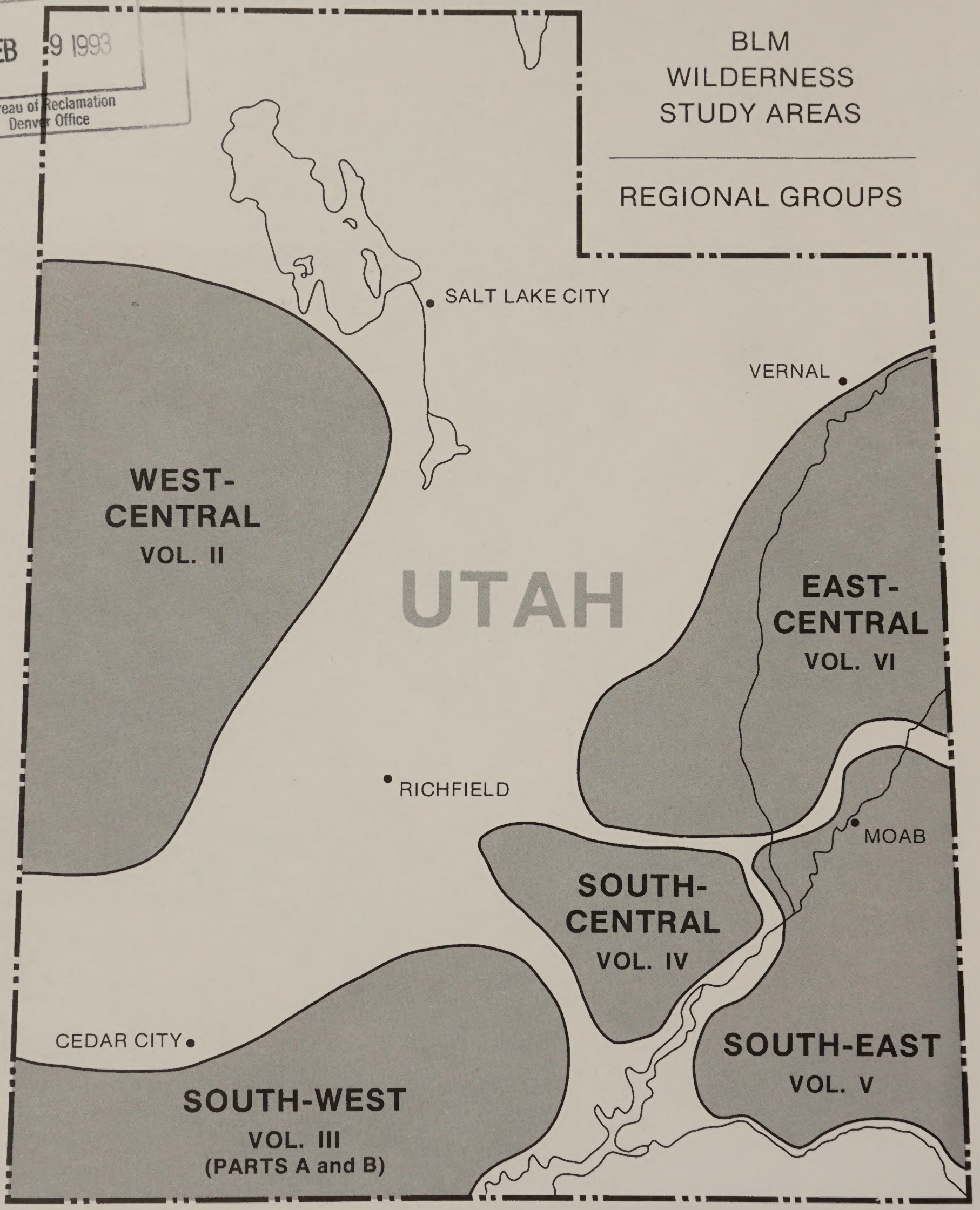

This is **Volume VI** of a seven volume set. Volume I is the state wide overview. It contains the Glossary and Appendices for all volumes. Volumes II-VI contain analyses for individual Wilderness Study Areas. Volume VII (parts A and B) contain public comments and responses.

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Volume VI East-Central Region

San Rafael Reef WSA

Crack Canyon WSA

Muddy Creek WSA

Devils Canyon WSA

Sid's Mountain WSA

Mexican Mountain WSA

Jack Canyon WSA

Desolation Canyon WSA

Turtle Canyon WSA

Floy Canyon WSA

Coal Canyon WSA

Spruce Canyon WSA

Flume Canyon WSA

Westwater Canyon WSA

Winter Ridge WSA

Daniels Canyon WSA

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INTRODUCTION TO VOLUME VI -- EAST-CENTRAL WSAs

The Utah Bureau of Land Management (BLM) Statewide Wilderness Final Environmental Impact Statement (EIS) is comprised of seven volumes which include one individual analysis of each of 83 Wilderness Study Areas (WSAs) (Volumes II through VI), a Statewide overview (Volume I), and public comments and responses on the Draft EIS (Volume VII). The individual WSA analyses are grouped into volumes by geographic location. Volume VI is comprised of individual analyses of the following sixteen WSAs located in the East-Central Region of Utah:

Map Reference Number	WSA	Acres
59	San Rafael Reef	59,170
60	Crack Canyon	25,335
61	Muddy Creek	31,400
62	Devils Canyon	9,610
63	Sids Mountain	80,970
64	Mexican Mountain	59,600
65	Jack Canyon	7,500
66	Desolation Canyon	290,845
67	Turtle Canyon	33,690
68	Floy Canyon	72,605
69	Coal Canyon	61,430
70	Spruce Canyon	20,350
71	Flume Canyon	50,800
72	Westwater Canyon	31,160
73	Winter Ridge	42,462
I	Daniels Canyon	3,496

The alternatives analyzed for each WSA are: No Action/No Wilderness designation and All Wilderness, which would be designation of the entire WSA to the National Wilderness Preservation System (NWPS). In addition, for several WSAs one or more Partial Wilderness Alternative is analyzed, where designation of a portion of the WSA would avoid conflicts between wilderness management and development and use of other resources, or where certain portions of WSAs have low quality wilderness values. Partial Wilderness Alternatives, based on wilderness values, would designate the portions of the WSA with outstanding opportunities for solitude, primitive recreation, and special features that are within a manageable boundary.

CHANGES FOR THE FINAL EIS

In response to public comment, and changing resource conditions and plans, the following changes have been made for the Final EIS for all of the East-Central WSAs:

1. The sections entitled Alternatives Considered and Eliminated from Detailed Study discuss citizen alternatives suggested during the public comment period.

2. New statements that further explain management of water resources, cultural resources, noxious weeds, and predators have been added to the Analysis Assumptions and Guidelines for All Alternatives.

3. The sections entitled Affected Environment include new or updated information on wilderness values, geology, water resources, soil reclamation potential, threatened and endangered species, mineral resources, livestock grazing, land use plans, and economic conditions.

4. Issue Identification sections have been revised and expanded.

5. The environmental consequences of alternatives described in the individual analyses have been modified to address only significant issues.

6. The Analysis Assumptions and Guidelines for All Alternatives have been moved to the Introduction to Volume VI. The specific assumptions on potential future activities inside the WSAs have been changed as described in the assumed action scenarios in the Descriptions of the Alternatives analyzed in the individual WSA analyses.

7. The State-of-Utah position on the exchange of in-held State lands has changed from requiring exchange of in-holdings, to exchanging only on a case-by-case basis to be determined by the State in the future. In the Final EIS, it is assumed that State lands would not be exchanged, and access to in-held State sections could be required following wilderness designation.

8. The bibliographies for the region have been merged into a comprehensive bibliography that is located at the end of Volume VI.

Additional changes specific to WSAs are identified in the Introductions to the WSA analyses.

INTRODUCTION TO VOLUME VI: EAST-CENTRAL WSAs

ISSUE IDENTIFICATION

BLM used the information obtained from scoping meetings, workshops, comments received during the public comment period on the Draft EIS, and input from BLM professionals to identify the issues for detailed analysis. Issues related to wilderness in general are addressed in Volume I, the Statewide overview. Several Statewide issues also pertain to the East-Central WSAs.

In determining the significance of issues, BLM considered the nature and magnitude of potential impacts, resources covered by law, requirements of BLM's wilderness review guidelines, and the level of public interest or concern over the potential impacts.

ISSUES CONSIDERED BUT NOT ANALYZED IN DETAIL FOR THE EAST-CENTRAL WSAs

1. Air Quality: The public has expressed concern that wilderness designation could lead to redesignation of WSAs from the existing Class II, Prevention of Significant Deterioration (PSD) classification, to the more stringent Class I rating. Additional PSD Class I areas could restrict future industrial developments in East-central Utah. Since the BLM Wilderness Management Policy (found in BLM Manual 8560) states that BLM will manage all wilderness areas to comply with the existing air quality classification, wilderness designation or nondesignation would not cause the air quality classification to change. The decision to change air quality classification is the prerogative of the State of Utah, rather than BLM. Therefore, the impact of wilderness designation on air quality is not analyzed in detail for the East-Central WSAs. Potential impacts on air quality from tar sand developments are analyzed for the Winter Ridge WSA.

2. Geology and Topography: The East-Central WSAs contain outstanding examples of Colorado Plateau topographic and geologic features. The public has expressed concern that only wilderness designation can adequately protect these features. The only potential threats to these features would be blasting, surface mining, or subsidence on a scale much larger than any projects anticipated for most of the WSAs in the region. Therefore, with the exception of Desolation Canyon and Winter Ridge WSAs, impacts on geologic or topographic features are not significant issues for the East-Central WSAs.

3. Water Rights: In November, 1985, U.S. District Court Judge John Kane ruled (Sierra Club vs. Block) that Federal wilderness in Colorado carries an implicit water right. The public is concerned that wilderness designation would interfere with development of existing water rights and would establish Federal reserved water rights that would conflict with future filings, transfers, or changes in points of diversion for water use. After study of the issue by the Department of the Interior Solicitor, the Secretary of the Interior asked the U.S. Attorney General's office for concurrence with the Solicitor's opinion. On July 28, 1988, the Attorney General (Meese, 1988) concluded that no legally sufficient basis exists for an implication of Federal reserved water rights for wilderness purposes. Therefore, impacts on water rights are not significant issues for analysis in the EIS.

4. Land Use Plans and Policies: Issues related to land use plans and policies include: (a) consistency of wilderness designation with the plans and policies of BLM, other Federal agencies, and State and local governments; (b) impacts on management and use of in-held private and State lands; and (c) impacts on special land use designations, existing facilities, and future proposals for rights-of-way for communication facilities, power transmissions lines, pipelines, reservoirs, etc.

Wilderness designation as proposed in the Utah BLM Statewide Wilderness Final EIS is not addressed in the current BLM land use plans because it is handled as a Statewide planning process. Wilderness designation is part of BLM's multiple-use concept, and the Statewide Wilderness EIS is linked to the current plans through analysis of the plans as the No Action/No Wilderness Alternative. Congressional designation of all or part of any of the WSAs would amend the applicable BLM land use plans.

The Federal Land Policy and Management Act (FLPMA) and the BLM Wilderness Study Policy (USDI, BLM, 1982a) require BLM to consider and document the extent to which BLM's recommendations are consistent with the plans and policies of other agencies and governments. Wilderness designation is perceived by State and local governments as a threat to development of in-held State lands. The Utah State Legislature passed a resolution (S.C.R. No. 1) in 1986 opposing any additional wilderness designation. The Consolidated Local Government Response to Wilderness (Utah Counties, 1986) also opposes wilderness designation of BLM lands in Utah. Designation of all or part of any WSA would not be consistent with the policies of State and local governments.

INTRODUCTION TO VOLUME VI: EAST-CENTRAL WSAs

The current policy of the State of Utah is to maximize economic returns and to reserve its position regarding the exchange of in-held State lands (see Chapter 1 in Volume I). Given this position, BLM assumes that specific reasonable access would be provided to in-held State lands in response to proposals for development and use. Therefore, impacts on development of in-held State lands are not analyzed in detail for each WSA. Likewise, BLM's Wilderness Management Guidelines require that access be provided to in-held private lands, and impacts of designation on the use of private lands are not an issue for detailed analysis. Volume I provides additional information and analysis regarding State and private in-holdings.

The current plans and policies of the various agencies and governments relative to wilderness designation are described in the Affected Environment sections of the individual WSA analyses, under the heading, Land Use Plans. The EIS notes the relationship of BLM wilderness study areas, State, and Indian lands in the East-Central region, but consistency with land use plans is not analyzed in detail for each of the alternatives because further analysis would lead only to restatement of the conflicts explained above.

The affects of wilderness designation on specific proposals and existing facilities or rights in WSAs may or may not be significant issues. Refer to the Issue Identification sections found in the Introductions to the individual WSA analyses for further discussion on these and other resource related issues not described above.

ANALYSIS ASSUMPTIONS AND GUIDELINES FOR ALL ALTERNATIVES

The following analysis assumptions and guidelines are applicable to the analysis of the WSA alternatives described in the Final EIS:

1. The alternatives would be carried out as cited in the Description of the Alternatives section.

2. For the No Action/No Wilderness Alternatives, and the nondesignated portions of WSAs with the Partial Wilderness Alternatives, it is assumed that BLM would manage according to the current BLM land use planning document. Six WSAs in this volume are within the area covered by the San Rafael Management Framework Plan (MFP) (USDI, BLM, 1979a). This MFP is expected to be replaced in 1990 by the San Rafael Resource Management Plan (RMP). A proposed RMP and Final EIS document was prepared (USDI, BLM, 1989); however, the RMP decisions were not issued prior to preparation of the Utah Statewide Wilderness EIS. As a result, it was necessary to use the MFP as a basis for the No Action/No Wilderness Alternative. It should be recognized that land use plans are subject to future adjustments.

The following general management practices would apply to all of the East-Central WSAs:

Water rights would be obtained pursuant to the applicable State statutory and administrative procedure, except where a Federal reserved right may be asserted for multiple-use purposes.

BLM would establish and maintain land use management practices which assure the protection of water supplies and aquatic habitat from chemical, physical, or biological deterioration as defined by the Environmental Protection Agency (EPA) and State water quality standards to protect the health of the public and other beneficial uses.

Private, commercial, and military aircraft use of airspace over the WSA would continue as at present.

Cultural resources would be protected by provisions of the Uniform Rules and Regulations (43 Code of Federal Regulations [CFR] Part 3) to carry out the Antiquities Act, the Historic Sites Act, Executive Order 11593, the National Historic Preservation Act, and the Archaeological Resources Protection Act. Cultural resources could be excavated, stabilized, or interpreted without regard for wilderness values.

Prior to authorizing surface-disturbing activities, BLM would consult with the U.S. Fish and Wildlife Service (FWS) as required under the provisions of the Endangered Species Act. Appropriate measures would be taken to protect endangered, threatened, or sensitive species.

Measures to control fire, insects, noxious weeds, or disease would be taken as required, if in conformance with land use plans and BLM guidelines.

Activities for the purpose of gathering information would be allowed by permit provided they are carried out in an environmentally sound manner.

Hunting would be allowed subject to applicable State and Federal laws and regulations.

Control of predators would be allowed without wilderness considerations and would be conducted according to State law and Animal and Plant Health Inspection Service (APHIS) guidelines. Methods of control would be determined as appropriate.

3. With the All Wilderness Alternative, and for the portions of the WSAs that would be designated as wilderness with the Partial Wilderness Alternatives, it is assumed that BLM would manage according to provisions of the BLM Wilderness Management Policy (BLM Manual 8560). The following general measures would apply to all WSAs (see Appendix 1 in Volume I):

All designated areas would be withdrawn from mineral location and closed to new mineral leasing and sale. Exploration and development of existing leases and valid claims would be allowed, with certain limitations to minimize effects on wilderness values.

Livestock grazing would continue as authorized in the BLM land use plans. New rangeland developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness protection and effective management of these resources. Occasional use of motor vehicles, motorized equipment, or mechanical transport may be permitted where practical alternatives are not available.

New water resource facilities or watershed activities (not related to rangeland or wildlife management) would be allowed only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(1) of the Wilderness Act (Eighty-Eighth Congress of the U.S., 1964)

BLM would establish and maintain land use management practices which assure the protection of water supplies and aquatic habitat from chemical, physical, or biological deterioration as defined by EPA and State water quality standards to protect the health of the public and other beneficial uses. Management practices would be consistent with the BLM Wilderness Management Guidelines.

Prior to authorizing surface-disturbing activities BLM would consult with the (FWS) as required under the provisions of the Endangered Species Act. Appropriate measures would be taken to protect endangered, threatened or sensitive species.

Wildlife transplants or habitat developments would be allowed if compatible with wilderness values. Projects would be considered for approval on a case-by-case basis.

Designated areas would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions.

Specific Wilderness Management Plans would be developed that would guide the use and protection of the wilderness areas. It is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or cherry-stem the wilderness areas, for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be from 100 to 300 feet from the centerline of the road travel surface.

Private, commercial, and military aircraft use of air space over the WSA would continue, but a minimum elevation of 2,000 feet would be encouraged by BLM and the Federal Aviation Administration (FAA).

Harvest of forest products would not be allowed in designated areas, except for the harvest of pine nuts or the noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means for use in the wilderness areas. Increased vehicular access for the harvest of forest products would not be allowed.

Cultural resources would be protected with the various antiquities and cultural resource protection acts. However, in most instances they would be subject to the forces of nature, and study and management would not normally include any excavation, stabilization, or interpretation activities. Exceptions would be allowed on a case-by-case basis after special approval of the BLM State Director.

Visual resources would be managed in accordance with Visual Resource Management (VRM) Class I standards which generally allow for only natural ecological change.

Measures to control fire, insects, noxious weeds, or disease would be taken in designated areas in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken would be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface).

Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.

Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried out in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without the use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternative exists.

Hunting would be allowed subject to applicable State and Federal laws and regulations, but would be limited to nonmotorized access.

Where control of predators is necessary to protect endangered or threatened wildlife species, or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns (M-44s) would not be allowed. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the areas.

4. Future users in WSAs would meet requirements for all applicable Federal, State, and local permits. Stipulations, mitigating measures, and reclamation procedures would be carried out in compliance with Federal, State, and local laws and regulations.

5. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources with wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation.

6. The impacts of wilderness designation would result from: (a) protection of certain resources; (b) denial of opportunity to develop certain resources; or (c) restrictions on or changes in allowable management practices and land uses.

7. The short term is defined as that time from the present to the year 2020. The long term is defined as beyond the year 2020. The term foreseeable future refers to both the short and long terms in reference to activities that are likely to occur in the WSA.

Although the degree of future development cannot be predicted with certainty, assumed action scenarios are presented for analysis purposes in the description of the alternatives. Based on known plans and proposals, known estimated resource values, and projections of future economic conditions, the assumed action scenarios describe activities likely to occur in the WSAs over the foreseeable future, if the alternative is implemented.

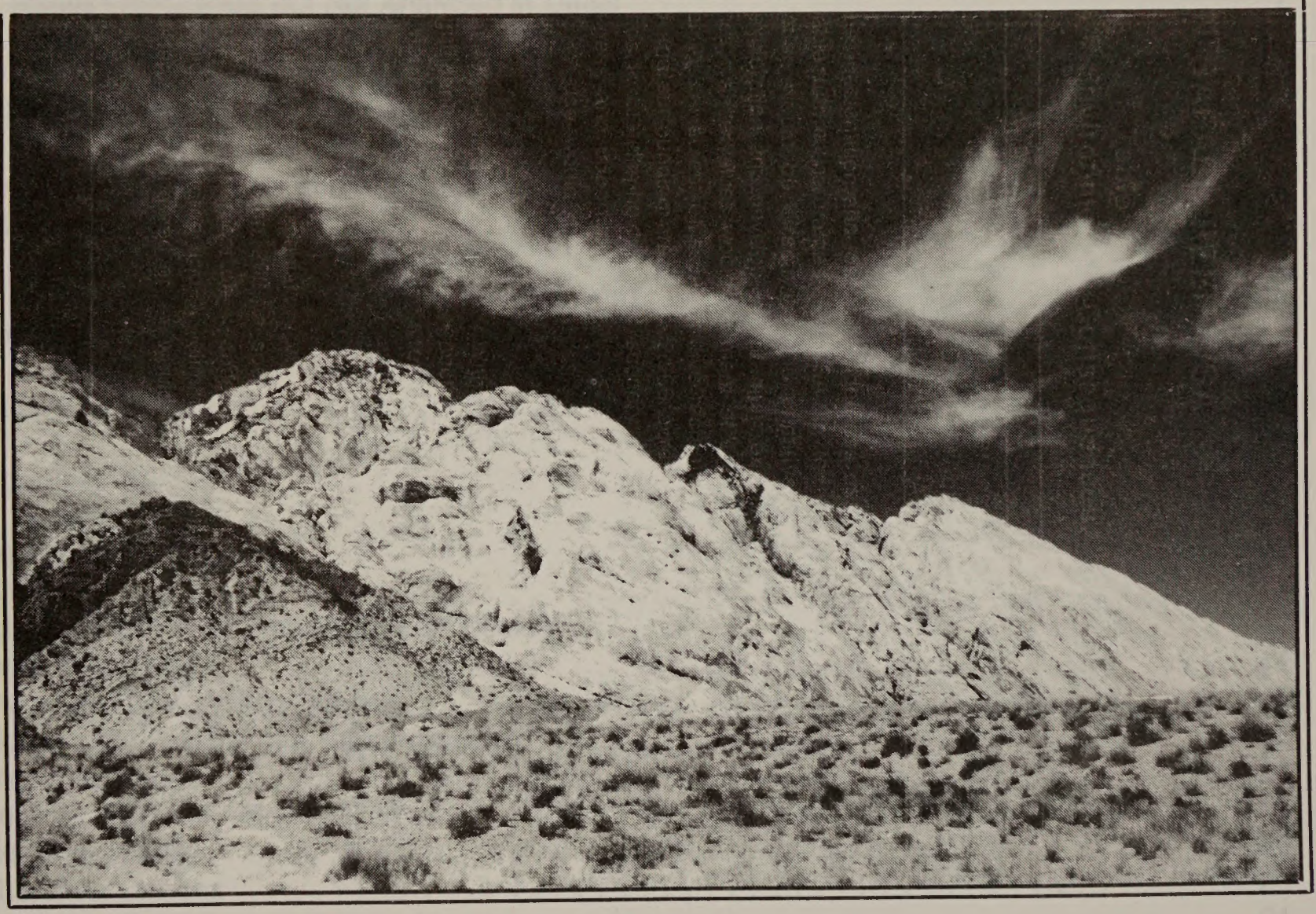
8. Development potential in many of the WSAs has been divided into short-term and long-term projections. Even within the short term, the quality of data varies. From the present time to about the year 2005, there are relatively good data with which to make development projections. From the year 2005 to the year 2020, little data exist and development expectations are more speculative. Surface disturbance figures and subsequent environmental impact analysis in the Final EIS are based on activities projected in the foreseeable future.

9. Mineral evaluations and estimates of in-place mineral resources are based on a mineral resource evaluation of the WSAs by the Science Applications, Inc. (SAI), U. S. Geological Survey (USGS), and U. S. Bureau of Mines (USBM) mineral survey reports where available, and subsequent evaluations conducted by BLM personnel. These estimates are generally based on literature studies and known mineral and energy activities in the vicinity of the WSA. The analysis estimates the potentially recoverable mineral resources and then, using BLM's field experience and judgment, determines the probability of short-term and long-term development. (Appendix 6 in Volume I explains the mineral exploration and development projections, and Appendix 10 explains the method for estimating surface disturbance from projected activities in the WSA.)

10. It is assumed that, once designated, management of WSAs as wilderness would continue over the long term.

11. The environmental consequences of alternatives analyze only the significant issues identified in the Introduction to the WSA analyses.

San Rafael Reef WSA



SAN RAFAEL REEF WSA

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SAN RAFAEL REEF WSA

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SAN RAFAEL REEF WSA

(UT-060-029A)

INTRODUCTION

General Description of the Area

The San Rafael Reef WSA is in the San Rafael Swell region of Emery County, Utah. It contains 55,540 acres of BLM-administered land. An additional 3,630 acres of public land adjacent to the east side of the WSA is considered as a variation for potential wilderness designation. This variation would increase the size of the WSA to 59,170 acres.

The WSA is about 22 miles northeast to south and between 6 to 8 miles east to west. It is situated between the Temple Mountain/Goblin Valley road and Interstate 70 (I-70). The nearest communities are Green River (18 air miles) and Hanksville (20 air miles). The San Rafael Reef WSA is the easternmost of three WSAs that form an irregular half-circle on the southern part of the San Rafael Swell. The Crack Canyon WSA is within about 1 mile to the west from the southern end of the San Rafael Reef WSA. Located about 2 miles north from the San Rafael Reef WSA is the Mexican Mountain WSA in the northern part of the San Rafael Swell.

The topography of the San Rafael Reef WSA is dominated by checkerboard sandstone mesas, incised canyon drainages, and vertical fins and domes of the San Rafael Reef. Elevations range from 4,800 feet along the base of the reef to 6,600 feet in the upper reaches of the central and northern areas.

The checkerboard sandstone mesas are located in the central and northern portions of the WSA. These lands are rich the in colors of gold, rust, tans, and yellows. The checkerboarding effect comes from the faulted and cracked character of the White Rim Sandstone and Kaibab Limestone.

At least eight drainages cut the WSA's highlands as they carve their way east through the San Rafael Reef. These drainages are typified by deep, narrow sandstone walls and canyons averaging in depth from 200 feet to 1,000 feet. Some of these canyons have acute pour-offs, deep pools or catchments, and narrow twisting bottoms.

In addition to the massive character of the WSA's canyons and drainages, the San Rafael Reef is a very dominant and unique topographic feature. Near vertical fins jut from the desert floor along the northeastern boundary, forming a sawtooth ridge of sandstone. Pinyon-juniper woodland and grassland are the dominant vegetation types in the WSA.

Average annual precipitation is 10 to 13 inches which mostly occurs in the form of rain. Temperatures range from 10 degrees to 105 degrees Fahrenheit (F). An average of 8 inches of snow falls between October and April.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following change specific to the WSA has been made since publication of the Draft EIS.

The anticipated surface disturbance presented in the Draft EIS (340 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 340 acres reported in the Draft EIS to 206 acres of surface disturbance for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies) the following issues or impacts specific to the San

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WSA
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Rafael Reef WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Water Resources: There are no perennial streams in the WSA. There are two livestock reservoirs but no other existing or planned water developments. Water is primarily used by wildlife and livestock. Consequently, impacts on water resources are not significant issues for analysis in the Final EIS.

2. Forest Resources: The only forest resources in the WSA are 48,350 acres of scattered pinyon pine and juniper trees. Demand is low and there is limited access. The area is presently closed to harvest under the San Rafael MFP. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

3. Livestock Management: The public is concerned that wilderness designation would interfere with livestock management by restricting access for maintenance of existing range improvements and moving livestock, preventing future range improvements, and restricting predator control. However, under the BLM Wilderness Management Policy (BLM Manual 8560), there shall be no curtailments in grazing simply because an area is wilderness. Grazing reductions have already been imposed as a result of a grazing EIS.

There are no proposed rangeland developments which would be precluded by wilderness designation. Three miles of way would be closed should the area be designated as wilderness. However, since motorized vehicles are used very little in livestock management, little effect on the management of livestock grazing is expected. Several methods of predator control would be allowed in designated wilderness area. For these reasons, impacts on livestock management are not significant issues for the San Rafael Reef WSA.

4. Wild Burros: The 35 head of wild burros which are found in the northwestern portion of the WSA would be protected by the Wild Free-Roaming Horse and Burro Act of 1971 (as amended), with or without wilderness designation. The removal of wild burros, generally by the use of saddle horses, can take place inside and outside the WSA. However, occasionally the removal program requires the use of a helicopter to assist in the round up. When this is the case, the helicopter would not be landing inside the WSA. Wild burro numbers are also inventoried by the use of helicopter over the WSA, but landing is not required.

- Issues Analyzed in Detail

The significant issues for the San Rafael Reef WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on soils.

3. Impacts on vegetation including special status species.

4. Impacts on mineral exploration and production.

5. Impacts on wildlife habitat and populations including special status species.

6. Impacts on visual resources.

7. Impacts on the preservation of cultural resources.

8. Impacts on the recreational use of the WSA.

9. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, BLM's wilderness inventory; local governments' position on wilderness; the need for further inventories of resource values; potential impacts of wilderness designation on surrounding resource and economic values; ORV use; water resources; and mineral values (including uranium, tar sand, and oil and gas.)

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 59, for responses to specific comments about the San Rafael Reef WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Alternatives that would add up to 31,000 acres of Federal and 8,400 acres of State land mainly west and north of the WSA boundary were suggested in the public comments. These alternatives were not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study

during the inventory phase (refer to Volume VII-B, General Comment Response 3.1).

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness; and (2) All Wilderness (Proposed Action) (59,170 acres). The All Wilderness Alternative includes 3,630 acres on the east side of the WSA that have been added for consideration since the 1980 BLM Intensive Wilderness Inventory (USDI, BLM, 1980) decision. This variation would improve manageability by following on-the-ground features, which would aid in boundary identification (refer to Map 1). Except for mineral and energy resources, the variation would not result in any appreciable differences in environmental impacts. The following analysis is equally applicable to both the original and modified boundaries of the WSA. For simplicity in presentation, only the 59,170-acre figure is used in the following discussion. Differences are noted, however, in the section on Mineral and Energy Resources. A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 59,170-acre San Rafael Reef WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, and the San Rafael RMP will eventually replace the San Rafael MFP (USDI, BLM, 1979a), it is assumed that the WSA would continue to be managed in accordance with the MFP. The six sections of State land (4,029.4 acres) within the WSA (refer to Map 1) have not been identified in the MFP for Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership. There are no private or split-estate lands in the WSA.

- Management Conditions and Constraints

All 59,170 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on the existing 807 mining claims (16,140 acres) and potential future mining claims subject to validity determination. These are primarily uranium claims. The original 55,540-acre WSA contains 751 existing mining claims covering 15,020 acres. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809). Six existing post-FLPMA oil and gas leases (6,940 acres) and potential future leases could be developed under Category 1 (standard stipulations) on about 33,140 acres and Category 3 (no surface occupancy) on about 24,750 acres. Oil and gas leasing in Category 4 would not be allowed on 1,280 acres of the WSA. The 55,540-acre WSA has six leases covering 6,830 acres.

Although mineral resources would be managed as described above, only uranium is expected to be explored and developed. Other locatable or leasable mineral explorations or developments are not projected in the WSA because the level of known resources and the probability of their development are too low to support development assumptions. Appendix 6 in Volume I explains the mineral exploration and development projections.

The present domestic livestock grazing use of the 59,170 acres would continue on five allotments as authorized in the MFP (1,344 Animal Unit Months [AUMs]). The existing two stock reservoirs could be used and maintained. No additional rangeland developments have been proposed. Use would continue by a small herd of wild burros (about 35 animals) that live in and near the WSA.

Public water reserve withdrawals would remain in effect on 910 acres. These reserves withdraw the lands from all public land laws and nonmetalliferous mineral location.

It is assumed that bighorn sheep would be reintroduced into the WSA by the Utah Division of Wildlife Resource (UDWR) to augment present populations.

The entire 59,170 acres would be open to ORV use. Established routes through canyon drainages and along old mining roads could be traversed by vehicles (primarily motorcycles and ORVs). Approximately 10 miles of ways inside the WSA and approximately 10 miles of road that border the WSA would remain available for vehicular use. Use of vehicles is expected to increase in the future.

Approximately 48,350 acres of sparse pinyon-juniper woodland would continue to be closed to

SAN RAFAEL REEF WSA

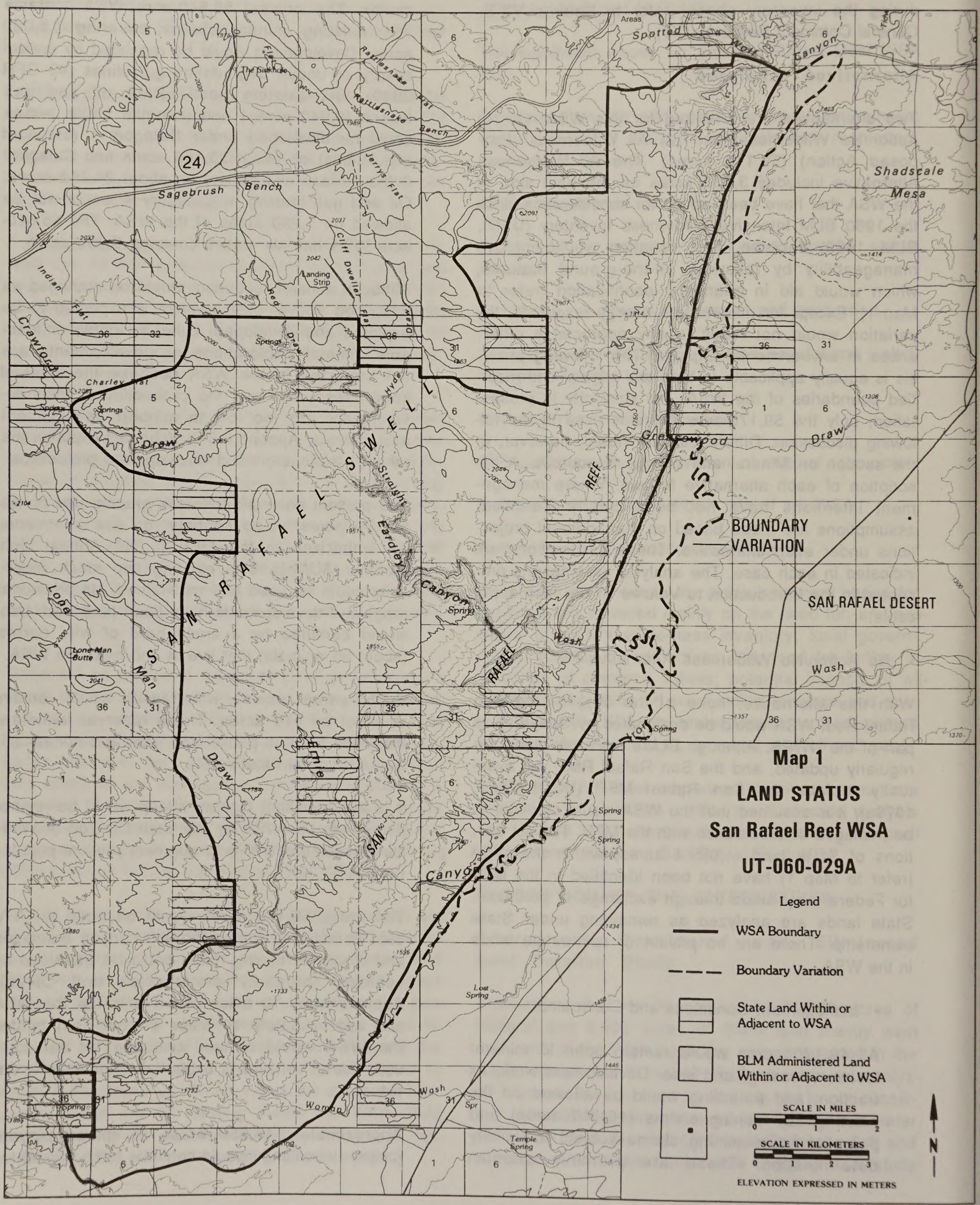
R. 12 E.

R. 13 E.

T. 22 S.

T. 23 S.

T. 24 S.



Map 1

LAND STATUS

San Rafael Reef WSA

UT-060-029A

Legend

- WSA Boundary
- Boundary Variation
- State Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES

0 1 2

SCALE IN KILOMETERS

0 1 2 3

N

ELEVATION EXPRESSED IN METERS

the harvest of firewood and fenceposts as directed in the MFP.

The entire area would continue to be managed under VRM Class II on 26,350 acres, Class III on 2,880 acres, and Class IV on 29,940 acres.

- Action Scenario

Given the management actions described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in about 206 acres of surface disturbance including up to 30 miles of access roads. Two hundred and two acres would be disturbed due to exploration and development of uranium resources, primarily in the northern and southern ends of the WSA. Up to five developments would consist of existing mine workings and construction of additional access routes. The ore would be processed offsite. Exploration and development could provide up to 40 jobs per operation over the foreseeable future.

In addition, about 4 acres would be disturbed due to developing access to in-held State lands. No other disturbance is anticipated.

Only a small amount of dispersed disturbance from ORV use is projected because traffic would mainly be restricted to existing roads, ways, and washes by rugged terrain. Recreational use is anticipated to increase over the current estimated use of 650 visitor days per year at a rate of 2 to 7 percent annually. Approximately 38 percent of visitor use would be based on use of vehicles.

- All Wilderness Alternative (Proposed Action)

With this alternative, all 59,170 acres of the San Rafael Reef WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding the exchange of in-held lands within any particular WSA. Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There are six State sections (4029.4 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). There are no private or split-estate lands within the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

All 59,170 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the 16,140 acres of 807 existing mining claims that may be valid. (The 55,540-acre area would involve 15,020 acres for 751 existing mining claims.) Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration for wilderness values. It is assumed that such claims for uranium would exist in the WSA at the time of designation and that they would be explored and developed under more restrictive conditions than the No Action/No Wilderness Alternative. Six existing post-FLPMA oil and gas leases involving 6,940 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. (The 55,540-acre area would involve six existing leases and 6,830 acres.)

Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The estimated 1,344 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of range developments existing at the time of designation (in this case, two stock reservoirs) could continue in the same manner as in the past based on practical necessity and reasonableness. A herd of approximately 35 wild burros would continue to use part of the WSA.

Public water reserve withdrawals would remain in effect on 910 acres. These reserves withdraw the lands from all public land laws and nonmetalliferous mineral location.

It is assumed that the potential reintroduction of desert bighorn sheep to increase existing populations would be allowed.

Harvest of forest products would not be allowed except for the harvest of pinyon nuts or the noncommercial gathering of dead-and-down wood for use in the wilderness, if accomplished by other than mechanical means.

SAN RAFAEL REEF WSA

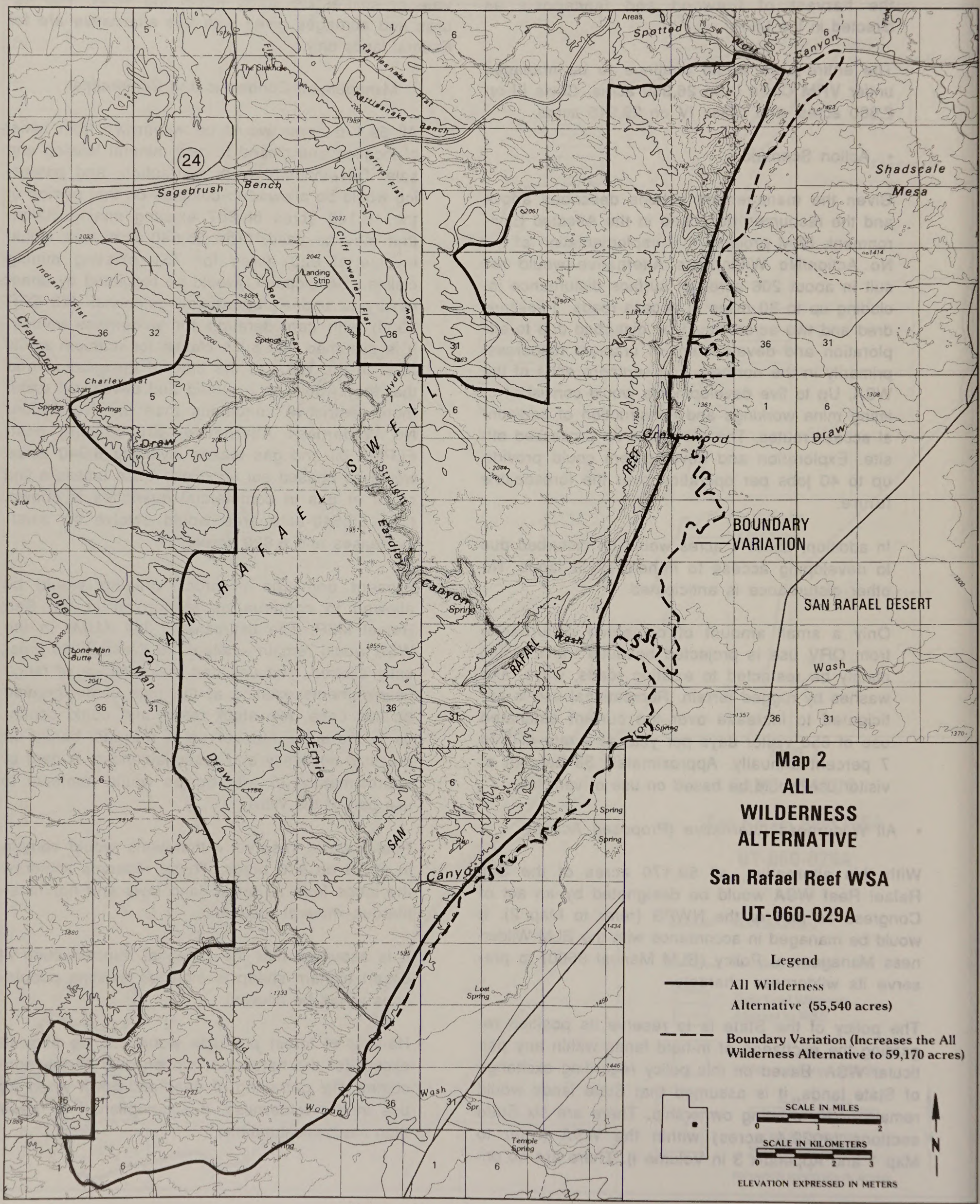
R. 12 E.

R. 13 E.

T. 22 S.

T. 23 S.

T. 24 S.



Map 2
ALL WILDERNESS ALTERNATIVE

San Rafael Reef WSA

UT-060-029A

Legend

All Wilderness Alternative (55,540 acres)

Boundary Variation (Increases the All Wilderness Alternative to 59,170 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

N

ELEVATION EXPRESSED IN METERS

The entire 59,170-acre area would be closed to ORV use except for users with valid existing rights, if approved by BLM in accordance with 43 CFR 8560 provisions, or for occasional and short-term vehicular access if approved by BLM for maintenance of approved rangeland development or water facilities. About 10 miles of existing vehicular ways and trails would not be available for vehicular use except as indicated above. This closure would affect the following ways including a 4-mile way south of Old Woman Wash, a 2-mile way south of Arson's Garden, and various trails in Iron Wash, Ernies Canyon, Straight Wash and in the drainage north of Temple Wash and Farnsworth Tanks. About 10 miles (or 15 percent) of the WSA boundary follow one short segment of I-70 and existing gravel roads that would remain open to vehicular travel.

Visual resources on 59,170 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 64 acres would be disturbed with the All Wilderness Alternative including up to 10 miles of access roads. About 60 acres will be disturbed with exploration and development of uranium under more restrictive conditions than the No Action/No Wilderness Alternative. Existing workings would be expanded and new access roads would be developed in the northern and southern portions of the WSA. The ore would be processed off site. Up to 20 jobs could be provided by each of the five projected operations.

In addition, up to 4 acres could be disturbed due to development of access to in-held State lands. No other disturbance is projected.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain.

Primitive recreational use is expected to increase above the current estimated use of 400 visitor days per year at a rate of 2 to 7 percent annually. Approximately 250 visitor days per year of motorized recreation and all potential increases would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA includes 59,170 acres. It is about 22 miles northeast to south and 6 to 8 miles east to west.

- Naturalness

The major imprints surrounding the San Rafael Reef WSA were eliminated by boundary adjustments during the BLM Intensive Wilderness Inventory. What remains are approximately 10 miles of ways, an oil drill site, and several tunnels and associated mining buildings and equipment.

A way, probably associated with mineral exploration, exists in the first drainage south of Old Woman Wash. The way is approximately 4 miles long and ends atop a bench. It is little used and substantially unnoticeable.

Another way, about 2 miles long, is located south of Arson's Garden. The way leads to an old drill site.

Both the way and drill site are recovering. However, there is some travel on the way.

Several other ways about 3.5 miles in total length exist in the WSA and are located in Straight Wash, the first canyon north of Straight Wash, in portions of Iron Wash, and the first major canyon north of Temple Wash (west side of the reef). The action of the washes has eroded the trails, making them substantially unnoticeable. Some ORV travel takes place

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SAN RAFAEL REEF WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives No Action/No Wilderness	All Wilderness (59,170 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 206 acres of the WSA because of uranium exploration and development and development of access to in-held State lands. These values would be indirectly reduced in quality on up to an additional 11,834 acres. Class A scenery would be reduced in quality in the disturbed and surrounding areas. Vehicular use of ways, future mining and access roads to State in-holdings, and other vehicular use would detract from naturalness and opportunities for solitude and primitive recreation in the WSA. ORV use would disturb wilderness wildlife, archaeological, and historic values.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 591 acres because of uranium exploration and development on valid mining claims and development of access to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 2,366 acres. Special features would be preserved overall, although Class A scenery could be reduced in quality in disturbed and surrounding areas.
Impacts on Soils	Soil loss from the WSA would increase by 3 percent (964 cubic yards per year) over the current rate. There would not be significant secondary off-site effects because the projected disturbance would not be along perennial streams and mitigation would be required.	With implementation of this alternative, soil loss from the WSA would be expected to increase by 1 percent (321 cubic yards per year) over the current rate. This would be 2 percent (643 cubic yards per year) less than with the No Action/No Wilderness Alternative.
Impacts on Vegetation	Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected because the 206 acres of projected surface disturbance would affect less than 0.4 percent of the vegetation in the WSA. Impacts from ORV use would be monitored and corrective measures taken should populations of threatened, endangered or other special status species be jeopardized.	Vegetation types and threatened, endangered, or other special status plant species would be protected by this alternative because projected disturbance would be reduced from 206 acres to 64 acres and ORV use would be eliminated. Appropriate inventories, clearances, and consultation with FWS would be completed prior to surface disturbance.

SAN RAFAEL REEF WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives No Action/No Wilderness	All Wilderness (59,170 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Mineral and energy exploration and production would not be affected because mineral leasing, location of mining claims and mineral developments would not be restricted for the protection of wilderness values.	Wilderness designation would limit potential exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. Although some production would occur, opportunities for production of an unknown portion of the uranium in th eWSA would be foregone. No other significant locatable or leasable mineral production would be foregone because the probability of development is low even if the area is not designated wilderness.
Impacts on Wildlife Habitat and Populations	About 0.4 percent (206 acres) of the wildlife habitat in the WSA would be directly disturbed and ORV use would continue. Populations of bighorn sheep, raptors, and special status species could be affected. Monitoring and enforcement of protective measures would be necessary.	Approximately 0.1 percent (64 acres) of the wildlife habitat would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude over the short and long term.
Impacts on Visual Resources	VRM class objectives would not be met on 0.4 percent (206 acres) because of uranium exploration and development and construction of access roads to State in-held lands. Visual quality would be reduced on the disturbed areas and on surrounding view areas.	VRM class objectives would not be met on 0.1 percent (64 acres) of the WSA because of uranium exploration and development and construction of access to in-held State lands. Visual quality would be reduced on the disturbed and surrounding areas but would be preserved on the remainder of the WSA.
Impacts on Cultural Resources	Impacts due to surface disturbance are expected to be minimal because only 0.4 percent (206 acres) of the WSA would be disturbed and mitigation would be required. Intentional or unintentional damage to archaeological sites may occur due to continued vehicular access and ORV use. Cultural resource management would continue without regard for protection of other wilderness values.	Very little impact to cultural resources is expected under this alternative because potential disturbance would be reduced from 206 to 64 acres and ORV use would not be allowed. Cultural resource management may be limited in scope and execution in order to preserve other wilderness values.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (59,170 Acres) (Proposed Action)
Impacts on Recreational Use	The quality of primitive recreation would be reduced on and near ORV-use areas and areas where other surface-disturbing activities occur. This could occur directly on 206 acres and indirectly on up to 20 percent (11,834 acres) of the WSA. Both primitive and motorized recreational use would increase by 2 to 7 percent annually over the next 30 years.	Primitive recreational values in the WSA would be protected and primitive use would increase at a rate of 2 to 7 percent annually over the next 30 years. The quality of primitive recreational use would be directly reduced on 0.1 percent (64 acres) and indirectly reduced on up to additional 4 percent (2,366 acres) of the WSA. Up to 2,179 visitor days of motorized recreational use per year would be precluded. Much of the existing recreational use is based on vehicular access and overall recreational use would temporarily decline following wilderness designation.
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 3.0 percent (200 jobs) by the year 2010. Recreation-related expenditures would contribute up to $23,226 annually to the local economy by the year 2020. Livestock grazing would contribute $26,880 annually in livestock sales and $2,070 in Federal revenues. Present and future oil and gas leases could contribute up to $115,800 annually in Federal and State lease revenues.	Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Up to 100 fewer jobs would be provided by locatable mineral activities with this alternative. Recreation-related expenditures could contribute up to $14,293 annually at the end of 30 years. Livestock grazing would continue to contribute $26,880 annually in livestock sales and $2,070 in Federal revenues. Up to $115,800 in Federal and State lease revenues would be foregone each year.

in the wash bottom. However, after flooding, evidence of use is erased.

Two tunnels and associated mine shacks are located in two drainages along the northeast half of the Reef. The imprints look old enough to be historic and they blend into their primitive environment. Also, an old-time drill rig is located near a way north of Ernies Canyon. The way totals about a 0.5 mile in length, and both the way and rig are substantially unnoticeable within the WSA.

These imprints in total cover about 2,800 acres (less than 5 percent) of the WSA. The remaining acreage (56,370 acres) is essentially untouched. Both areas meet the naturalness criterion for areas under wilderness review. Therefore, the entire 59,170-acre WSA is considered natural in character. No surface-disturbing activities have occurred since the wilderness inventory, and naturalness has not been affected.

- Solitude

The WSA offers outstanding opportunities for solitude. The many incised drainages through the reef offer passages for the user to experience seclusion and isolation. The twisting character of the canyons and 10 foot to 1,000 foot cliffs effectively shroud lines of sight and suppress sounds for any substantial distance within these canyons. Off-site intrusions and influences are essentially nonexistent within these canyons.

The higher reaches of the WSA, consisting of sandstone knobs, petrified dunes, checkerboarded mesas, and the reef's jutted fins, are intermittently open and provide vantage points. To the east is the San Rafael Desert, to the west is the mesa of the swell, and to the north and south is the sawtooth ridge of the reef. Vegetation cover is sparse in some areas and does not effectively screen visitors. The rolling terrain and immense topographic character of the area allow for separation and the feeling of seclusion. With an expansive view of the surroundings, a user can experience the feeling of remoteness.

From specific points within the WSA, several dirt roads and traffic on U-24 (3 miles east) and I-70 (adjacent to the northern boundary) can be seen outside the WSA. Their observation is not necessarily intruding and may actually, as a comparison, emphasize the remoteness of the users' recreational experience. Within a 0.25 mile of I-70, sounds from traffic are very noticeable. Because of these sounds, the opportunity for solitude in this part of the WSA is less than outstanding. During the spring months, the sounds from ORV activity near the southern boundary of the WSA are also imposing.

Overall, in 99 percent of the WSA (58,578 acres), the opportunities for solitude meet the outstanding criterion for areas under wilderness review. The remaining 1 percent (592 acres) does not meet the solitude criterion.

- Primitive and Unconfined Recreation

Educational groups, rock hounders, and backpackers currently use the WSA as an instructive and recreational experience. Trips involve hiking the canyon drainages through the reef. Historic, prehistoric, and geologic qualities are observed and studied.

During the spring holidays, recreationists travel to the desert to enjoy the warm weather. ORV use, the main recreational activity, is concentrated adjacent to the southern portion of the WSA and some visitors venture into portions of the WSA along the eastern boundary. Due to the restrictive character of the WSA's topography, many of these recreationists explore the area by foot. Outstanding opportunities for hiking, backpacking, rock scrambling, art, photography, and scenic viewing await these explorers.

Many isolated pools of water provide contrast to the dry, desolate character of the WSA. The dramatic nature of the reef's formations with its sheer-walled cliffs, pinnacles, knobs, twisted canyons, colors, and historic and prehistoric remnants all contribute to a high quality recreational experience.

The unusual topographic character of the WSA adds to outstanding hiking, rock scrambling, and camping. Also, the presence of water sources, a rare collectable agate, and several other outstanding recreation opportunities allow the entire WSA (59,170 acres) to meet the standards for outstanding opportunity for primitive and unconfined recreation.

- Special Features

The canyons of this WSA offer many exposed geologic strata and formations, including arches, caves, and narrow textured passageways. The upper reaches provide dramatic views of the vertical rise of the San Rafael Reef and its many fins and folds. The rare

grape agate is another value within the WSA thought to be found in only a few places in the country.

Few prehistoric sites have been recorded; these are represented by small pictograph or petroglyph panels and small habitations in rock shelters. Evidence of old mining activity can be found near the northeastern and southwestern boundaries of the WSA. Shacks, cabins, and mine shafts dot the area, providing a historic flair to the natural surroundings. Evidence of the old Green River to Hanksville wagon trails also add historic significance to the WSA.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are two animal species (black-footed ferret and peregrine falcon) and two plant species (Maguire daisy, Erigeron maguirei var. maguirei, and Wright fishhook cactus, Sclerocactus wrightiae) listed as endangered that occur or may occur in the WSA. The Jones cyclodenia, Cyclodenia humilis var. jonesii, is a threatened species that occurs within the WSA. Also, the Last Chance townsendia, Townsendia aprica, is a threatened species that may occur in the WSA.

There are nine animal species and five plant species that are considered sensitive that occur, or may occur, in the WSA. Cougar and desert bighorn sheep, which are wildlife species associated with wilderness, are found in the WSA. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

Approximately 45 percent (26,626 acres) of the WSA is rated Class A for scenic quality.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the potential natural vegetation (PNV) types of juniper-pinyon woodland, saltbush-greasewood, and galleta-threeawn shrub steppe.

Refer to the Vegetation Including Special Status Species section for more discussion of ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the, Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is a PSD Class II area and currently meets Class II air quality classification as per the 1977 Clean Air Act Amendments. The nearest Class I area is Capitol Reef National Park, located approximately 23 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and the Green River-Moab area. Large point sources include powerplants in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, I-70, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles (Aerocomp, Inc., 1984).

Geology and Topography

The San Rafael Reef WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. The WSA lies along the eastern flank of the San Rafael Swell. During the Eocene Epoch, the area began to be uplifted, creating a bulge in the existing sedimentary formations. A period of erosion began, carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, which resulted from the uplifting, is a breached, doubly plunging anticline that forms a prominent north-trending uplift on the Colorado Plateau. Geologic formations outcropping in the WSA range from the Jurassic Curtis to the Pennsylvanian Hermosa Formation. A brief description of the exposed formations in the WSA follows, listed in order from oldest to youngest.

The Hermosa Formation, found in the central part of the WSA, consists of limestone with sandstone, shale, and evaporites. The formation contains the Paradox Member (an evaporite series) that thickens to the east.

Also found in the central part of the WSA is the White Rim Sandstone. This formation consists of white to buff, fine-grained, cross-bedded, massive, eolian sandstone with limestone occurring at the base.

The Kaibab Limestone is a light gray to brown, sandy, cherty limestone. This formation is found in relation to the White Rim Sandstone within the WSA. It contains many chert nodules with quartz and calcite crystals.

The Moenkopi Formation is also found in the central part of the WSA. It is composed of cross-bedded, medium-grained sandstone with lenses of conglomerate and variegated shale. Silicified and carbonized wood are common along what is considered the reef's backside in the Chinle Formation. Important vertebrate fossils may also be found in the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and intertongue. The formation is a uranium producer and is composed of four members (Temple Mountain, Monitor Butte, Mossback, and Church Rock).

The Wingate Formation lines the cliff faces. It consists of buff, orange, and brown massive cross-bedded, medium-grained sandstone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls.

The Carmel Formation forms the eastern base of the WSA. It consists of brown to gray, sandy limestone, red, thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

The northeastern boundary of the WSA is made up of a small portion of the Entrada Sandstone and Curtis formation. The Entrada consists of red-brown, massive sandstone in its upper part and thin-bedded sandstone and red shale in the lower part. The Curtis Formation consists of red-brown to green-gray thick-bedded sandstone and green-gray conglomerate.

The formations dip from 20 degrees to 80 degrees to the east-southeast. The more resistant and steeply dipping formations form hogbacks, or monoclines, known as the San Rafael Reef. Elevations range from 4,800 feet along the base of the reef to 6,600 feet in the upper reaches of the central and northern areas.

Soils

The WSA contains four general soil mapping units differentiated by rock fins, canyon floors, hogbacks, and the lower portion of the reef. Although wind may be an erosive agent, especially on the sandy soils at the base of the San Rafael Reef, water is the primary agent of erosion in the WSA. Vegetation offers fairly good groundcover, except on the reef where the exposed bedrock resists erosion. Precipitation is light, but it tends to occur in short, intense summer thundershowers that can dislodge and transport a great deal of soil. Refer to Table 2 for a summary of soil characteristics and land types and to Table 3 for erosion condition.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock Outcrop	34	20,091	0.0	0
Shallow loamy soils on moderately steep cuestas	40	23,636	1.0	10
Deep stony soils on steep canyonsides	10	5,909	1.0	10
Deep loamy soils on gently sloping structural bench	16	9,534	0.1	1
Totals	100	59,170		

Source: Hansen, 1985.

The soils within the WSA have an estimated annual salt production of 52 lbs per acre. About 20 percent (11,835 acres) of the WSA is classified strongly saline, 35 percent (20,709 acres) slightly saline, and 45 percent (26,626 acres) nonsaline.

Seeding suitability is fair to good on approximately 20 percent (11,835 acres) of the WSA where loamy soils are located. The remaining 80 percent (47,336 acres) is unsuitable for seedling establishment due to shallow soils, rock outcrops, and steep slopes.

Vegetation Including Special Status Species

The major vegetation types in the WSA are pinyon-juniper woodland/desert shrub, pinyon-juniper

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	50	29,545	295,450
Medium	5.0	-	-	-	-	-	-
Low	1.0	50	29,545	29,545	16	9,534	9,534
Very Low	0.1	16	9,534	953	-	-	-
None	0.0	34	20,091	-	34	20,091	-
Totals		100	59,170	30,498[a]	100	59,170	304,984[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic-yards per acre, 0.52 under present conditions; 5.2 if disturbed.

woodland/grasslands, and grasslands (refer to Table 4). A barren type makes up the remainder of the WSA. The barren areas, such as cliff faces and rocky slopes, are where there is no natural vegetation, or practically none.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper/desert shrub	45,036	77
Pinyon-juniper/grassland	3,314	5
Grassland	4,640	8
Barren	6,180	10
Total	59,170	100

Source: USDI, BLM, 1989

The pinyon-juniper woodland/desert shrub type is found on the foothills and mesas and other areas of relatively high elevation and precipitation in the WSA. Dominant species are pinyon pine and Utah juniper. The pinyon-juniper woodlands stop at lower elevations due to low precipitation, high temperatures, and salty substrate. The woodlands are replaced by the desert shrubs along the eastern boundary of the WSA. Desert shrubs belonging to the Chenopodiaceae and Compositae families make up the majority of vegetation and include Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants include curly grass, Indian ricegrass, sand dropseed, sandhill muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell area, including wavy leaf oak, sand sagebrush, and purple sage.

The grassland type is distinguished by a predominance of grasses over shrubs. The major grasses are curly grass, blue grama, Indian ricegrass, and sand dropseed. Other grasses include western wheatgrass, Fendler threeawn, needle-and-thread, and squirreltail. Other common plants found in the grassland type are shadscale, Mormon tea, black sagebrush, rabbitbrush, and snakeweed.

As the name implies, the pinyon-juniper/grassland type is comprised of pinyon-juniper woodland and grassland species such as curly grass, blue grama, Indian ricegrass, dropseed, and the other species listed for the grassland type.

There are no riparian areas within the WSA.

The San Rafael Swell, of which the WSA is a part, provides suitable (or potential habitat) habitat for a large number of rare plant species. Nine special status species may occur in the WSA (refer to Table 5).

The San Rafael Reef WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA are listed on Table 6.

Water Resources

The San Rafael Reef WSA is within the San Rafael River drainage which is a tributary to the Green River in the Upper Colorado River hydrologic subregion.

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Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenia humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barnebyi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 in Volume I

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	13,885	23
Saltbush-greasewood	9,783	17
Galleta-threeawn	35,502	60
Total	59,170	100

Source: USDI, USGS, 1978.

All 22 perennial waters in the WSA are either springs or water holes, mostly located along the base of the San Rafael Reef. There are no perennial streams in the WSA. There are also an undetermined number of small, unmapped slickrock potholes along the crest of the reef.

Water is used primarily by wildlife and domestic livestock. There are two stock reservoirs in the WSA.

The WSA is within Water Right Adjudication Area 93. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed time applications may exceed 0.015 cfs in certain areas. There are no areas of significant groundwater development in this drainage area.

The water quality standards for the San Rafael River and tributaries, from the confluence with Green River to the confluence with Ferron Creek, are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Water quality data are lacking for this area. All of the slickrock tanks or water holes and most of the springs are contained in a small basin and do not flow except during severe storms. Water may be stagnant with algae bloom and die-off cycles. Salinity, taste, and coliform bacteria may present a problem for human consumption.

Mineral and Energy Resources

The mineral and energy resource rating summary for the San Rafael Reef WSA is given in Table 7. Appendix 5 in Volume I describes the mineral and energy resource rating system.

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic-feet of natural gas
Tar Sand	f2	c4	Less than 10 million barrels
Potash	f2	c2	Less than 1 million metric-tons
Geothermal	f2	c1	Low temperature
Uranium/Vanadium	f2	c4	Less than 500 metric-tons of uranium oxide
Manganese	f2	c1	Less than 100,000 metric-tons of 40-percent manganese
Copper	f2	c2	Less than 50,000 metric-tons of contained copper

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

The WSA may contain deposits of vanadium, manganese and copper that are currently listed as strategic and critical materials (USDoD, 1988). Although copper is listed as strategic, it is relatively common and supplies currently exceed domestic demand.

• Leasable Minerals

There are no known deposits of any leasable minerals in the WSA. Currently, there are no active drilling, mining or exploration activities for leasable minerals.

• Oil and Gas

The San Rafael Swell is a structural trap. The interior of the swell has been eroded away, allowing any petroleum contained in the structure to escape. The swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the swell. The Ferron gas field, 20 miles northwest of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic-feet of natural gas and 38,771 barrels of petroleum. The field's producing formations do not occur in the WSA. The Last Chance gas field, 18 miles to the west, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability of the rock. Examples include channel sands, sand leases and pinchouts, and organic reefs. The Grassy Trail field, 37 miles to the north, is an example of a stratigraphic trap or change in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

One oil and gas well was drilled in the WSA. The well was drilled to a depth of 2,218 feet, plugged, and abandoned on July 29, 1957. Four other oil and gas wells were drilled from a 0.25 mile to 1 mile from the WSA. All four were drilled, plugged, and abandoned between 1921 and 1970. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. Therefore, it is felt that any oil and gas occurrences in the WSA would probably be small pools and/or fields. Traps occurring in the WSA could be either stratigraphic or structural (due to small faults). The WSA is probably too far from the center of the swell to contain much, if any, petroleum within the older (Mississippian, etc.) formations because the petroleum collects in the apex of anticlines. However, this does not rule out traps due to faulting.

The favorability rating of (f2) indicates that a potential exists within the tract for less than 10 million barrels of oil or less than 60 billion cubic-feet of natural gas (SAI, 1982). The certainty level of (c1) indicates there are no direct data available to support or refute the occurrence. Positive evidence of resource occurrence is far removed from the tract or is on a trend considered unrelated to the geology of the tract.

The established BLM oil and gas categories for the 59,170-acre are listed in Table 8 (USDI, BLM, 1975a). Currently, six post-FLPMA oil and gas leases cover 6,940 acres in the WSA.

Table 8
Oil and Gas Leasing Categories

Category		Acres	Percent of WSA
1. Open		33,140	56
2. Open with special stipulations		0	0
3. Open with no surface occupancy		24,750[a]	42
4. No leasing		1,280	2
	Total	59,170	100

Source: USDI, BLM, 1975a.

[a] All additional 3,630 acres added with the boundary modification are under Category 3.

• Tar Sand

The San Rafael Swell Special Tar Sand Area (STSA) was designated in 1982. The STSA is 130,292 acres in size, of which about 1,920 acres are within the northern portion of the San Rafael Reef WSA. The oil and gas leasing categories were amended to apply to the tar sand resource in the STSA (USDI, BLM, 1984c). Of the 1,920 acres in the WSA, 320 acres are in Category 1 (standard stipulations), 320 acres are in Category 3 (no surface occupancy), and 1,280 acres are in Category 4 (no leasing). No applications were filed to convert existing oil and gas leases in the San Rafael Reef WSA to combined hydrocarbon leases as provided for by the Combined Hydrocarbon Leasing Act (Ninety-Seventh Congress of the U.S., 1981). However, the tar sand resource could still be leased in the future through a competitive leasing process.

The low favorability rating of (f2) for tar sand indicates a possibility for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. The high certainty level (c4) recognizes oil-impregnated rocks are in the WSA, regardless of the associated favorability (SAI,

1982). It is unlikely the tar sand within the WSA will be developed due to small-sized deposits, scarcity of water, and distance to the nearest railhead or pipeline.

- Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousands of feet thick in the area of Moab where potash is produced commercially. The formation thins considerably to the west and is reduced to a thickness of 500 feet or less in the San Rafael Swell.

The low favorability rating (f2) indicates that, if deposits occur in the WSA, they will contain less than 1 million metric-tons of potash. The certainty level of (c2) implies that no direct data occur within or very near the WSA, although the WSA is within a recognized evaporite basin (SAI, 1982). The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it unlikely that the potash resource in the WSA would be developed.

- Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal resource associated with the WSA is low temperature thermal waters (between 20 and 90 degrees Centigrade (C)). Water extracted at these temperatures can be used for direct heating purposes. The geothermal resource potential is rated as low (f2/c1) (SAI, 1982). It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource and the associated high drilling costs.

- Locatable Minerals

There are presently 807 mining claims covering 16,140 acres within the WSA.

- Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These deposits are generally small (1,000 to 5,000 metric-tons of ore) and scattered. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock members. Ore is found primarily in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member.

Other minerals associated with uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable.

The southern belt, which runs through the southernmost part of the WSA, is most favorable for the occurrence of ore deposits. Moderate and large-size ore bodies are found in the southern belt which roughly parallels the Muddy and Dirty Devil Rivers (Hawley, et al., 1968). Also, the ore bodies of the small Temple Mountain District, located a few miles south of the WSA, occur chiefly in the Chinle Formation. Some of the deposits contain 10,000 metric-tons or more of uranium and vanadium ore in tabular bodies and as rolls. Small ore bodies are also contained within the curious collapse structures that occur throughout the Temple Mountain District. These structures are plug-like masses up to 3,000 feet in diameter, consisting of a central core of infolded strata and brecciated rock. They are derived presumably from the collapse of overlying formations into subsurface voids resulting from dissolution of carbonates and salts (SAI, 1982). The majority of the mineral production activity has come from the Temple Mountain Mine located adjacent to the southern boundary of the WSA.

Smaller ore bodies (5,000 metric-tons and less) occur in the northern belt, which is more favorable for uranium occurrence than the southern belt. The northern belt parallels the San Rafael River and reaches into the northern part of the WSA. The Cliff Dweller Mine, located in the WSA, produced 268 metric-tons of ore up to 1973.

The Chinle Formation outcrops from the northeastern to the southwestern portion of the WSA, and dips to the east under the overlying formations. Within the outcrop, it is felt that most of the surface deposits have been located. Remaining deposits are likely to occur in the subsurface where exploration drilling would be required. Extraction costs would be greater in the western areas and would probably be less attractive.

The east-central part of the San Rafael Swell is considered relatively unfavorable for uranium and vanadium based chiefly on the lack of channels and the thick, massive character of some of the otherwise favorable host rocks (such as the Mossback Member), and also because the area lacks folds and altered rock (SAI, 1982). On this basis and because of the large amount of past exploration in this area, the uranium/vanadium favorability is rated as low (f2) indicating less than 500 metric-tons of uranium oxide with a high degree of certainty (c4) (SAI, 1982).

- Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville Formations. The nearest deposits are 14 miles east of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low favorability rating of (f2) indicates a deposit size of less than 100,000 metric-tons of 40 percent manganese. Also, the WSA is favorable for only very small accumulations, several tons at the most. The certainty that manganese will occur is (c1) (SAI, 1982).

- Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is the Copper Globe Mine located about 1 mile south of the Devils Canyon WSA (approximately 15 miles west of the WSA). The mine produced two or three tons of ore during World War I and has only produced mineral specimens and jewelry pieces since then.

The favorability rating of (f2) indicates a low potential for copper deposits in the WSA and, if found, these would be small in tonnage (less than 50,000 metric-tons of contained copper) (SAI, 1982).

- Gypsum

The Carmel Formation is reported to contain an 8-foot thick bed of high grade gypsum in the northeastern portion of the WSA. BLM data indicates a moderate potential of occurrence. If a deposit does exist within the WSA, it would be moderate in tonnage (5 to 100 million metric-tons). It is unlikely that any gypsum would be developed due to the distance of mines to their market and the lack of cheap transportation.

- Glass Sands

High quality silica sand deposits suitable for making glass are suspected in the northwestern portion of the WSA. Exploration drilling has been adjacent to the WSA boundary but the potential quantity and quality of the deposit are unknown.

- Salable Minerals

No known salable minerals are found in the WSA, although a sand and gravel resource is probable. If present, salable minerals would not be of economic significance because of the presence of ample similar materials in other areas.

Wildlife Including Special Status Species

The San Rafael Reef WSA provides habitat for a limited variety of wildlife species. Except for several springs and deep water holes, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock potholes are a good source following rains, but they cannot be relied on by wildlife because of drying out during extended drought periods. During the winter, snow can provide water when available. Vegetation is also limited due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer (less than one deer per square mile). Desert bighorn sheep were reintroduced into the WSA during January 1983 and January and February 1984. Pronghorn antelope occur east of the WSA and may utilize the WSA. A bull buffalo was sighted adjacent to the WSA in 1982.

UDWR and BLM have designated 27,311 acres in the WSA as high-priority desert bighorn sheep habitat. The remainder of the WSA (31,859 acres) is limited-value desert bighorn sheep habitat. Lambing and rutting grounds, along with water sources, are considered critical habitat. These habitats are currently being inventoried and their acreages are unknown at this time. The majority of these critical habitats occur within the WSA's high-priority desert bighorn sheep habitat. Currently, the WSA provides 50 percent (27,311 acres) of the habitat for the desert bighorn sheep in the South San Rafael Herd. About 50

percent (approximately 70 animals) of the herd resides in the WSA.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, blacktail jackrabbits, woodrats, ringtails, badgers, Ord kangaroo rats, gray foxes, kit foxes, white-tail antelope, ground squirrels, chipmunks, rock squirrels, bats, mice, and voles.

Habitat for various small bird species is found within the WSA. Species diversity and population sizes are small due to the lack of diverse habitat. The San Rafael Reef, along with various cliffs and canyons, provides many nesting, roosting, and foraging opportunities for birds. Few individual raptors are found in the WSA. Of those present, golden eagles, prairie falcons, American kestrels, red-tailed hawks, ferruginous hawks, and rough-legged hawks (winter residents) are the most common. Chukars are found in the WSA and are dependent on available water. Mourning doves are also found in this WSA.

Several species of snakes and lizards can be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, western rattlesnakes, and western terrestrial garter snakes are the most common snake species. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Cougars may occasionally visit the area, but with low deer numbers this would be a rare occurrence. No documented sightings are recorded.

No fish species occur in the WSA. Tadpole shrimp (a crustacean) may be found in some potholes.

The peregrine falcon (an endangered species) is a possible visitor to the WSA, although no sightings in the WSA have been recorded. The most likely place to find peregrines would be the Straight Wash drainage. The FWS has also identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle, a sensitive species recognized by BLM, occurs within the WSA. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, southern spotted owl, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

There are no proposed or existing wildlife management facilities within the WSA.

Forest Resources

The pinyon and juniper trees are found in sparse quantity within the WSA on about 48,350 acres. None of the woodland is considered to be of commercial quality. Because of the remoteness and the availability of woodland products closer to population centers, harvest has been minimal and is not expected to increase in the foreseeable future.

Livestock and Wild Horses/Burros

Table 9 contains livestock grazing use data for this WSA.

Table 9
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Big Pond	24,590	11,526	2,240	362	15 Cattle 1,582 Sheep	10/01-03/31 05/11-06/20	1
Black Dragon	49,640	20,122	3,223	410	644 Cattle	11/01-04/15	1
Georges Draw	12,690	4,661	988	262	1,663 Sheep	10/01-02/28	1
Iron Wash	130,510	20,269	4,980	240	498 Cattle	09/01-06/30	1
Taylor Flat	37,500	2,592	2,016	70	50 Cattle 1,430 Sheep	11/01-04/30	2
Total	254,930	59,170	13,447	1,344			6

Source: BLM File Data.

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The San Rafael Reef WSA contains portions of five grazing allotments. Grazing was authorized in all five allotments prior to the passage of the FLPMA. All allotments in the WSA are administered by the San Rafael Resource Area of the Moab District.

Range developments in the WSA are limited to two stock reservoirs (neither are functional at present). At present, there are no plans for additional range developments in the WSA.

Livestock operators use about 3 of the 10 miles of way for livestock management (salting, etc.). One sheep camp which is located on the border of the WSA is in the Taylor Flat Allotment.

There are no known herds of wild horses that frequent the WSA. A small herd of wild burros (35 animals) can often be found in the northwestern portion of the WSA.

Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the San Rafael Reef WSA (USDA, APHIS, 1988). However, sheep losses have occurred adjacent to the WSA and predator control has taken place there.

Visual Resources

The most outstanding visual features of the San Rafael Reef WSA are the deeply carved drainages and the sawtooth ridge of the reef itself. Rising at a near vertical angle from the desert floor, huge upturned sandstone fins dominate the scenery for over 12 miles of the WSA. Deep-cut canyons add additional character to an already unique desert scene. There are few views within the reef that do not involve a panoramic scene into a deeply cut canyon or an enclosed view dominated by a vertical red sandstone wall or tremendous fin.

The vertical rise of the reef is best displayed in the northeastern half, from Straight Wash to I-70. Behind the reef to the west lies a narrow valley bordered on both sides by a mass of uplifted land. To the east are the colorful terraces of the reef's backside. To the west is a jumbled congregation of rocks, slides, and talus slopes.

The southeastern half of the reef is cut many times by twisted and colorful drainages. The reef takes on a more rolling character here, with large domes and mounds of slickrock rather than fins. Vertical red sandstone walls line the drainages, nearly meeting and forming very narrow passages.

The central and northern portions of the WSA are characterized by a checkerboard pattern of rust, tan, and orange colored sandstone slabs, criss-crossed by fault and fracture lines. Green vegetation dots the area, adding an element of color and variety to the texture.

The WSA is classified as having Class A scenery along 26,350 acres of the reef and its major drainages (Roy Mann Associates, 1977). These areas contain the most outstanding characteristics of the physiographic region. The northwestern part of the WSA (8,320 acres) is classified as having Class C scenery and the southwestern portion (24,500 acres) as having Class B scenery. Class C scenery contains rolling terrain and very little variation in landform. Class B scenery has interesting erosional patterns and some steep canyons. Both the Class B and C areas have been rated medium in sensitivity, except for a portion along I-70 where a scenic corridor is rated high for sensitivity. These medium sensitivity areas are also seldom seen. A high sensitivity level is given for the reef. Based on these factors, the San Rafael Reef WSA is managed according to VRM Class II on 26,350 acres, Class III on 2,880 acres, and Class IV on 29,940 acres. An explanation of the BLM VRM system can be found in Appendix 7 in Volume I.

Cultural Resources

One 10-acre parcel of land located in the WSA has been inventoried for cultural significance. One site was located during the inventory. The site has been recorded as a rock art panel and cave. Five other sites have been recorded in the WSA. Three of these sites contain rock art. The other two sites contain rock art, features, and artifacts. These sites have not been evaluated by an archaeologist, nor have they been nominated or listed on the National Register.

It is believed that the many drainages of the reef may contain archaeological sites, some of which could be eligible for National Register nomination.

Located along the WSA's eastern boundary are the Green River-Hanksville roads. During the early years of this century, the mail was carried by horseback through the desert from Green River to Hanksville. This trail was the most direct route, but the soils were too sandy for use by wagons. As a result, the wagon routes between the two towns were placed on

the firmer soils close to the reef. It is believed that one route, close to the reef, was utilized for heavy freight wagons. The other trail, located somewhat to the east, was used by light wagons. In some sections of the WSA there is evidence of this early trail on the ground (Iron Wash), but substantial portions of the trail have been bladed or otherwise recently utilized.

Recreation

The majority of the recreational use occurs along the eastern boundary of the WSA, as well as in several drainages that cut through the San Rafael Reef. The main recreational activities known to occur within the WSA are hiking, backpacking, cultural exploration, and educational study. This use is estimated at over 400 visitor days per year. Motorcycle riding and four-wheel driving are popular activities in the southern and eastern portions of the WSA. Occasionally motorcyclists ride through the major drainage north of Temple Wash and Farnsworth Tanks. However, the canyon is narrow and access is difficult. ORV use is associated with the 10 miles of ways in the WSA and 10 miles of road along the boundaries. Sometimes the mouths of canyon drainages are used by ORVs. Trails run from Temple Wash to Iron Wash along the first drainage south of Old Woman Wash, in Iron Wash and Straight Wash, and north approximately 1 mile from Greasewood Wash to I-70. The majority of the ORV use occurs during the spring months, usually concentrated on the Easter weekend. Recreationists use the desert and Goblin Valley State Park south of the WSA as camping areas. The exact number of ORV riders using the WSA is unknown. However, public concern and interest in the area has been high. It is estimated that the area receives about 250 visitor days of ORV use per year.

The WSA has been used by educational groups. Most of the interest is related to the area's unique geology which attracts college students from many states to study the San Rafael swell and reef.

The historic significance of the wagon roads and mail route in the WSA have already caught the interest of some recreationists. An organized motorcycle race, the Mail Run, has been held for 8 of the past 10 years. The 100-mile course roughly parallels the old mail route outside of the WSA. Other recreationists come to the area to search for the routes.

Rock collecting is another recreational activity pursued within and near the WSA. Greasewood Draw has been identified by local representatives of the Utah Federation of Gem and Mineral Societies as containing extremely rare values.

This area offers grape agate, selenite crystals, and jasper. The density of collectable materials is relatively low, but grape agate is extremely uncommon. Greasewood Draw is apparently one of the few locations in the country where it can be found.

Under the San Rafael MFP, ORV designation for the 59,170-acre WSA is open in accordance with 43 CFR 8560.

There are no recreational facilities within the WSA. Evidence of the early mining exploration is present. Several shafts and tunnels can be found along the reef and associated trails can be followed into drainages and canyons. Approximately 8 miles south of the WSA is Goblin Valley State Park, a recreational fee area that provides 15 camping sites, a restroom, foot trails, and a ranger station. The State park emphasizes recreational use of the San Rafael Swell and the San Rafael Reef WSA with printed material, slide shows, and talks. Most of this information caters to the ORV user or passenger vehicle recreationist.

The amount of recreational use occurring in the WSA is not known. User statistics show the surrounding desert and Goblin Valley State Park receive over 4,000 recreationists on Easter weekend. If even a portion of those using the surrounding area were to venture into the WSA, in addition to those already taking advantage of it, a large user number could result.

The San Rafael Reef WSA offers the recreationist a variety of experiences such as hiking, backpacking, rock scrambling, cultural exploration of narrow, twisting canyons, and wildlife viewing. The canyon system in the WSA could provide a variety of loop trips, both easy and challenging. Various pools, arches, and slickrock gardens add to the interesting visual character of the area and complement the recreational experience.

In summary, while no actual use figures are available, recreational use in the WSA is currently estimated at 650 visitor days annually. No visitor days are related to commercial outfitting. Approximately 62 percent of the use (400 visitor days) is attributed to primitive recreational activities. Approximately 38 percent (250 visitor days) are attributed to ORV activity.

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Land Use Plans

The WSA is BLM-administered public land except for six State sections (4,029.4 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding the exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. Of the 4,029 acres of in-held State land, 639 acres are under lease for oil, gas, and hydrocarbons, and all 4,029.4 acres are leased for grazing (UDNRE, DSLF, 1988).

The area is identified for multiple-use management by the San Rafael MFP (USDI, BLM, 1979a). Wilderness is not addressed in the MFP. However, wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

The Emery County Zoning Plan (Emery County Board of Commissioners, 1984) classified the WSA as potential future mining and grazing land. In addition, the Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation for BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is located in south-central Emery County. The two closest communities are Green River (about 8 road miles east of the WSA) and Hanksville (about 30 miles south of the WSA). These communities are the main gateways to the WSA. Hanksville is in Wayne County and Green River is in Emery County.

Table 10 shows the baseline and projected total population data for Emery County.

Table 10
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980 the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired powerplants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for a 21-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends throughout the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910) and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is separated from the western part of Emery County by the San Rafael swell.

Emery County contains 4,449 square miles of land. About 82 percent (3,648 square miles) of the county is owned by the Federal government, 11 percent (489 square miles) by the State, and 7 percent (312 square miles) by private interests.

- Employment

Table 10 shows the baseline and projected total employment for Emery County to the year 2010.

Coal mining and operation of the Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's most important sources of employment. The local economy is most affected by changes in the coal market and have had periods of boom and bust. Green River has not grown in the past 30 years. Major employment for Green River includes mining, government, agriculture, and tourism.

Emery County is part of the Southeast Multi-County District (MCD). Table 11 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent and that services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture and construction

sectors will decline (Utah Office of Planning and Budget, 1987).

Table 11
Southeast Multi-County District Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Past activities in the WSA that could have local economic consequence include mineral activities, livestock production, and dispersed nonmotorized recreation. Table 12 summarizes the local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 12
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$80,700	0
Oil and Gas Leases and Production	0	$13,880
Livestock Grazing	$26,880	$2,070
Recreational Use	$2,665	0
Total	$110,245	$15,950

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Limited production from mines and prospects within and adjacent to the WSA has brought an unquantified amount of income and employment to nearby residents. The amount of income and employment from this production would be low.

The WSA has about 807 mining claims. Regulations require $100 per claim expenditure for labor and improvements, an undetermined part of which is spent in the local economy. One oil and gas well has been drilled in the WSA over the past 30 years. This drilling generated an estimated 1.5 work years of employment over the past 30 years, some of which represent local employment.

Six livestock operators have grazing privileges in the WSA. Based on the use of 1,344 AUMs of forage by cattle, it is estimated that the WSA accounts for $26,880 of livestock sales, $6,720 of ranchers' returns to labor and investment, and a total $24,000 of income earned in the area.

The WSA supports private (both motorized and nonmotorized) recreation use. Use is low and recreation-related expenditures are locally insignificant. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that the Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. Total recreational use for the San Rafael Reef WSA is estimated to be 650 visitor days per year.

No woodland products are harvested from the WSA. Therefore, woodland harvest does not contribute to the local economy.

The WSA generates revenues to the Federal Treasury from two sources: grazing and mineral leasing. Based on 1,344 AUMs of forage allotted to livestock in the WSA, the WSA annually accounts for $2,070 of grazing fee revenues (at $1.54 per AUM) to the Treasury. One half of this amount ($1,035) is returned to the local BLM District for the construction of range improvement projects.

Within the WSA, about 6,940 acres are currently leased for oil and gas. At $2 per acre, this generates about $13,880 annually. Half of this, or about $6,940, is apportioned to the State of Utah. The State then distributes these revenues to various funds, the majority of which are related to mitigation of impacts from energy development.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and

anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the San Rafael Reef WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the BLM Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be protected on some areas by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on 26,350 acres and management under oil and gas leasing Category 4 [closed to leasing] on 1,280 acres, and oil and gas leasing Category 3 [no surface occupancy] on 24,750 acres).

In the foreseeable future, disturbance of approximately 206 acres caused by uranium exploration and development in the northern and southern portions of the WSA and development of access to State in-holdings would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Special features including geologic features, collectable minerals, archaeological and historical features, endangered and sensitive species, and wildlife associated with wilderness would not be significantly affected because the direct disturbance would involve only 0.4 percent (206 acres) of the WSA, and would generally not be located where the special features are located. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Refer to the Wildlife and Vegetation Including Special Status Species and Cultural Resource sections for more information. Some Class A scenery would be reduced in quality in disturbed and surrounding areas.

During the period of activity, the visual and audible disturbances from mineral exploration and development and from providing access to State in-holdings, would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 10 percent (5,917 acres) of the WSA could be so affected in the foreseeable future.

The continued and increased vehicular use of existing ways and canyon bottoms, etc., in the southern and eastern portions of the WSA would continue to detract from opportunities for solitude, primitive recreation and naturalness. As much as 10 percent (5,917 acres) of the WSA would be so affected. In addition, vehicular access could result in increased vandalism of archaeological and historical features, and increased disturbance of wildlife associated with wilderness. Refer to the Wildlife Including Special Status Species and Cultural Resources sections.

The gradual increase in visitor use would be expected to reduce wilderness values because much of the additional use would be vehicular in nature, which would conflict with opportunities for primitive recreation.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. However, loss would occur, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 206 acres, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 11,834 acres. Class A scenery would be reduced in quality in the disturbed and surrounding areas. Wilderness, wildlife, archaeological and historic values would be disturbed.

- Impacts on Soils

It is estimated that up to 206 acres of soil could be disturbed by mineral exploration and development and construction of new access to State lands. The average loss at present in the WSA is estimated to be about 0.52 cubic-yards per acre per year. Soil loss on areas that would be disturbed has been estimated to be 5.2 cubic-yards per acre per year. Therefore, soil loss on the 206 acres would increase from 107 cubic-yards to 1,071 cubic-yards per year. Soil loss would decrease as reclamation occurred. The time required for complete reclamation cannot be determined.

Maximum annual soil loss in the WSA would increase 3 percent from 30,498 cubic-yards to 31,462 cubic-yards per year. There would not be significant secondary off-site effects because the projected disturbance would not be along perennial streams and mitigation would be required.

Conclusion: With implementation of the No Action/No Wilderness Alternative, soil loss from the WSA increase by 3 percent (964 cubic-yards per year) over the current rate.

• Impacts on Vegetation Including Special Status Species

The projected 206 acres of disturbance in the foreseeable future would directly affect about 0.4 percent of the WSA and would not significantly impact the WSA's vegetation types. There is potential that the two threatened, three endangered and four Category 1 and 2 candidate plant species which may occur in the WSA could be impacted by continued ORV use (mainly in washes and canyon bottoms) and individual plants may be lost. However, the habitats of these species are widespread and extend beyond WSA boundaries. BLM would initiate intensive monitoring efforts and a public-awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation. There is also potential that individual special status plants could be disturbed by locatable minerals exploration and development. This situation would primarily exist where such mineral operations would occur on sites of 5 acres or less, where a plan of operations and approval are not required under 43 CFR 3809 regulations. The Endangered Species Act and subsequent regulations apply to these operations and any loss would be inadvertent. Before authorizing any surface-disturbing activities (mineral activities subject to 43 CFR 3809 regulations and access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened, endangered, or candidate species are located, BLM would initiate consultation with the FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of threatened, endangered, or other special status plant species populations would be preserved with the No Action/No Wilderness Alternative.

Conclusion: There would be no significant impacts to populations of threatened, endangered, or other special status plant species. Impacts from ORV use would be monitored and corrective measures taken should populations of special status plant species be threatened. While special status plant species populations would remain viable, the loss of some individual plants could occur. The 206 acres of projected surface disturbance would affect only 0.4 percent of the vegetation in the WSA; therefore, no significant impacts to vegetation types are projected.

• Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Including Special Status Species

With this alternative, wildlife species, particularly those sensitive to surface disturbance or human interference, could be adversely affected by possible surface disturbance due to locatable mineral exploration and development (202 acres), development of access to in-held State land (4 acres), and continued ORV use.

About 27,311 acres are considered high priority habitat for desert bighorn sheep.

There is a slight potential that individual animals of the two endangered and eight sensitive animal species that may occur in the WSA could be disturbed by locatable mineral exploration and development. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under the 43 CFR 3809 regulations. The Endangered Species Act and subsequent regulations apply to these operations and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the endangered or other special status animal species.

Prior to authorizing any surface-disturbing activities (locatable mineral operations subject to 43 CFR 3809 Regulations and development of access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with the FWS as required by the

Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of the threatened, endangered, or other special status animal species populations would be preserved with the level of mineral and access development that is projected. However, continued use of the WSA could adversely affect bighorn sheep and raptor nesting on cliff faces adjacent to vehicle-use areas. Intensive monitoring efforts would be initiated to determine if populations of these species, as well as others including threatened, endangered, or sensitive species which may occur in the WSA, would be lost with continued ORV use. BLM would also prepare a management plan which would consider various management options for habitat preservation.

Conclusion: About 0.4 percent of the wildlife habitation in the WSA would be directly disturbed and ORV use would continue. Populations of bighorn sheep, raptors, and special status animal species could be affected. Monitoring and enforcement of protective measures would be necessary.

- Impacts on Visual Resources

Even though mitigating measures would be applied to minimize the visual contrast created by intrusions, visual values would be degraded in areas directly affected by the estimated 206 acres of surface disturbance from locatable mineral and energy exploration and new access development. A perceived loss of visual quality would also occur in areas surrounding the disturbance. In VRM Class II areas, management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected. In VRM Class III and Class IV areas, management objectives would probably be met and the visual values would not be significantly affected.

Conclusion: VRM objectives would not be met on 206 acres within the WSA. Visual quality would be reduced on the disturbed and surrounding areas.

- Impacts on Cultural Resources

All sites in the unit would continue to receive protection under existing Federal and State antiquities laws. Any surface disturbance would be preceded by standard inventory and mitigation procedures; however, some sites, especially those that cannot be identified by surface inspection, may be inadvertently damaged or lost.

The WSA would remain open to ORV use and vehicular access under this alternative. ORV activity currently constitutes a major recreational use of the unit and may increase in the future. Some archaeological sites may receive unintentional damage as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of vehicular traffic. Artifacts may be broken or shallowly buried deposits may be disturbed and exposed to erosional processes. In addition, general vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens, et al., 1981).

With this alternative, archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without the restriction of wilderness value maintenance.

Conclusion: Impacts due to surface disturbance would be minimal because only 0.4 percent (206 acres) of the WSA would be disturbed. Intentional or unintentional damage to archaeological sites would occur due to continued vehicular access and ORV use. Cultural resource management would continue without regard for protection of other wilderness values.

- Impacts on Recreation

The entire 59,170 acres would remain open for ORV use as identified in the San Rafael MFP. Vehicular use would continue, mostly involving 10 miles of ways as well as washes. Primitive recreation values would not be enhanced or protected due to the lack of specific management goals. The quality of outstanding primitive recreation opportunities would be reduced on and near ORV use areas. The possible surface disturbance of 206 acres resulting from energy and mineral exploration and development and construction of new access to State lands would also reduce the quality of the recreation experience in the disturbed and adjacent areas.

The future trends in recreational use of the WSA are unknown. Based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Cordell and Hendee, 1982; Jungst, 1978; and Hof and Kaiser, 1981), it is

estimated that outdoor recreation in Utah will increase 2 to 7 percent per year over the next 30 years. At this rate, overall recreational use of the WSA is expected to increase from 650 current visitor days per year to be between 1,225 and 5,665 visitor days at the end of 30 years. Of this amount, ORV activity would increase from 250 visitor days to between 471 and 2,179 visitor days. The remainder of the projected increase (from 400 visitor days to between 754 and 3,486 visitor days) would be attributed to primitive recreation activities. However, the primitive recreational use could eventually decline as vehicular use and other surface-disturbing activities increased.

Conclusion: The quality of primitive recreational use would be reduced on and near ORV-use areas and areas where other surface-disturbing activities occurred. Both primitive and motorized recreational use would increase by 2 to 7 percent per year over the next 30 years.

- Impacts on Local Economic Conditions

There would be no loss of local employment or income as a result of this alternative. The opportunity to explore and develop mineral resources would continue. If the mineral resources in the WSA were developed, there would be a slight increase in employment and income for Emery County. Creation of 40 jobs at each of the five projected uranium operations would add about 3 percent to the Emery County work force by the year 2010. The probability of economic development of other mineral resources within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials). A portion of the $100 per year assessment fee required for each mining claim would reach the local economy.

There would be no livestock-related economic losses because the existing grazing use (1,344 AUMs) and the ability to maintain, replace, and build new range improvements would continue.

As discussed in the Recreation section, recreational use and related local expenditures could increase at a rate of 2 to 7 percent per year over the next 30 years. By the end of 30 years, recreational use in the area is estimated to increase to be between 1,225 and 5,665 visitor days per year. If this is the case, local recreation-related expenditures averaging $4.10 per visitor day would contribute up to $23,226 annually to the local economy by the year 2020. Recreation-related expenditures would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. Existing lease fees of $13,900 per year would continue. There are 50,950 acres in the WSA open to oil and gas leases that are currently not leased. If leased, they would bring up to $101,900 in additional Federal lease fee revenues per year. Half of these monies would be apportioned to the State, a portion of which could reach the local economy. Collection of livestock grazing fees ($2,070 per year) would continue. About 50 percent of the grazing revenues would be returned to the local BLM office for use in range improvement projects.

Conclusion: Present economic trends and conditions would not be affected. Locatable mineral activity would increase employment by 3 percent (200 jobs) by the year 2010. Recreation-related expenditures would contribute up to $23,226 annually to the local economy by the year 2020. Present and future oil and gas leases could contribute up to $115,800 annually in Federal lease revenues.

All Wilderness Alternative (Proposed Action) (59,170 Acres)

- Impacts on Wilderness Values

Designation and management of all 59,170 acres as wilderness would contribute to the preservation of the wilderness values in the San Rafael Reef WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for primitive and unconfined recreation would be protected on all 59,170 acres. Solitude would be protected on approximately 58,578 acres that meet and 592 acres that do not meet the standards for outstanding opportunities. Resources that could be considered special features in the WSA, including Class A scenery, geologic features, endangered and sensitive species, wildlife associated with wilderness, collectible minerals, archaeological and historical features, would all be protected.

Although protected, complete preservation of wilderness values would not be assured because of the existence of valid existing rights. Disturbance of 64 acres is anticipated from exploration and development of valid uranium mining claims and from

providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 4 percent (2,366 acres) of the WSA would be affected. Special features would generally not be significantly affected because the disturbance would be minor (involving 0.1 percent of the WSA). In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Some Class A scenery could be reduced in quality. Refer to the Wildlife and Vegetation Including Special Status Species and Cultural Resource sections for more information.

Mitigation to protect wilderness values would be applied, but loss of wilderness values would occur if development involving valid existing rights could not meet wilderness management criteria.

Vehicular use of 10 miles of existing ways as well as other vehicular activity would cease with ORV closure, improving opportunities for solitude and primitive recreation and naturalness.

Over the long term there would be no potential for loss of wilderness values due to the development of new leases and mining claims. The potential for other long-term development is not accurately known but would be less with this alternative than with No Action/No Wilderness due to the application of mitigating measures that would protect wilderness values subject to valid existing rights.

The gradual increase in visitor use that would occur would be primitive in nature and would be managed to preserve wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 64 acres and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on an additional 2,366 acres. Special features would be preserved overall, although some Class A scenery would be reduced in quality in disturbed and surrounding areas.

- Impacts on Soils

It is estimated that up to 60 acres of soil would be disturbed by mineral exploration and development and 4 acres would be disturbed by construction of new access to in-held State lands. The average rate of soil loss at present in the WSA is estimated to be about 0.52 cubic-yards per acre per year. Soil loss on disturbed acres has been estimated to be 5.2 cubic-yards per acre per year. Therefore, soil loss on the 64 acres would increase from 33 cubic-yards per year to 333 cubic-yards per year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Under this alternative, maximum annual soil loss in the WSA would increase about 1 percent, from approximately 30,498 cubic-yards to 30,831 cubic-yards per year.

Conclusion: With implementation of the All Wilderness Alternative, soil loss from the WSA would increase by 1 percent (321 cubic-yards per year) over the current rate. This would be 2 percent (643 cubic-yards) less than with the No Action/No Wilderness Alternative.

- Impacts on Vegetation Including Special Status Species

The anticipated maximum surface disturbance of 64 acres would not affect the vegetation types in the WSA. The two threatened, three endangered, and four sensitive species which may occur in the WSA would be provided with additional protection over the entire WSA. The WSA would be closed to ORV use. Prior to any disturbance due to locatable mineral exploration and development (estimated 60 acres) and development of new access to in-held State land (estimated 4 acres), appropriate inventories, clearances, and, if required, consultation with the FWS would be undertaken under the Endangered Species Act as described in the No Action/No Wilderness Alternative. Significant impacts to threatened, endangered, or other special status species would not occur.

Conclusion: Vegetation types and threatened, endangered, or other special status plant species would be protected with the All Wilderness Alternative.

• Impacts on Mineral and Energy Exploration and Production

• Leasable Minerals

Undiscovered oil and gas resources could not be explored or produced. However, development potential of the area is low. Because development potential is low, it is projected that the six post-FLPMA oil and gas leases (6,940 acres) would not be developed and would expire. Expired leases would not be renewed and no new leasing would be allowed.

Due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development (due to low resource potentials or restrictive terrain and occupancy restrictions) it is concluded that this alternative would not result in a significant loss of oil and gas recovery.

The potential for occurrence of tar sand in the WSA is high for small deposits but the probability of development is low. Thus, exploration and development of tar sand would likely not occur under any alternative.

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The likelihood of the WSA being explored or developed is remote due to thicker, richer, and shallower deposits elsewhere. The area could not be leased for potash. However, exploration or development would be unlikely even without wilderness designation.

• Locatable Minerals

There are 807 mining claims covering 16,140 acres (27 percent) of the 59,170-acre WSA (751 claims cover 15,020 acres of the original 55,540-acre WSA). Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations could not cause unnecessary or undue degradation of the wilderness values. Claims would be subject to a validity exam and those not showing a valid discovery would be declared null and void. Those claims not current in assessment would be declared abandoned and void.

Following wilderness designation, lands without valid mining claims would be closed to prospecting and development (USDI, BLM, 1981a). Production of an unknown portion of the less than 500 metric-tons of recoverable uranium oxide in the WSA would be foregone. There would not be significant loss of recoverable gypsum, manganese, zinc, or copper because the probability of development is low even if the area is not designated wilderness.

• Salable Minerals

No known deposits of salable minerals exist in the WSA. Thus, wilderness designation would have no affect on them.

Conclusion: Wilderness designation would limit potential exploration and development opportunities for uranium, to the extent of the valid mining claims existing at the time of designation. Although some production would occur, maximum opportunities for production of uranium would be foregone. No other significant locatable or leasable mineral production would be foregone.

• Impacts on Wildlife Including Special Status Species

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat and opportunities to find solitude. Bighorn sheep populations would be expected to expand due to habitat protection afforded over the 27,311 acres of high priority habitat and 31,859 acres of limited value habitat in the WSA. Potential disruptions of animal life cycles and habitat disturbance from ORV use would be prevented.

There are no proposed wildlife management facilities or vegetation treatment projects for the WSA. Therefore, habitat conditions would remain in a natural state, except on the 64 acres projected to be disturbed by locatable mineral exploration and development and construction of new access routes to in-held State land. Prior to any surface disturbance, site-specific clearances and necessary consultations with FWS would be completed and appropriate mitigation measures would be enforced.

Wildlife habitat generally would be protected. Increases in recreation visitor use could have a small negative impact on wildlife, although visitor encounters with wildlife would be infrequent due to low wildlife populations. Mining claim and access development projected for 64 acres could have a disruptive

effect, but would not significantly affect wildlife habitat and populations in the WSA.

Conclusion: Wilderness designation would provide all wildlife species with additional solitude. About 0.1 percent (64 acres) of the wildlife habitat in the WSA would be disturbed.

- Impacts on Visual Resources

The exceptional visual resources in the WSA would be protected because the VRM class would change from Class II to Class I. This class generally allows for only natural ecological change and would reduce the potential for surface-disturbing activities.

Even though mitigating measures would be applied to minimize visual contrast created by intrusions, visual values would be degraded in areas affected by the projected 64 acres of surface disturbance. VRM Class I management objectives would probably not be met on the northern and southern portions of the WSA during the short term. Even after rehabilitation, some permanent localized degradation would be expected. However, visual quality would probably not be reduced in the WSA as a whole.

Conclusion: VRM objectives would not be met on 64 acres of the WSA. Visual quality would be reduced on the disturbed and surrounding areas but would be preserved in the remainder of the WSA.

- Impacts on Cultural Resources

The entire unit would be closed to mineral location and leasing and only 64 acres of surface development is expected in the foreseeable future. The entire WSA would be closed to vehicular access. Few intentional or unintentional impacts to cultural resources would occur with this alternative.

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts, and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility may encourage large scale commercial looting. The rock art and rockshelter sites in the WSA may meet these requirements (Wylie, 1988). The benefits of the protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any negative effects from increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restrictions of wilderness management in order to protect other wilderness values (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied.

Conclusion: Cultural resources would not be significantly affected by disturbance of only 0.1 percent (64 acres) of the WSA. Cultural resources would be protected, but management would be limited in scope and intensity in order to protect other wilderness values.

- Impacts on Recreation

Primitive recreation values would be enhanced, especially since specific management goals would protect the opportunities present. Recreational interest at Goblin Valley State Park could be positively influenced by a wilderness designation of the surrounding area.

As discussed for the No Action/No Wilderness Alternative, primitive recreational use of the WSA is estimated to increase by 2 to 7 percent per year over the next 30 years in relation to population increases and current trends of recreational use. Use is estimated to increase to as much as 3,486 visitor days per year within the next 30 years. Management provided through a Wilderness Management Plan would provide for control of destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use.

The WSA, including approximately 10 miles of ways, would be closed to recreational vehicular activity. The existing 250 visitor days and potential 2,179 visitor days of ORV activity and/or vehicle aided hunting and sightseeing in the WSA that could occur by the year 2020 without designation would be eliminated. There may be an initial decline in overall recreational use after designation because the current vehicular use is significant. Because there are other suitable ORV play areas in the region of the WSA, ORV use would probably not experience an overall decline in the vicinity of the WSA.

As primitive recreation use increases, commercial operations based on primitive recreational activities could become interested in use of the WSA.

Overall the primitive recreational values would be protected in the WSA. In the foreseeable future, the quality of primitive recreational use would be reduced on 64 acres that would be disturbed and in areas surrounding the disturbance.

Conclusion: The quality of the primitive recreation opportunity would be preserved. Primitive use would increase at a rate of 2 to 7 percent. Vehicular activity would be eliminated in the WSA but not regionally.

- Impacts on Local Economic Conditions

Overall there would be a slight change in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 12).

With the exception of uranium, the potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing mining claims could be developed but designation would preclude new claims in the WSA. Precluding or reducing exploration and development of uranium would not alter existing economic conditions, but could alter future economic conditions from what they would be with the No Action/No Wilderness Alternative. Exploration and development of the uranium resource could proceed on claims valid at the time of designation. It is assumed that such claims would exist, and exploration and development would occur under more restrictive conditions than with the No Action/No Wilderness Alternative. It is anticipated that 20 jobs could be provided with each of the five projected operations. This would result in a total of 100 jobs or one half of those projected to occur with the No Action/No Wilderness Alternative. In addition, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would not change from the current $26,880 based on livestock sales and $5,720 from the ranchers' return to labor and investment.

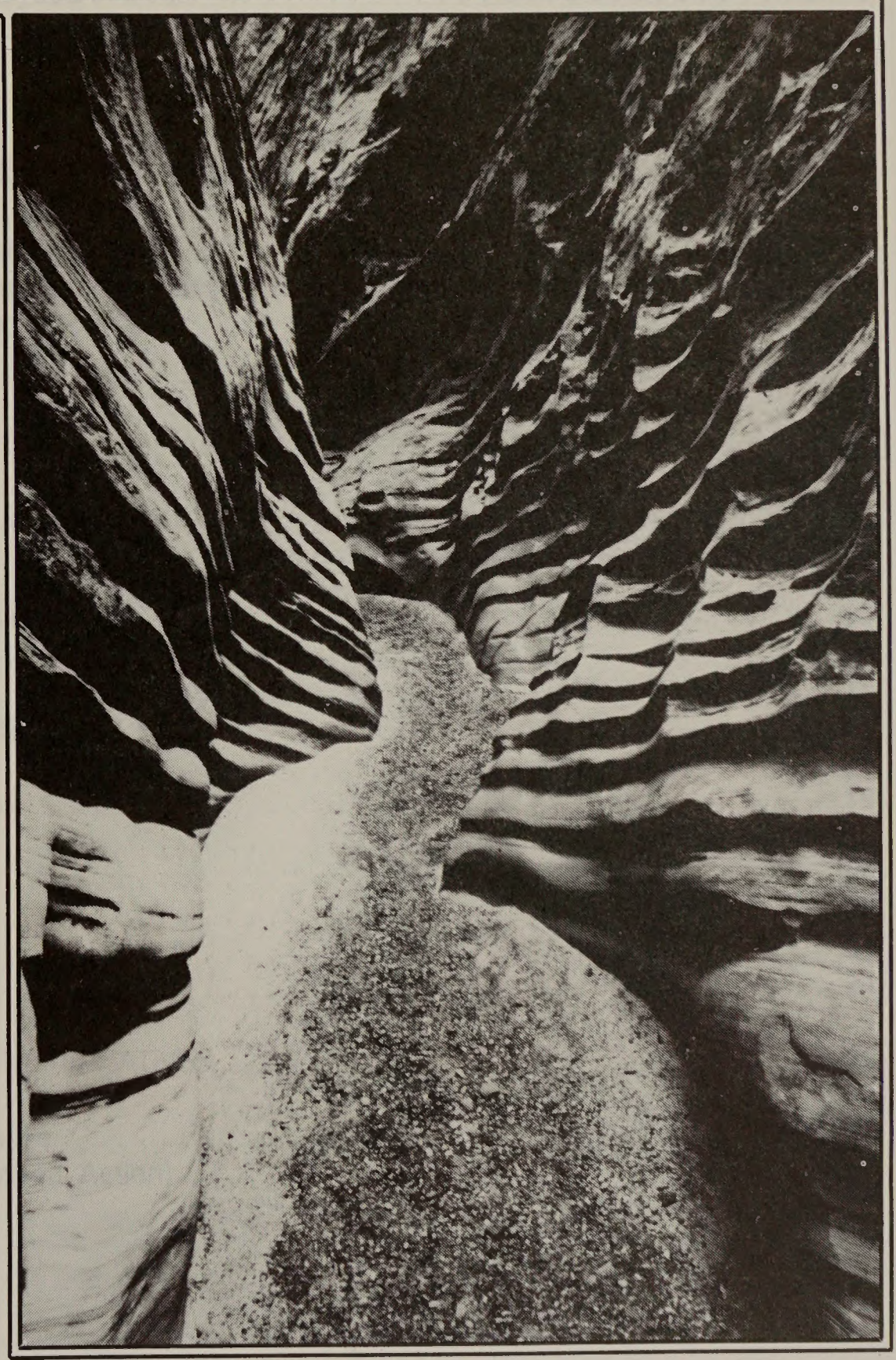
Local expenditures (averaging $4.10 per visitor day Statewide) related to increased nonmotorized recreational use (refer to the Recreation section) could increase to be as much as $14,293 annually by the year 2020. Motorized recreational use in the WSA, which is currently estimated at 250 visitor days per year and would increase to 2,179 visitor days per year without wilderness designation, would be eliminated. The change in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 6,940 acres now under oil and gas lease would cause an eventual loss of $13,330 per year of lease fees to the Federal Treasury. There would also be a potential loss of $101,900 annually in Federal revenues from the 50,950 acres that could be leased without designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increases. There are presently no commercial outfitters using the WSA, but designation could lead to commercial recreational use in the WSA.

Conclusion: Over the long term, wilderness designation would cause a change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. One hundred fewer jobs would be provided by uranium exploration and development under this alternative. Recreation-related expenditures would contribute up to $14,293 annually at the end of 30 years. Up to $115,800 in Federal lease revenues would be foregone each year.

Crack Canyon WSA



CRACK CANYON WSA

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CRACK CANYON WSA

(UT-060-028A)

INTRODUCTION

General Description of the Area

The Crack Canyon WSA is in the San Rafael Swell region of Emery County, Utah. It contains approximately 25,315 acres of BLM-administered land, including portions of the San Rafael Reef, a series of sandstone and shale formations. An additional 20 acres of public land added as a combination of minor boundary modifications on the east end of the WSA (about 250 acres were added and 230 acres were deleted) is considered as a variation for potential wilderness designation. This variation increased the size of the WSA to 25,335 acres. The WSA is roughly 16 miles long (northeast to southwest) and between 2 and 3 miles wide (northwest to southeast).

The WSA contains rolling badlands that are a colorful mix of soil, cliffs, and rock monuments. The San Rafael Reef makes up the majority of the Crack Canyon WSA, providing a unique, rugged, and picturesque quality to the terrain. Fins jut from the desert floor, forming a sawtooth ridge of sandstone. Rounded knobs, caves, and arches have been created over time by erosional forces. Elevations in the WSA range from 4,700 to 6,000 feet.

Several major drainages cut through the reef and are typified by deep, narrow sandstone walls. These drainages have an average depth of 200 feet and are as deep as 500 feet. Some of these canyons have acute pour-offs and narrow twisting routes.

The WSA is situated adjacent to the Goblin Valley State Park of Utah. The nearest towns are Green River (36 air miles) and Hanksville (15 air miles). Crack Canyon WSA is the middle unit of three WSAs that form a half circle around the southern part of the San Rafael Swell. The Muddy Creek WSA is within 1 mile to the northwest and the San Rafael Reef WSA is about 1 mile to the east from the Crack Canyon WSA.

The area is warm and arid to semiarid. Average annual precipitation is 10 to 13 inches mostly in the form of rain, and temperatures range from 10 to 105 degrees Fahrenheit (F). About 8 inches of snow falls between October and April.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 26 S., R. 10 E., secs. 8 and 9) has been redrawn to correct an error in the Draft EIS maps. This change did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. The variation of the All Wilderness Alternative to establish travel corridors through Wild Horse Wash and Chute Canyon (about 3.75 miles of wash bottom) is no longer being considered and is not part of the All Wilderness Alternative.

3. The anticipated surface disturbance presented in the Draft EIS (1,000 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comment relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 1,000 acres reported in the Draft EIS to 94 acres of surface disturbance for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Crack

STATEWIDE POCKET MAP
WSA NO. 60
SEE VOL.I

Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation, future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the disturbance estimate for the WSA has been reduced from 1,000 to 94 acres in the Final EIS, only 0.4 percent of the WSA would be disturbed and reclamation would be required. Except for about 2.5 miles of Muddy Creek and two small springs, perennial streams or other natural water sources are lacking in the WSA. Therefore, there would not be secondary impacts to water quality, and sediment yield from the WSA would not increase. Therefore, impacts on soils are not significant issues for the Crack Canyon WSA.

2. Forest Resources: The only forest resources in the WSA are 1,685 acres of scattered pinyon pine and juniper trees. Demand is low and there is limited access. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

3. Livestock Management: The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements and moving of livestock, by preventing future range improvements, and placing restrictions on predator control. However, under the BLM Wilderness Management Policy (BLM Manual 8560) there shall be no curtailments in grazing simply because an area is wilderness. Grazing reductions have already been imposed as a result of a grazing EIS.

There are no proposed rangeland developments which would be precluded by wilderness designation. Two and one-quarter miles of way would be closed should the area be designated as wilderness. However, since motorized vehicles are used very little in livestock management, little effect on management of livestock grazing is expected. Several methods of predator control would be allowed in designated wilderness and predator control has not been conducted for several years on the allotments that comprise the WSA. For these reasons, impacts on livestock management are not significant issues for the Crack Canyon WSA.

4. Visual Resources: As discussed above for soils, the estimates of surface disturbance have been reduced for the Final EIS. Therefore, the impacts on visual resources would be less than described in the Draft EIS. In the Final EIS, impacts on visual resources are not addressed under the heading of Visual Resources, but are addressed as part of the discussion of naturalness and special features in the Wilderness Values section.

5. Wild Horses: The 5 to 15 head of wild horses which are found in the western portion of the WSA would be protected by the Wild Free-Roaming Horse and Burro Act of 1971 (as amended), with or without wilderness designation. The removal of the excess wild horses, generally by the use of saddle horses, can take place inside and outside the WSA. It requires the construction of temporary corrals for holding the captured animals. Because of the rough topography in the WSA, almost all of the temporary facilities would be outside the WSA boundary. Occasionally, the removal requires the use of a helicopter to assist in the round up. When this is the case, the helicopter would not be landing inside the WSA. Wild horse populations are also inventoried by the use of helicopter over the WSA, but landing is not required. Therefore, impacts on wild horses are not significant issues for analysis in the Final EIS.

- Issues Analyzed in Detail

The significant issues for the Crack Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on water resources.

4. Impacts on mineral exploration and production.

5. Impacts on wildlife habitat and populations including special status species.

6. Impacts on the preservation of cultural resources.

7. Impacts on recreational use of the WSA.

8. Impacts on local economic conditions.

Comments during the public comment period for the Draft EIS centered mainly on the adequacy of BLM's wilderness inventory; the variation to the All Wilderness Alternative which would allow travel corridors in Wild Horse Draw and Chute Canyon; threatened or

endangered plant species; ORV use; impacts of wilderness designation on opportunities for economic development (seen as mining) in the region; and mineral values.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 60, for responses to specific comments about the Crack Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During the public comment period for the Draft EIS, BLM received two suggestions which would combine the Crack Canyon and Muddy Creek WSAs. One proposal would also add about 3,240 acres of State and 24,800 acres of Federal land to BLM's Crack Canyon WSA. These alternatives were not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1). Thus the two WSAs are separated from each other by Federal lands which are not under study for wilderness designation.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness; and (2) All Wilderness (Proposed Action) (25,335 acres). The All Wilderness Alternative includes 20 acres that have been added for consideration since the BLM Intensive Wilderness Inventory (USDI, BLM, 1980) decision. This variation would improve manageability by following on-the-ground features, which would aid in boundary identification. Boundary identification is important in this area because of potential heavy ORV use. The variation would not result in any appreciable differences in environmental impacts from those of the original All Wilderness Alternative; therefore, the analysis is equally applicable to both. For simplicity in presentation, only the larger 25,335-acre figure is used throughout this document.

A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the Crack Canyon WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, and the San Rafael RMP will eventually replace the San Rafael MFP (USDI, BLM, 1979a), it is assumed that the area would continue to be managed in accordance with MFP. The 640 acres (one section) of State land within the WSA (refer to Map 1) have not been identified in the MFP for Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership.

- Management Conditions and Constraints

All 25,335 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed for the existing 372 mining claims on 7,440 acres and potential future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) without wilderness considerations. There are no existing oil and gas leases, but future leases could be developed under Category 1 (standard stipulations) on about 22,155 acres and Category 3 (open with no surface occupancy) on about 3,180 acres.

Although mineral resources would be managed as described above, with the exception of uranium, no locatable or leasable mineral exploration or development are projected in the WSA because the level of known resources and the probability of their development are too low to support a development assumption (see Appendix 6 in Volume I).

The present domestic livestock grazing use of the WSA would continue on five allotments as authorized in the MFP (approximately 727 AUMs). The existing one well, one stock reservoir, and a 0.5 mile of fenceline could be used and maintained. Use would continue by about 5 to 15 wild horses along the western part of the WSA.

Developments for wildlife (including potential reintroduction of natural species), watershed, and other resources would be allowed without concern for the wilderness resource if in conformance with the San Rafael MFP and future BLM planning documents. Reintroduction of bighorn sheep

Map 1
LAND STATUS
Crack Canyon WSA
UT-060-028A

Legend

- WSA Boundary
- Boundary Variation
- State Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 24 S.

T. 25 S.

T. 26 S.

R. 9 E.

R. 10 E.

R. 11 E.

CRACK CANYON WSA

BOUNDARY VARIATION

SAN RAFAEL REEF

GOBLIN VALLEY STATE RESERVE

Crack Canyon

Bell Canyon

Wild Horse Mesa

Little Wild Horse Mesa

Middle Wild Horse Mesa

Horse Creek

Buckskin Spring

Temple Mountain

Flat Top

Landing Strips

Molly's Castle

Wild Horse Butte

JEEP TRAIL

Hunt Draw

Well Draw

Goblin Valley

would be allowed to augment present populations, if proposed by the UDWR.

Public water reserve withdrawals on 122 acres would continue. These withdrawals segregate the lands from all public land laws and nonmetalliferous mineral location.

The entire 25,335 acres in the area would be open to ORVs. The approximately 2.25 miles of ways and 3.75 miles of travel routes (wash bottoms) through Chute Canyon and Wild Horse Wash inside the WSA and 20 miles of roads that border the WSA would remain available for vehicular use.

The approximately 1,685 acres of pinyon-juniper woodland would continue to be closed to harvest of firewood and fenceposts as identified in the MFP.

The entire area would continue to be managed under VRM Class II.

- Action Scenario

Given the management plans described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in approximately 94 acres of surface disturbance. Up to 11 miles of access roads could be constructed. About 93 acres of the projected disturbance would result from further uranium exploration and development along the northwestern boundary of the WSA. Close spaced development drilling will occur as additional reserves at existing wells are further designated. Roads and exploratory drilling will be conducted in other claims in the area. The ore would be processed off-site. Up to four operations could provide up to 160 jobs (40 jobs per operation) over the foreseeable future.

In addition, about 1 acre would be disturbed due to developing new access to in-held state land (T. 25 S., R. 11 E., sec. 16). No other surface disturbance is anticipated.

Only dispersed disturbance from ORV use is projected because traffic will mainly be restricted to existing roads, ways, and washes due to rugged terrain.

Recreational use will increase over the current estimated use of 1,500 visitor days per year at a rate of 2 to 7 percent annually. Approximately 66 percent of all visitor use will continue to be attributed to vehicular activity, mostly in wash bottoms and on 2.25 miles of ways.

- All Wilderness Alternative (Proposed Action)

With this alternative, all 25,335 acres of the Crack Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There is one state section (640 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). No private or split-estate lands are located in the WSA and the figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

All 25,335 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the 7,440 acres of 372 existing mining claims or future claims that may be located prior to wilderness designation that may be valid. Existing claims are primarily uranium claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration for wilderness values. It is assumed that such claims for uranium would exist in the WSA at the time of designation and they would be explored and developed under more restrictive conditions than the No Action/No Wilderness Alternative. Oil and gas leases have been phased out and new ones would not be issued.

Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The estimated 727 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of designation (in this case one well, one stock reservoir, and a

Map 2
ALL WILDERNESS ALTERNATIVE
Crack Canyon WSA
UT-060-028A

Legend

——— All Wilderness Alternative (25,315 acres)

– – – Boundary Variation (Increases the All Wilderness Alternative to 25,335 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 24 S.

T. 25 S.

T. 26 S.

CRACK CANYON WSA

BOUNDARY VARIATION

R. 9 E.

R. 10 E.

R. 11 E.

0.5 mile of fenceline) could continue in the same manner as in the past, based on practical necessity and reasonableness. From 5 to 15 head of wild horses would continue to use the western portion of the WSA.

Public water reserve withdrawals on 122 acres would continue. These withdrawals segregate the lands from all public lands and nonmetalliferous mineral locations.

Wildlife transplants and habitat developments would be allowed after designation if compatible with wilderness values. It is assumed that the potential reintroduction of bighorn sheep to increase existing populations would be allowed.

Harvest of forest products would not be allowed except for the harvest of pinyon nuts or the noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means for use in the wilderness.

The entire 25,335-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions or for occasional and short-term vehicular access if approved by BLM for maintenance of approved rangeland developments or water facilities. About 2.25 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 20 miles (or 35 percent) of the WSA boundary follow existing gravel roads that would remain open to vehicular travel.

The existing motorcycle trail from Crack Canyon to Wild Horse Wash could continue to be maintained by nonmechanical means and used by hikers and/or horseback riders. Motorcycles would be prohibited.

Visual resources on 23,335 acres would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Action Scenario

BLM projects 29 acres would be disturbed with the All Wilderness Alternative. About 28 acres will be disturbed with exploration and development of uranium under more restrictive conditions than with the No Action/No Wilderness Alternative. About 5 miles of access roads could be constructed. This exploration and development would occur along the northwestern portion of the WSA as close spaced drilling. As additional reserves at existing mines are further designated, roads and exploratory drillings will be conducted on other claims in the area. Up to 20 jobs could be provided for each of the four protected operations.

In addition, about 1 acre would be disturbed with the development of new access to in-held State lands (T. 25 S., R. 11 E., sec. 16). No other surface disturbance is anticipated.

No disturbance from ORV use is anticipated because of wilderness management restrictions and rugged terrain. Primitive recreation use will increase over the current estimated primitive-type use of 500 visitor days per year at a rate of 2 to 7 percent annually. Motorized recreation, which is currently about 1,000 visitor days per year would be precluded.

Summary of Environmental Consequences

Table 1 presents the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA (25,335 acres) is of sufficient size to enhance the wilderness values present.

- Naturalness

The major imprints surrounding the Crack Canyon WSA have been excluded during the BLM Intensive

CRACK CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (25,335 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 94 acres because of uranium exploration and development and construction of access to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 2,543 acres. Special features would generally not be significantly affected by mineral-related disturbance, although Class A scenery would be reduced in quality in the disturbed areas. Vehicular use of ways, future mining access roads, and other vehicular access would detract from naturalness and opportunities for solitude and primitive recreation in the WSA. ORV use would also disturb Class A scenery, special status plant species, archaeological values, and wildlife associated with wilderness.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 29 acres because of urani-um exploration and development on valid mining claims and construction of access to State in-held lands. Opportunities for solitude and primitive recre-ation would be indirectly reduced in quality on up to an additional 760 acres. Special features would be preserved overall, although Class A scenery would be reduced in quality in the disturbed and surrounding areas.
Impacts on Vegetation	Populations of threatened, endangered, or other special status plant species would not be significantly affected. The 94 acres of projected surface disturbance would affect less than 0.4 percent of the vegetation in the WSA. ORV use would be monitored and corrective measures taken should populations of threatened, endangered, or other special status species be jeopardized.	Vegetation types and threatened, endangered, and other special status plant species would be protected by this alternative because the potential for surface disturbance would be reduced from 94 to 29 acres and ORV use would be eliminated. Appropriate inventories, clearances, and consultation with FWS would be completed prior to surface disturbance.
Impacts on Water Resources	This alternative would not significantly alter present or future water quality or uses. Only 0.4 percent (94 acres) of the WSA would be disturbed and there would be no restrictions imposed by wilderness management.	In the long term, future water diversions and new consumptive uses in the Muddy Creek system upstream of the WSA may be restricted or precluded. Potential upstream uses include irrigation, cooling water for coal-fired generation of electricity, coal mining, and municipal use.
Impacts on Mineral and Energy Exploration and Production	Mineral and energy exploration or production would not be significantly affected because mineral leasing, location og mining claims, and mineral development would not be restricted for protection of wilderness values.	Wilderness designation would limit potential exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. Although some production would occur, an unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be foregone because the probability of development is low even if the area is not designated wilderness.

CRACK CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	Alternatives: All Wilderness (25,335 Acres) (Proposed Action)
Impacts on Wildlife Habitat and Populations	About 0.4 percent (94 acres) of the wildlife habitat in the WSA would be directly disturbed and ORV use would continue. Populations of bighorn sheep, raptors, and special status species could be affected. Monitoring and enforcement of protective measures would be necessary.	Wilderness designation would protect all wildlife species and provide additional solitude over the short and long term. Approximately 0.1 percent (29 acres) of the wildlife habitat in the WSA would be disturbed.
Impacts on Cultural Resources	All sites, including three recorded sites, would continue to be protected under existing laws. Inadvertent loss or damage to archaeological sites may occur due to surface development and/or continued ORV use. Impacts from development would be minimal because only 0.4 percent of the WSA would be disturbed and mitigation would be required. Intentional vandalism and artifact collection may increase due to increased activity and accessibility. Cultural resource management would continue without regard for protection of other wilderness values.	Very little impact to cultural resource is expected under this alternative because potential disturbance would be reduced from 94 to 29 acres and ORV use would not be allowed. Cultural resource management may be limited in scope and execution due to wilderness management in order to preserve other wilderness values.
Impacts on Recreational Use	The quality of primitive recreation would be reduced on and near ORV-use areas and areas where other surface-disturbing activities occur. This could occur directly on 94 acres and indirectly on up to 10 percent (2,533 acres) of the WSA. Both primitive and motorized recreational use would increase by 2 to 7 percent annually over the next 30 years.	Primitive recreational opportunities would be protected, and primitive recreational use would increase at a rate of 2 to 7 percent annualy over the next 30 years. The quality of primitive recreational use would be directly reduced on 29 acres and indirectly reduced on up to an additional 3 percent (760 acres) of the WSA. Up to 8,720 visitor days of motorized use per year would be precluded at the end of 30 years. About 75 percent of the present recreational use is based on vehicular access and overall recrea-tional use would decline following wilderness designation.
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 2.4 percent (160 jobs) by the year 2010. Recreation-related expenditures could contribute up to $53,972 annually to the local economy by the year 2020. Livestock grazing would continue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Future oil and gas leases could generate up to $50,670 annually in Federal and State revenues.	Over the long term, wilderness designation would cause a slight change in local economic conditions from those what would occur with the No Action/No Wilderness Alternative. Approximately 80 fewer jobs would be provided by locatable minerals activities with this alternative. This is equivalent to about 1.2 percent of the projected Emery County employment in the year 2010. Recreation-related expenditures could contribute up to $18,040 annually at the end of 30 years. Livestock grazing would continue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Up to $50,670 in Federal and State lease revenues would be foregone each year.

Wilderness Inventory (USDI, BLM, 1980). Of note are a 0.5 mile fence, approximately 2.25 miles of ways, a stock reservoir, one water well, and one managed exploratory well. These imprints occurred before 1976, unless otherwise indicated.

The 0.5 mile fence is located near Chute Canyon wash, along the southern boundary of the WSA. The fence is used for livestock operation.

Ways, totaling approximately 2.25 miles, are located near Hunt Draw, Muddy Creek, and between Wild Horse Wash and Crack Canyon. The most common use of these ways is motorcycling, although some four-wheel vehicular traffic may occur. Flooding and erosional processes are slowly eliminating these imprints. Motorcycle use, however, on the way between Crack and Wild Horse Canyons has developed a distinct trail that is approximately 3 to 4 feet in width.

A stock reservoir, once used for livestock purposes, is located near the southern boundary of the WSA. The reservoir is situated near Muddy Creek and only provides a source of water after thundershowers, usually during the driest periods of the summer when Muddy Creek is nearly dry.

A water well, located along the southern border near Muddy Creek, is also used periodically by livestock. This imprint, in addition to those listed above, is substantially unnoticeable, and does not detract from the area's naturalness. Another well developed by Union Carbide is located adjacent to the northern boundary near Temple Mountain. The well was drilled in the 1950s, and is also substantially unnoticeable.

Imprints in the WSA cover a total of about 506 acres (2 percent of the WSA). The remaining 24,829 acres could be considered pristine. The entire 25,335 acres meet the naturalness criterion for areas under wilderness review.

No surface-disturbing activities have occurred since the wilderness inventory.

- Solitude

The WSA offers outstanding opportunities for solitude. The many incised drainages through the San Rafael Reef offer passages for the user to experience seclusion and isolation. The twisting character of the canyons and the up-to-1,000-foot cliffs effectively shroud lines of sight and suppress sounds within these canyons. Off-site intrusions and influences are essentially nonexistent within the canyons.

The higher reaches of the WSA, consisting of sandstone knobs, solidified dunes, and the San Rafael Reef's jutted fins, are intermittently open and provide great vantage points for viewing the surrounding desert to the east, the badlands of Robber's Roost to the south, and the inner drainage system of the San Rafael Swell to the north-northwest. Vegetation cover is limited and does not effectively screen visitors. The rolling and incised terrain does allow for separation and the feeling of seclusion. The expansiveness of the surroundings provides the user with a feeling of remoteness. From specific points within the WSA, the traffic on U-24 (8 miles east) and within Goblin Valley State Park may be seen. These outside elements do not necessarily intrude upon the visitor's solitude. They may actually emphasize the remoteness of the WSA. During the Easter and Memorial Day weekends, when ORV use adjacent to the WSA is the greatest, solitude may be less than outstanding. Also, motorcycle use occurring within two specific canyons of the WSA has a negative effect on solitude when the two types of recreation activities are combined in the same place.

In over 99 percent of this WSA (25,300 acres), the opportunities for solitude are considered outstanding during most of the year.

- Primitive and Unconfined Recreation

Educational groups use the WSA. Their trips involve hiking and backpacking the intricate canyon drainages through the reef. Historic, prehistoric, and geologic qualities found in the area are observed and studied. Survival techniques are taught.

During the spring and early fall, recreationists flock to the desert to enjoy the warm weather. ORV use is their main recreational activity, and many use the area adjacent to the WSA. Due to the restrictive character of the topography, recreationists explore the WSA mostly by foot. Outstanding opportunities for hiking, backpacking, rock scrambling, photography and scenic viewing await these explorers.

Muddy Creek is used for innertubing (floater must negotiate rapids) during the early spring when high water is present. During the creek's drier periods, the drainage is used for hiking and motorcycling. The Muddy Creek drainage is the southwestern boundary of the WSA.

CRACK CANYON WSA

After rain storms, many isolated pools of water provide an element of surprise and contrast to the dry, desolate character of the WSA. The dramatic nature of the reef with its sheer-walled cliffs, pinnacles, knobs, twisted canyons, valleys of color, and prehistoric remnants all contribute to a high quality recreational experience.

A combination of several outstanding recreation opportunities allows the entire WSA (25,335 acres) to meet the outstanding criterion set for areas under wilderness review.

- Special Features

The Crack Canyon WSA has several special features, including geologic, scenic, wildlife, and archaeologic values.

The canyons of this WSA display exposed geologic strata and formations, including arches, caves, and narrow, twisted and textured passageways. many of the features are unique to the San Rafael Reef. The upper reaches provide dramatic views of the San Rafael Reef and its many fins and folds.

Although only three archaeological sites have been recorded, they include small pictograph or petroglyph panels and small habitations in rock shelters.

Considerable evidence of old mining activity surrounds the northern, western, and southern boundaries of the WSA. Shacks, cabins, and mine shafts are located adjacent to the WSA, providing striking contrast to the color, beauty, and magnitude of the surrounding land.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are three animal species (black-footed ferret, bald eagle, and peregrine falcon) and two plant species (Maguire daisy, Erigeron maguirei var. maguirei, and Wright fishhook cactus, Sclerocactus wrightiae) listed as endangered that may be found near or within the WSA. Also, two threatened species, the Jones Cycladenia (Cycladenia humilis var. jonesii) and the Last Chance Townsendia (Townsendia aprica) may occur in or near the WSA. There are nine animal species and five plant species that are considered sensitive that may occur in the WSA.

Cougar and desert bighorn sheep, which are wildlife species associated with wilderness, may occasionally visit the WSA. In 1983 a group of bighorn sheep was spotted adjacent to the WSA's northwestern border. Bighorn sheep were known to occupy the area before mining activities occurred. There are wild horses within the WSA. Refer to the Vegetation and Wildlife Including Special Status Species for additional information.

The entire WSA is rated Class A for scenic quality. It has approximately 2.5 miles of perennial stream.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of saltbush-greasewood and galleta-threeawn shrub steppe. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City/Ogden, Utah, and Provo/Orem, Utah.

Air Quality

The WSA is in an attainment area and currently meets the standards for a PSD Class II air quality classification (1977 Clean Air Act, as amended). The nearest Class I area is Capitol Reef National Park, located approximately 2 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and the Green River-Moab area. A large point source includes two powerplants in the Castle Valley area. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles (Aerocomp, Inc., 1984).

Geology and Topography

The Crack Canyon WSA is along the southeastern flank of the San Rafael Swell. During the Eocene Epoch, the area began to be uplifted, creating a bulge in the existing formations. A period of nondeposition and erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The result of this uplifting was the San Rafael Swell, a breached,

doubly plunging anticline that forms a prominent north-trending uplift on the Colorado Plateau. Elevations range from 4,700 to 6,000 feet.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations outcropping in the WSA range from the Triassic Moenkopi Formation (220 million years ago) on the north to the Jurassic Morrison Formation (140 million years ago) on the south.

The Moenkopi Formation, exposed along the northside of the San Rafael Reef (or northwest boundary of the WSA), consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-gray and red shale, and conglomerate. Towards the base of the formation is the Sinbad Limestone Member. The Moenkopi Formation is known as an oil and gas producer in the Grassy Trail field to the north.

Also exposed along the reef's north side is the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and intertonguing. The formation is a uranium producer and composed of four members: Temple Mountain, Monitor Butte, Mossback, and Church Rock.

The Wingate Formation lines the cliff faces of the reef's north side. It consists of buff, orange, and brown, massive cross-bedded, medium-grained sandstone and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow-colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls. The Navajo Sandstone makes up the greatest percentage of the WSA.

The Carmel Formation is exposed on the eastern and southeastern sections of the WSA. It consists of brown to gray sandy limestone; red, thin-bedded sandstone; and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

In the region of the WSA known as Broken Rainbow Valley is a southern running band of three formations. These are the Entrada Sandstone and Curtis and Summerville Formations. The Entrada consists of red-brown, massive sandstone in its upper part and thin-bedded sandstone and red shale in the lower part. The Curtis Formation consists of red-brown to green-gray, thick-bedded sandstone, green-gray conglomerate, and maroon shale. The Summerville Formation is comprised of red-brown sandstone, maroon mudstone, and dark-brown mudstone with green-white sandstone, limestone, and gypsum. This area is often referred to as the Badlands.

The Morrison Formation, located in the southernmost portion of the WSA, is uranium-bearing and may contain dinosaur remains. The formation is composed of two members: the upper Brushy Basin and the lower Salt Wash. The Brushy Basin Member is composed of variegated red, purple, gray, and gray-green siltstone, mudstone, claystone, and shale with minor amounts of sandstone and conglomerate. The Salt Wash Member consists of gray, tan, white, and yellow-brown sandstone and mudstone. Limestone and shale can be interbedded with the mudstone. Lenses of conglomerate occur in the upper portions of the member.

Soils

The WSA contains five general soil mapping groups with overall soil characteristics as shown in Table 2. Although wind may be an erosive agent, especially on the sandy soils at the base of the San Rafael Reef, water is the primary agent of erosion in the WSA. Vegetation offers fair ground cover, except on the reef where the exposed bedrock resists erosion. Precipitation is light, but it tends to occur in short, intense summer thundershowers that can dislodge and transport a great deal of soil. Estimated erosion is shown on Table 3. Natural erosion is considered to be relatively high at an average of 4.3 cubic-yards per acre per year in the Crack Canyon WSA.

About 40 percent of the soils in the WSA are considered strongly saline and 60 percent are considered slightly saline. Annual salt production from soils in the WSA is estimated to be 93 lb per acre.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year Present Condition	Bare Soil Surface
Rock Outcrop	35	8,880	0.0	0
Badland	15	3,797	20.0	20
Shallow to deep silty and clayey soils on moderately steep dissected structural benches. Some of these soils are affected by g ypsum and salt.	20	5,063	5.0	20
Shallow loamy soils on sloping structural benches	25	6,329	1.0	5
Very deep loamy and sandy soils on nearly level valley floors	5	1,266	0.1	1
Totals	100	25,335		

Source: Hansen, 1985.

Ninety-five percent of the WSA (24,068 acres) is unsuited for seeding because of rock outcrops, rocky soil, steep slopes, and soils with a high salt/alkaline content. Seeding potential on the remaining 5 percent (1,267 acres) is fair. Here slopes are tolerable, soils are moderately deep to deep with a lower salt/alkaline content.

Vegetation Including Special Status Species

The major vegetation types in the WSA are desert shrub-saltbush, desert shrub, and pinyon-juniper woodland-desert shrub (refer to Table 4). The desert shrub-saltbush vegetation type is found at the lower elevations and is associated with saline and/or alkaline soils. Poor drainage conditions coupled with low precipitation result in accumulations of soil salts in these lowlands, significantly affecting plant growth. Dominant species are shadscale, Castle Valley clover, mat saltbush, and fourwing saltbush.

The desert shrub type is found in areas characterized by low precipitation, high temperatures, and rapid evaporation. It is located on gravelly benches and gently sloping sandy lowlands, in soils that are mostly shallow and rocky. Species belonging to the Chenopodiaceae and Compositae families dominate the desert shrub and include Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandy muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell area, including wavy-leaf oak, sand sagebrush, and purple sage.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	15	3,797	75,940	35	8,860	177,200
High	10.0	-	-	-	-	-	-
Medium	5.0	20	5,063	25,315	25	6,329	31,645
Low	1.0	25	6,329	6,329	5	1,266	1,266
Very Low	0.1	5	1,266	1,266	-	-	-
None	0.0	35	8,880	-	35	8,880	-
Totals		100	25,335	108,850[a]	100	25,335	210,111[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre, 4.3 under present conditions; 8.3 if disturbed.

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Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Barren	12,120	48
Desert shrub-saltbush	11,410	45
Desert shrub	120	1
Pinyon-juniper/desert shrub	1,685	6
Total	25,335	100

Source: USDI, BLM, 1989

The pinyon-juniper woodland/desert shrub vegetation type is found on foothills and mesas and other areas of relatively high elevation and precipitation in the area. Soils are typically shallow and rocky. The pinyon-juniper woodland stops at lower elevations due to low precipitation, high temperatures, and salty substrata. Major species in the type are pinyon pine, Utah juniper and desert shrub vegetation type species.

Nine threatened, endangered, Category 1 and 2 candidate species may occur in the WSA (refer to Table 5). The habitats of all of these species extend beyond the WSA boundaries.

Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenia humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barnebyi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 In Volume I

The barren designation is applied to areas where there is no vegetation or practically none, such as cliff faces and rocky slopes.

There are no riparian areas within the WSA. The Muddy Creek makes up a portion of the southern boundary, but it does not have riparian vegetation.

The San Rafael Swell, of which the WSA is a part, provides habitat for a large num-ber of rare plant species.

The Crack Canyon WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The potential natural vegetation (PNV) types in the WSA are listed on Table 6.

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Saltbush-greasewood	17,721	70
Galleta-threeawn shrubsteppe	7,614	30
	25,335	100

Source: USDI, USGS, 1978.

Water Resources

The Crack Canyon WSA is in the Muddy Creek drainage which is a tributary to the Dirty Devil River in the Upper Colorado River hydrologic subregion.

About 2.5 miles of Muddy Creek, located along the southwest corner of the unit, is the major perennial water source. All other streams in the WSA are intermittent or ephemeral. Cow Tanks, an unnamed spring, and Bullberry Spring (just outside the WSA boundary) are also considered year-round sources of water. There are also an undetermined number of small, unmapped water holes along the crest of the San Rafael Reef.

Water use in the unit is primarily by wildlife and domestic livestock. The only developed water sources within the WSA consist of a stock reservoir located near the southern boundary at Little Wild Horse Mesa, and a water well located along the southern border of the WSA near Muddy Creek. Muddy Creek is used for recreation such as innertubing during high flows and hiking during low flows.

The WSA is within Water Right Adjudication Area 94. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed time

applications may exceed 0.015 cfs in certain areas. The main stream of Muddy Creek is fully appropriated. There are no areas of significant ground water development in this drainage area.

The water quality standards for Muddy Creek and tributaries, from confluence with Fremont River to Highway U-10 crossing, are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]; Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses including irrigation of crops and stockwatering).

Water quality in Muddy Creek is generally poor, but adequate for livestock and wildlife. Irrigated agriculture in the upstream reaches of Muddy Creek may create some problems for human use of water in terms of taste, solids, nutrients, salinity, and coliform bacteria. No specific water quality data are available.

Muddy Creek originates on the Manti LaSal National Forest over 35 miles upstream of the WSA. It crosses national forest, private, BLM-administered, and scattered sections of State land before entering the WSA. Present and potential upstream uses include irrigation, cooling water for coal-fired generation of electricity, coal mining, and municipal use in Emery County.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Crack Canyon WSA is given in Table 7. Appendix 5 in Volume I describes the mineral and energy resource rating system.

The WSA contains deposits of vanadium and could contain copper and manganese that are currently listed as strategic and critical materials (USDoD, 1988). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

- Leasable Minerals

There are no active drilling, mining, or exploration activities for leasable minerals.

- Oil and Gas

The BLM oil and gas categories are as follows: About 22,155 are open to leasing with standard stipulations (Category 1) and 3,180 acres are open to leasing with no surface occupancy stipulation (Category 3) (USDI, BLM, 1975a).

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of natural gas
Tar Sand	f2	c4	Less than 10 million barrels
Potash	f2	c2	Less than 1 million metric tons
Uranium/Vanadium	f4	c4	Greater than 1,000 metric tons of uranium oxide
Geothermal	f2	c1	Low temperature
Manganese	f2	c1	100,000 metric tons of 40-percent manganese
Copper	f2	c2	Less than 50,000 metric tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

These leasing categories also apply to tar sand. There are currently no mineral leases in the WSA.

In order to have an oil and gas field, certain conditions must be met. These conditions include a source for petroleum, porous and permeable rock (reservoir rock), and traps. Traps can be either stratigraphic, structural, or a combination of both. Structural traps are caused by folding, faulting, fracturing, and intrusions of salt plugs.

The San Rafael Swell is a structural trap. The interior of the swell has been eroded away, probably allowing any petroleum contained in the structure to escape. The swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the swell. The Ferron gas field, 38 miles northwest of the WSA, is an anticlinal structure trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance gas field, 18 miles to the west, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability and

porosity of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail field, 54 miles to the north, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 3 miles to the northwest. The well was plugged and abandoned in 1959. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Crack Canyon WSA would probably be small pools and/or fields. Traps occurring in the WSA could be either stratigraphic or structural (due to small faults). The WSA is probably too far from the center of the swell to contain much, if any, petroleum within the older (Mississippian, etc.) formations because the petroleum collects in the apex of anticlines. This, however, does not rule out traps due to faulting.

The favorability rating of f2 indicates that potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. Positive evidence of resource occurrence is some distance away from the tract or in a situation that may be considered unrelated to the geology of the WSA. Therefore, the certainty that the resources exist are rated very low (c1) (SAI, 1982).

- Tar Sand

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape leaving behind a heavy fraction or tar substance. The Torrey Member of the Moenkopi Formation is one of the sand-bearing units in the WSA. The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of tar sand.

The San Rafael Swell STSA was designated in 1982 by the Department of the Interior. About 630 acres of the northwestern portion of the WSA known as the Chute Canyon deposit, are within the STSA. This deposit is presumable in the Black Dragon Member and contains an estimated 50 to 60 million barrels of oil in-place. The San Rafael Swell STSA is estimated to contain 445 to 545 million barrels of oil in-place.

The favorability rating of f2 for tar sand indicates a potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. It is unlikely the tar sand within the WSA would be developed due to small sized deposits and economic factors. The certainty that tar sand occurs in the WSA is high (c4) (SAI, 1982). No lease conversion applications occurred in the WSA.

- Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousand feet thick in the area of Moab, where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating of f2 indicates that if deposits occur in the Crack Canyon WSA, they generally would contain less than 1 million metric tons of potash (SAI, 1982). The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it likely that the potash resource in the WSA would not be developed.

- Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal water (between 20 degrees and 90 degrees Centigrade). Water extracted at these temperatures can be used for direct heating purposes. It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and the lack of nearby potential users. The favorability and certainty are rated low (f2/c1) (SAI, 1982).

- Locatable Minerals

There are two known deposits (Delta/Hidden Splendor) of locatable minerals in the WSA, and there are presently 372 mining claims, covering 7,440 acres.

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• Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These are scattered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback and Church Rock members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member. Production of uranium from mines and prospects along the WSA's northern boundary is small. Adjacent to the extreme western boundary of the WSA is the Delta Mine. Tunnel workings of that mine extend under the WSA approximately 0.3 mile. The Delta Mine, also known as Hidden Splendor, produced 104,000 tons of ore with an average grade of 0.28% (U308) from 1952 to 1970. Other mines adjacent to the northwestern boundary of the WSA produced over 55,000 tons of ore also in the 1950s to the 1970s.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these other minerals occurs in sufficient grades or quantities within the WSA to be minable. These metals indicate a hydrothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The southern uranium belt, which extends through the WSA, is most favorable for the occurrence of ore deposits. Moderate- and large-size ore bodies are found in the southern belt (Hawley, et al., 1968). The large ore body of the Delta Mine, located in the southern belt and extending into the WSA, occurs in a sandstone lens of the Monitor Butte Member. The ore body is enclosed in red, purple, and pale-green mudstone and attains a maximum thickness of 20 feet. The main ore minerals are uranite and carnotite, believed to be deposited by solutions that traveled laterally along bedding plane fractures until the sandstone lens was reached. The ore grade is relatively rich (greater than 1 percent uranium oxide).

The ore-bearing solutions responsible for the deposition of the Delta ore body could have deposited similar ore bodies in the immediate vicinity.

The collapse structures present at Temple Mountain (outside the northwestern end of the WSA) are not present in the WSA. A significant portion (approximately 1,300 acres) of the Temple Mountain mining district, though, as historically outlined by the Atomic Energy Commission and its predecessor the Manhattan Engineer District, is within the northern portion of Crack Canyon WSA. The production figures for the Temple Mountain mining district are 3.7 million lb of vanadium (V205) and 1.2 million lb of uranium (U308) concentrates. The potential for uranium in the Morrison Formation within the southeastern part of the WSA is relatively unknown. The formation consists of two members (Salt Wash and Brushy Basin) and ore deposits in these formations are chiefly tabular or lenticular, occurring in the channel sands of the Salt Wash Member. The ore was deposited when the ore-bearing solution entered a reducing environment. Ore bodies in this formation are also expected to be scattered, but could be slightly larger (up to 20,000 metric tons).

The overburden in the north portion of the WSA is thin and increases in thickness to the southeast. The probability of finding ore bodies decreases as this overburden increases. Difficulty of discovery combined with increasing recovery costs is the main reason for decreasing probability of development. Most of the surface deposits have been discovered, leaving subsurface deposits that require extensive drilling for development. Large target potential may encourage drilling to depths of 2,000 to 2,500 feet.

Associated with uranium may be vanadium, copper, and silver. Vanadium is the only critical mineral produced from the San Rafael Swell and has occurred in relation to uranium development.

Due to numerous uranium mines and their occurrence near the northwestern boundary of the WSA, plus the fact that the southern part of the swell is considered favorable for large ore bodies, the tract is rated with a high favorability (f4) for a large tonnage of ore (greater than 1,000 metric tons of uranium oxide). The certainty that uranium and vanadium occur in the WSA is also high (c4) (SAI, 1982).

- Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville Formations. The nearest known deposits are 26 miles northeast of the WSA. The host formations occur in the southern part of the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low favorability rating (f2) indicates a deposit size of up to 100,000 metric tons of 40-percent manganese (SAI, 1982).

- Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is the Copper Globe Mine located about 1 mile south of the Devils Canyon WSA (approximately 17 miles northwest of the Crack Canyon WSA). The mine produced 2 or 3 metric tons of copper ore between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The favorability and certainty rating (f2/c2) indicates a low potential for copper deposits in the WSA and, if found, deposits would be small in tonnage (less than 50,000 metric tons of contained copper) (SAI, 1982).

- Gypsum

The Summerville Formation is reported to contain a bed of industrial grade gypsum in the southern portion of the WSA. BLM has given gypsum a favorability rating indicating a moderate potential of occurrence. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million tons). It is unlikely that any gypsum would be developed due to distance of mines to the market and related transportation concerns.

- Salable Minerals

Although the potential exists for use of rock materials from the WSA, it is considered low due to limited demand and high availability elsewhere in more accessible locations.

Wildlife Including Special Status Species

The Crack Canyon WSA provides habitat for a limited variety of wildlife species. Except for Muddy Creek and several springs, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock water holes are a good source of water following rains, but they cannot be relied upon by wildlife due to drying out during drought periods. During the winter, snow (when available) can provide water. Vegetation is also limited due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer. Desert bighorn sheep were sighted along the San Rafael Reef during the 1960s. A sighting was recorded adjacent to the WSA's northwestern border in 1983. Pronghorn antelope occur to the east and may utilize the WSA. A bull buffalo was sighted adjacent to the WSA in 1982.

The WSA provides habitat for coyote, bobcat, cottontail rabbit, blacktail jackrabbit, woodrat, ringtail, badger, Ord kangaroo rat, gray fox, kit fox, whitetail antelope squirrel, chipmunk, rock squirrel, bat, mice, and vole.

Habitat for various small bird species is found within the WSA. The species' diversity and population sizes are small due to the lack of a diverse habitat. The San Rafael Reef, along with various cliffs and canyons, provide many nesting, roosting, and foraging opportunities for avian fauna. Few individual raptors are found in the WSA. Of those present, golden eagle, prairie falcon, American kestrel, red-tailed hawk, ferruginous hawk, and rough-legged hawk (winter residents) are the most common. Waterfowl and shorebirds could exist in the WSA where Muddy Creek borders the unit, although occurrences would be rare. Chukars are found in the WSA and are dependent upon available water. Mourning dove are also found in this WSA.

Several species of snakes and lizards could be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snake, striped whipsnake, and western rattlesnake account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Cougar may occasionally visit the area, but with low deer numbers, they would be a rare occurrence. No documented sightings are recorded. Muddy Creek flows along the southwest border of the WSA. This portion of Muddy Creek has been classified by UDWR as a limited value (lowest rating), nongame fishery, Class V stream. Speckled dace, flannelmouth sucker,

bluehead or green sucker, and round-tail chub are found in this portion of the Muddy Creek. Tadpole shrimp (crustaceans) may be present in the various potholes.

The peregrine falcon (an endangered species) is thought to be a possible visitor to the WSA. No known sightings exist. Bald eagles may be found along the Muddy Creek searching for food in the winter. No known sightings have occurred in the WSA, but there is potential. The FWS has also identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle, a BLM sensitive species occurs in the area. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, southern spotted owl, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

UDWR and BLM have designated all 25,335 acres in the WSA as high-priority desert bighorn sheep habitat. Lambing and rutting grounds, along with water sources, are considered crucial habitat. Currently, the WSA provides habitat for about 32 percent of the desert bighorn sheep in the south San Rafael herd.

There are no existing or potential wildlife facilities or vegetation treatments within the WSA.

Forest Resources

Scattered pinyon and juniper trees are found in sparse quantity on about 1,685 acres within the WSA. Because of the remoteness from populated areas and availability of the woodland products closer to population centers, harvest of the pinyon-juniper woodland in the WSA has been minimal and is not expected to increase in the foreseeable future. The area is closed to woodland harvest under the present BLM land use plan.

Livestock and Wild Horses/Burros

The Crack Canyon WSA contains a portion of five livestock grazing allotments involving five permittees.

Table 8 gives livestock grazing use data for this WSA.

Range development projects in the WSA are limited to one 0.5-mile fence, one stock reservoir, and one well. There are no plans for additional grazing improvements within the WSA.

Wild horses have been seen along the western portion of the WSA and within several of the area's main canyon drainages. Herd numbers range from 5 to 15 horses.

Predator control was not conducted during the 1986-1987 period in the grazing allotments that comprise the Crack Canyon WSA (USDA, APHIS, 1988).

Visual Resources

The most dramatic and outstanding visual feature of the Crack Canyon WSA is the San Rafael Reef. The reef rises out of the desert floor with rock formations jutting over 1,500 feet into the sky. The huge

Table 8
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Iron Wash	130,510	7,570	4,980	299	498 Cattle	09/01-06/30	1
McKay Flat	47,350	1,400	2,288	60	416 Cattle	11/01-04/15	1
Rock Springs	87,750	20	4,414	1	600 Cattle	11/01-05/31	1
Temple Mountain	15,700	148	618	68	103 Cattle	10/16-04/15	1
Wild Horse	58,501	16,197	1,523	290	152 Cattle	09/01-06/30	1
Total	339,811	25,335	13,736	72			5

Source: BLM File Data.

sawtooth ridge of upturned sandstone is cut by spectacular canyons. There are few scenes within the reef that do not involve a panoramic view into a deeply cut canyon, an enclosed view dominated by a vertical red sandstone wall, or a tremendous rock protrusion.

Near the southern end of the WSA a small valley is formed between the San Rafael Reef and a low ridge lying southeast of the reef. From the crest, this ridgeline and valley, known as Broken Rainbow Valley, provide a picturesque view. It is a colorful area of purples, reds, yellows, greens, whites, blacks, browns, and blues. Interesting shapes are formed by erosion in the soils and rocks of the valley. The southern area is known as the Badlands.

The north and west boundaries of the WSA consist of sheer cliff faces of the reef's backside. Golden, rust, and red colored pinnacles and sandstone figures provide additional visual variety to this area where several drainages have cut their way through the rugged character of the San Rafael Reef.

Elevations in the WSA range from 4,500 feet in the badlands region to over 6,000 feet atop the jutted fins of the reef.

The entire WSA is classified as having Class A scenery, containing the most outstanding characteristics of the physiographic region. The entire area has been rated high for its sensitivity level. The high level is based on the visual qualities seen from Utah Highway 24. Based on these factors, the entire WSA is within the VRM Class II management area.

Cultural Resources

No cultural inventory has been made of the area; however, three sites have been reported (USDI, BLM, 1988). These sites are: a rock shelter with structural remains, and two rock art sites. These sites have not been evaluated for significance, nor have they been nominated to or listed on the National Register.

Due to other occurrences of sites found along the San Rafael Reef, it is believed that the many drainages in the WSA could contain other archaeological sites.

Recreation

The majority of recreational use occurs along the southeastern boundary of the WSA and in several drainages cutting through the San Rafael Reef. Total recreation use in the Crack Canyon WSA is estimated at 1,500 visitor days annually.

Primitive-type recreational activities known to occur within the WSA are hiking, backpacking, cultural exploration, and educational events. The WSA is used frequently by educational hiking groups. The Muddy Creek drainage forms the southwestern boundary of the WSA and is also used by recreationists. The main activities taking place there are hiking, floating, and some ORV use. Total primitive-type recreational use in the WSA is estimated at over 500 visitor days per year. This estimation is based on BLM field observations and public contact.

Motorcycle riding and other ORV use are popular activities in the area surrounding the WSA, and recreationists have been known to traverse through or ride in portions of the WSA. The majority of the ORV use occurs during the spring months and is usually concentrated on the Easter and Memorial Day weekends. The exact number of ORV riders using the WSA is unknown; however, public interest in the area has been relatively high and use is estimated at over 1,000 visitor days per year. The most popular motorcycling areas in the WSA are Chute Canyon, Wild Horse Wash, and a trail between Crack Canyon and Wild Horse Wash. The San Rafael MFP indicates that the area is designated as open to ORV use.

There are no recreational facilities within the WSA. Several foot trails exist within drainages, but are normally washed away during flooding. Goblin Valley State Park is located 2 miles southeast of the WSA. The park includes 15 camping sites, a restroom, foot trails, and a ranger station. The park emphasizes recreational use of the San Rafael Swell and the Crack Canyon WSA with printed material, slide shows, and brochures. Much of this information caters to the ORV user. In 1982, Goblin Valley State Park had approximately 20,000 visitors. About 4,000 of those were during the Easter weekend. It was also estimated that 3,000 additional recreationists used the surrounding area (including the WSA) at Easter.

With the adjacent State park and easy access via the park's roadway and roads surrounding the area, Crack Canyon WSA offers the recreationist a variety of experiences such as hiking, backpacking, rock scrambling, and exploration of narrow and twisting canyons.

The intricate canyon system of the WSA provides a variety of loop trips, both easy and challenging.

Various pools, arches, and slickrock gardens add to the interesting visual character of the area.

Land Use Plans

The WSA is BLM-administered public land except for one State section (640 acres). The current policy of the Utah Board of State Lands and Forestry is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands. In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. The State section is leased for grazing (UDNRE, DSLF, 1988).

There are no recreational or other withdrawals or valid rights-of-way within or adjacent to the WSA.

Physical and legal access to the WSA is provided by Emery County roads encompassing the eastern, southern, northern, and a portion of the western boundaries of the WSA.

There are no contiguous lands under consideration by other agencies for wilderness.

The current BLM planning document for the Crack Canyon WSA is the San Rafael MFP (USDI, BLM, 1979a). Wilderness is not addressed in the San Rafael MFP. However, wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

In the Emery County Zoning Plan (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing). The Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is located in southern Emery County. Table 9 shows the baseline and projected total population data for Emery County.

From 1970 to 1980 the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county.

It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000, for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910) and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

- Employment

Table 9 shows the baseline and projected total employment for Emery County to the year 2010.

Table 9
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

Coal mining and operation of Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's most important sources of employment. The local economy is most affected by changes in the coal market and had periods of boom and bust. Green River has not grown in the past thirty years. Major employment for Green River includes mining, government, agriculture and tourism.

Emery County is part of the Southeast MCD. Table 10 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the southeast district were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010, employment in the MCD will increase by about 27 percent. Services will increase to 18

percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

Table 10
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and dispersed recreation. Table 11 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 11
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$37,200	0
Livestock Grazing	$14,540	$1,120
Recreational Use	$6,150	0
Total	$57,890	$1,120

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

In the past, production from mines and prospects within and adjacent to the WSA have brought significant income and employment to residents of the area (approximately 2,500 work years of employment). The WSA has 372 mining claims. Regulations require a $100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Five livestock operators have grazing privileges in the Crack Canyon WSA. Based on the consumption of 727 AUMs of forage by cattle, it is estimated that the WSA accounts for $14,540 of livestock sales, including $3,635 of ranchers' returns to labor and investment.

The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the WSA is estimated as about 1,500 visitor days per year resulting in a total estimated expenditure of $6,150 annually.

The WSA generates revenues to the Federal Treasury from grazing. Based on 727 AUMs of forage consumed by livestock in the WSA and a grazing fee of $1.54, the WSA annually accounts for $1,120 of grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM district for the construction of range improvement projects.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives section for Crack Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on all 25,335 acres and management under oil and gas leasing Category III (no surface occupancy) on 3,180 acres. Due to the topographic character of the majority of the WSA, wilderness qualities have been protected from other resource uses. Many of these wilderness values would probably remain even without wilderness designation due to the rugged rock formations that curtail access.

In the foreseeable future, disturbance of approximately 93 acres from uranium exploration and development and 1 acre for development of access to an in-held State section would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation. Most special features, including geologic features, wildlife associated with wilderness, archaeological and historical values, wild horses and perennial waters would not be significantly affected because the disturbance would involve only 0.4 percent of the WSA. Appropriate measures would be taken to protect cultural values and threatened, endangered and sensitive species prior to any surface-disturbing activity. Class A scenery would be reduced in quality in the disturbed and surrounding areas.

During the period of activity, the visual and audible disturbance from mineral exploration and development, and from development of access to a State inholding would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 10 percent (2,533 acres) of the WSA could be so affected in the foreseeable future.

The continued and increased vehicular use of existing ways and washes and use of new roads would detract from naturalness and opportunities for solitude and primitive recreation in the accessible portions of the unit. Tracks from motorcycle travel on 3.75 miles of wash bottoms would continue to be periodically removed by thunderstorm run-off. The 2.25-mile motorcycle way between Crack Canyon and Wild Horse Wash would remain and could become enlarged by continued use. Vehicular use could disturb several special features including Class A scenery, special status plant species, archaeological values, and wildlife associated with wilderness. Monitoring would be necessary to assess impacts and protect these values.

The gradual increase in visitor use would be expected to reduce the quality of wilderness values because the additional use would be largely vehicular in nature.

The extent that disturbance would occur over the long term, and, therefore, the long term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation, and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 94 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 2,533 acres. Class A scenery would be reduced in quality in the disturbed areas. Continued ORV use could affect special status species, archaeological values, and wildlife. Continued monitoring and protective measures would be necessary.

- Impacts on Vegetation Including Special Status Species

Implementation of the No Action/No Wilderness Alternative would result in surface disturbance on 94 acres or 0.4 percent of the WSA. This would not significantly affect any vegetation type in the WSA. There is a potential that the two threatened, three endangered, and four Category 1 and 2 candidate plant species that may occur in the WSA could be impacted by continued ORV use and that individual plants may be lost. However, the habitats of these species are wide spread and extend beyond WSA boundaries. Intensive monitoring efforts would continue in the foreseeable future. BLM would initiate a public awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation.

There is also a slight potential that individual threatened, endangered, or other special status species could be disturbed by locatable mineral exploration. This situation would only exist where such mineral operations would occur on sites of 5 acres or less, where a plan of operation and approval are not required under 3809 Regulations. The Endangered Species Act and subsequent regulations apply to these operations and any loss would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species. Before authorizing any surface-disturbing activities (mineral activities subject to 3809 Regulations and access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented.

Because necessary measures would be taken to protect these species, threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Vegetation types and populations of threatened, endangered or other special status plant species would not be significantly affected. Impacts from ORV use would be monitored and corrective measures taken should populations of special status species be threatened. While special status species populations would remain viable, the loss of some individual plants could occur.

- Impacts on Water Resources

Mineral exploration and development along the northwestern edge of the WSA would generally be shallow and would not significantly change groundwater quality or quantity.

Due to restrictions on development imposed by oil and gas Category 3 (no surface occupancy) on 3,180 acres, guidelines for protection of riparian habitat, and public water reserves, potential surface disturbance of 94 acres would not decrease water quality in the Muddy Creek drainage. Existing and future water use within or upstream of the WSA would not be significantly affected because there would be no restrictions on uses imposed by wilderness management.

Conclusion: The No Action/No Wilderness Alternative would not significantly alter present or future water quality or uses.

- Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife species, particularly those sensitive to surface disturbance or human interference, could be adversely affected by surface disturbance due to locatable mineral exploration and development (93 acres), development of access to in-held State land (1 acre), and continued ORV use. The entire WSA is considered high priority habitat for big horn sheep.

There is a slight potential that individual animals of the three endangered and eight sensitive species that may occur in the WSA would be disturbed by locatable minerals exploration. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under the 3809 Regulations. The Endangered Species Act and subsequent Regulations apply to these operations and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the endangered or other special status species.

Prior to authorizing any surface-disturbance activities (locatable mineral operations subject to 3809 regulations and development of access to in-held State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or special status animal species would be preserved with the level of mineral and access development that is projected.

Continued ORV use of the WSA could adversely affect big horn sheep and raptor nesting on cliff faces adjacent to vehicle use ways. Intensive monitoring efforts would be initiated to determine the effects of populations of these species, as well as others including threatened, endangered, or other special status species which may occur in the WSA. BLM would also prepare a management plan which would consider various management options for habitat preservation.

Conclusion: About 0.4 percent of the habitat in the WSA would be disturbed. Wildlife habitat or populations including threatened, endangered, or other special status animal species would not be significantly affected by locatable mineral or new access development. Adverse impacts would occur to big horn sheep

and raptor habitat without necessary monitoring of ORV use and enforcement of protective measures.

- Impacts on Cultural Resources

The entire WSA would remain open to mineral location and leasing, and oil and gas-related development unchanged. Potential impacts to cultural resources are unknown, but all sites in the unit would continue to receive protection under existing Federal and State antiquities laws. About 94 acres (0.4 percent of the WSA) of surface disturbance is projected. Any surface disturbance would be preceded by standard inventory and mitigation procedures. However, some sites, especially those that can not be identified by surface inspection, may be inadvertently damaged or destroyed. In addition, increased human presence in developed areas may provide opportunities for illegal artifact collection (Nickens et al., 1981).

The entire WSA would remain open to ORV use and vehicular access. ORV activity currently constitutes a major recreational use of the unit and may increase in the future. Some archaeological sites may receive unintentional damage as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of surface vehicular traffic. Artifacts may be broken or shallowly buried, deposits may be disturbed and exposed to erosional processes. In addition, general vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens et al., 1981).

With this alternative, archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without the restriction of wilderness values maintenance.

Conclusion: All sites, including the three recorded sites, would continue to be protected under existing laws. Impacts from disturbance of 0.4 percent of the WSA would be minimal.Inadvertent loss or damage to archaeological sites would occur due to surface development and/or continued ORV use. Intentional vandalism and artifact collection would increase due to increased activity and accessibility. Cultural resource management would continue without regard for protection of other wilderness values.

- Impacts on Recreation

The entire 25,335 acres would remain as a proposed open area for ORV use as identified in the San Rafael Resource Area MFP. About 3.75 miles of wash bottom travel routes and approximately 2.25 miles of ways receive traditional ORV (motorcycle) use of about 1,000 visitor days per year. Primitive recreation opportunities would be foregone in those areas where ORV use or surface-disturbing activities (94 acres) take place.

The future trends in recreational use of the Crack Canyon WSA are unknown. However, based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Cordell and Hendee, 1982; Jungst, 1978; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 percent to 7 percent per year over the next 30 years. At this rate, overall recreational use would increase from 1,500 current visitor days per year to be between 2,840 and 13,120 visitor days per year at the end of 30 years. Assuming that the 2 percent to 7 percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 500 visitor days per year to between 940 to 4,400 visitor days per year. Likewise, recreational activities utilizing vehicular access (primarily motorcycling) would increase from about 1,000 to between 1,900 and 8,720 visitor days per year.

Conclusion: The quality of primitive recreation would be reduced on and near ORV-use areas and areas where other surface-disturbing activities occur. This could occur directly on 94 acres and indirectly on up to 10 percent (2,533 acres) of the WSA. Both primitive and motorized recreational use would increase by 2 to 7 percent annually over the next 30 years.

- Impacts on Local Economic Conditions

There would not be changes in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected. Domestic livestock grazing (727 AUMs) would continue as authorized in the San Rafael MFP. Up to $50,670 per year in Federal oil and gas lease revenues could be generated within the WSA if the 25,335 acres in the WSA were to be leased for oil and gas.

The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, with the exception of uranium, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained. In the long term, up to 160 jobs could be provided by the four projected mining operations in the WSA. This would add about 2.4 percent to the Emery County workforce by the year 2010.

As discussed in the Recreation section, recreational use and related expenditures could increase at a rate of 2 to 7 percent per year over the next 30 years. By the end of 30 years, annual local expenditures related to recreation ($4.10 per visitor day) could increase from $6,150 to be between $11,644 and $53,972.

Conclusion: Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 2.4 percent (160 jobs) by the year 2010. Recreation-related expenditures could contribute up to $53,972 annually to the local economy by the year 2020. Livestock grazing would continue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Future oil and gas leases could generate up to $50,670 annually in Federal and State revenues.

All Wilderness Alternative (Proposed Action) (25,335 acres)

- Impacts on Wilderness Values

Designation and management of all 25,335 acres as wilderness would contribute to the preservation of the wilderness values in the Crack Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for primitive and unconfined recreation would be protected on all 25,335 acres. Solitude would be protected on approximately 25,300 acres that meet and 35 acres that do not meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including Class A scenery, geologic features, archaeological and historical values, endangered or sensitive species, wildlife associated with wilderness, wild horses, and perennial waters, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 28 acres is anticipated from exploration and development of valid uranium mining claims, and 1 acre from providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. Class A scenery would be reduced in quality in disturbed and surrounding areas. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 3 percent (760 acres) of the WSA could be so affected. Special features would not be significantly affected because the direct disturbance would be minor (involving only 0.1 percent of the WSA). In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activities. Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. The disturbance would most likely not be substantially noticeable in the area as a whole.

Vehicular use of existing ways and washes would generally cease with ORV closure, improving opportunities for solitude and primitive recreation.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for other disturbance is not accurately known, but would be less with this alternative than with No Action/No Wilderness due to application of mitigation that would protect wilderness values subject to valid existing rights.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 29 acres and the quality of opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 760 acres. Special features would be preserved overall, although Class A scenery would be reduced in quality in the disturbed and surrounding areas.

• Impacts on Vegetation Including Special Status Species

With this alternative, surface disturbance in the WSA due to projected exploration and development of mining claims would be only 28 acres, compared to 93 acres with the No Action/No Wilderness Alternative. About 1 acre would be disturbed with construction of new access to in-held State lands. Any surface disturbance would be preceded by site-specific clearances of the disturbed areas. If any threatened, endangered, or other special status species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, potential populations of threatened, endangered, or other special status plant species would be preserved with the All Wilderness Alternative.

ORV use would be precluded and this would have a positive impact on the threatened, endangered, or other special status plant species noted in the Vegetation Including Special Status Species section.

Conclusion: Vegetation types and special status species would be protected.

• Impacts on Water Resources

Surface disturbance from mineral and energy exploration, and development and construction of new access to State in-held lands could impact 29 acres with this alternative. This disturbance could be scattered through most of the WSA, although it could be less along the rocky outcrops of the San Rafael Reef due to terrain limitations. Because of the small, scattered areas affected and the lack of surface water resources, there would be no significant change from the current water quality.

Even though existing water uses would not be affected, wilderness designation could hamper future proposals or projects that would consumptively use water upstream of the WSA, or significantly alter flow through the WSA. Projects would be hampered because changes in use, changes in points of diversion, or transfer of water rights could be protested by the Federal government to maintain flow through the WSA. Potential upstream water uses include irrigation, cooling water for steam power generation, coal mining, and municipal uses.

Conclusion: In the short term, wilderness designation would not significantly alter water quality or uses. In the long term, future water diversions and new consumptive uses in the Muddy Creek system upstream of the WSA may be restricted or precluded.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

  Wilderness designation of the Crack Canyon WSA would have an impact on exploration for oil and gas. Oil and gas leases have been phased out and no new leases would be issued. Undiscovered oil and gas resources could not be explored or produced; however, potential of the area is considered low.

  The potential for the occurrence of tar sand within the WSA is low to moderate for small deposits. Since development is unlikely due to small-sized deposits, scarcity of water, and economic factors, impacts on tar sand as a result of wilderness designation would not be significant.

  The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The loss of potash development potential would not be significant because the likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere.

  No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

  • Locatable Minerals

  There are 372 mining claims covering 7,440 acres of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void. New claims could not be located after designation.

The uranium/vanadium-bearing strata is known to occur in the WSA.

With the exception of uranium, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Because only valid claims could be developed following designation in the WSA would be invalid claims, recovery of an unknown portion of the uranium in the WSA would be foregone. Therefore, this alternative would probably not result in any significant loss of recoverable copper, manganese, and gypsum resources but, in the long term, loss of uranium recovery would be important.

- Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these minerals within the WSA is predicted because such materials are available at much more accessible locations.

Conclusion: Wilderness designation would limit potential exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. Although some production would occur, opportunities for production of an unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be foregone.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to human interference and surface disturbance would benefit through protection of habitat and opportunities to find solitude. Big horn sheep populations would be expected to expand due to habitat protection afforded over the 25,335 acres of range. Off-road vehicle use would be precluded and wildlife habitats, including the endangered and other special status species which may occur in the WSA, would be protected from inadvertent vehicle damage. Sensitive life cycles would be less likely to be disturbed.

There are no proposed wildlife management facilities nor vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 28 acres of disturbed land due to locatable mineral activities. Increases in recreation visitor use could have a small negative impact on wildlife, although visitor/wildlife encounters would be infrequent due to low wildlife population. Mining claim development projected for 28 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA. Prior to any surface disturbance (28 acres due to mineral activities and 1 acre due to construction of new access to in-held State land), site-specific clearances and necessary, informal consultations with FWS would be made and appropriate mitigation measures would be set.

Conclusion: Approximately 0.1 percent (29 acres of the habitat in the WSA would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude.

- Impacts on Cultural Resources

The entire 25,335 acre unit would be closed to new mineral location, mineral leasing, and vehicular access. About 29 acres would be disturbed in the foreseeable future. Some 28 acres would be disturbed due to locatable mining activities and 1 acre would be disturbed due to construction of new access to in-held State lands. Any surface disturbance would be preceded by standard inventory and mitigation procedures and FWS intentional or unintentional impacts to cultural resources would occur under this alternative.

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility of wilderness designation may encourage large scale commercial looting. The rock shelter and rock art sites in the WSA may meet these requirements (Wylie, 1988). The benefits of protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any negative effects from increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restriction of wilderness management (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied in order to protect other wilderness values.

Conclusion: Cultural resources would be protected with this alternative. Cultural resource management would be limited in scope and execution.

- Impacts on Recreation

The entire 25,335 acres would be closed to recreational ORV use. Over 1,000 visitor days per year of traditional ORV (motorcycle) use would be lost. Most of this use occurs along 3.75 miles of wash bottoms within Chute Canyon, Wild Horse Wash, and along 2.25 miles of a way between Crack Canyon and Wild Horse Wash. In addition, potential future ORV use of up to 8,720 visitor days use would be foregone. This ORV use could be transferred to other locations without significant affect on visitation to Emery or Wayne Counties. The one adverse impact to existing motorcyclists would be loss of the unique Crack Canyon area and the convenience of riding from Goblin Valley State Park that they now enjoy.

Primitive recreation values could be enhanced by the All Wilderness Alternative. By increasing public awareness of the area, designation could result in increased primitive recreational use of the WSA. Judging from the WSA's site characteristics, population distribution about the site, and availability of similar sites, primitive recreation use would increase from the present 500 to between 940 to 4,400 visitor days per year. The nature of the recreation use in the WSA would change from about 33 percent primitive use and 67 percent ORV use to 100 percent primitive recreation use.

Mineral-related surface disturbance on up to 28 acres and 1 acre due to new access development could cause localized impairment of primitive recreational values in the WSA. This would occur on 29 acres that would be directly disturbed and indirectly on up to 3 percent (760 acres) of the WSA. However, the alternative could benefit the outstanding primitive recreation opportunities by preventing the likelihood of 65 acres of surface-disturbing mineral activities and eliminating ORV conflicts. Increased recognition would be given to specific primitive recreational values.

Conclusion: Primitive recreational opportunities would be protected, and primitive recreational use would increase at a rate of 2 to 7 percent annualy over the next 30 years. The quality of primitive recreational use would be directly reduced on 29 acres and indirectly reduced on up to an additional 3 percent (760 acres) of the WSA. Up to 8,720 visitor days of motorized use per year would be precluded at the end of 30 years. About 75 percent of the present recreational use is based on vehicular access and overall recreational use would decline following wilderness designation.

- Impacts on Local Economic Conditions

Overall, there would be a slight change in current trends of population, employment, and local income distribution.

Valid existing mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding mineral exploration and development would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action/No Wilderness Alternative. Except for uranium, the potential for mineral development is low in the foreseeable future and it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. Over the long term, exploration and development of the uranium resource could proceed on valid claims filed at the time of designation. It is assumed that such claims would exist and exploration and development would occur under more restrictive conditions than the No Action/No Wilderness Alternative. It is anticipated that up to 20 jobs could be provided with each of the four projected mining operations. This would result in a total of up to 80 jobs or one-half of those available with the No Action/No Wilderness Alternative. This loss would be equivalent to about 1.2 percent of the projected employment in Emery County for the year 2010. In addition, any local income related to assessment of future mining claims or income associated with possible mining in the distant future would be lost.

Livestock use and ranchers' income would continue as at present with $14,540 annually of livestock sales and $3,635 of ranchers' returns to labor and investment. Federal grazing fee revenues of about $1,120 would continue (at $1.54 per AUM).

Nonmotorized recreational use will increase (refer to the Recreation section). Related local expenditures would be small (average of $4.10 per visitor day Statewide), but could increase from $2,050 to between $3,854 to $18,040, for a net increase of up to $11,890 per year. This would be about $35,932 less than with the No Action/No Wilderness Alternative.

These expenditures would be well distributed among businesses in the affected area and would be locally insignificant. By increasing public awareness, designation could also increase the demand for commercial outfitter services and result in a more regular commercial use of the WSA.

The elimination of recreational ORV (motorcycle) use in the Crack Canyon WSA would reduce related expenditures. Although these expenditures would be locally insignificant, they probably would exceed any gain from increased nonmotorized use. Regional ORV expenditures would probably not be lost as the use transfers to other nearby areas in the region.

The loss of 25,335 acres potentially available for mineral lease would cause a potential loss of $50,670 per year (at $2.00 per acre) to the Federal Treasury. In each case, the State would have received half of these revenues.

Depending on the degree of impact on consumptive use of water, from Muddy Creek, wilderness designation could impede or interfere with major economic developments in Emery County. The magnitude of the potential impact is unknown.

Conclusion: Over the long term, wilderness designation would cause a slight change in local economic conditions from those what would occur with the No Action/No Wilderness Alternative. Approximately 80 fewer jobs would be provided by locatable minerals activities with this alternative. This is equivalent to about 1.2 percent of the projected Emery County employment in the year 2010. Recreation-related expenditures could contribute up to $18,040 annually at the end of 30 years. Livestock grazing would continue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Up to $50,670 in Federal and State lease revenues would be forgone each year.

Muddy Creek WSA

MUDDY CREEK WSA

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MUDDY CREEK WSA

MUDDY CREEK WSA

(UT-060-007)

INTRODUCTION

General Description of the Area

The Muddy Creek WSA is in the San Rafael Swell region of Emery County, Utah. It is situated 8 miles south of Interstate 70 (I-70) and 12 miles northeast of Capitol Reef National Park. The nearest towns to the north are Emery (30 road miles) and Ferron (42 road miles). The WSA has approximately 31,400 acres of BLM-administered land, including portions of Muddy Creek and its major drainage area. In size, the WSA is roughly 10 miles north to south and between 3 and 6 miles east to west.

The WSA's topography can be divided into three categories: deep-cut drainages, river-canyon bottoms, and stair-stepped mesas.

The canyons of Muddy Creek, the Chute, the Chimney, Hebes Canyon, and Willow Springs Wash are deeply entrenched into the Slaughter Slopes and Hondo Country. They vary from 5,000 feet elevation along their wash bottoms to nearly 7,000 feet elevation atop their rims. The canyons are steep and rugged, being accessible from the higher country in only a few spots.

The Muddy Creek drainage is only moderately vegetated, mainly with pinyon-juniper woodland and desert shrubs in the upper meandering portions of the canyon. Some side canyons are spotted with vegetation, small pour-offs and pools, and mostly shaded by steep walls.

The southern portion of the WSA consists of deep-red, stair-stepped mesas called Keesle Country. The Pasture forms another mesa scene and both are interrupted by the narrow, deep, and twisting character of Muddy Creek as it flows through the Chute.

The climate in this area is cold desert with temperatures ranging from 15 degrees to 100 degrees Fahrenheit (F). Precipitation averages about 8 to 10 inches, with approximately 15 inches of snow between October and April.

The west end of the BLM Crack Canyon WSA is located within 1 mile of the southeast border of Muddy Creek WSA.

Changes for the Final EIS

The anticipated surface disturbance presented in the Draft EIS (253 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 253 acres reported in the Draft EIS to 42 acres of surface disturbance for the Final EIS. The analysis of impacts has been revised accordingly.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Muddy Creek WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the disturbance estimate for the WSA has been reduced from 253 to 42 acres in the Final EIS, only 0.1 percent of the WSA would be disturbed and reclamation would be required. ORV use would be precluded under the existing San

STATEWIDE POCKET MAP
WSA NO. 61
SEE VOL.I

Rafael Management Framework Plan. Therefore, impacts on soils are not significant issues for the Final EIS for the Muddy Creek WSA.

2. Forest Resources: The only forest resources in the WSA are 6,953 acres of pinyon-juniper woodland and another 14,896 acres of scattered patches of pinyon pine and juniper trees. The WSA is closed to harvest of forest products under the San Rafael Management Framework Plan. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

3. Livestock Management: The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements, moving of livestock, and by preventing future range improvements, and placing restrictions on predator control. However, under the Wilderness Management Policy (BLM Manual 8560), there shall be no curtailments in grazing simply because an area is wilderness. Grazing reductions have already been imposed as a result of a grazing EIS.

There are no proposed rangeland developments which would be precluded by wilderness designation. Seven miles of way would be closed should the area be designated as wilderness. However, since motorized vehicles are seldom used in livestock management, little effect on management of livestock grazing is expected. Many methods of predator control would be allowed in the designated wilderness area. Predator control has not been conducted for several years in the grazing allotments that comprise the WSA. For these reasons, impacts on livestock management are not significant issues for the Muddy Creek WSA.

4. Visual Resources: As discussed above for soils, the estimates of surface disturbance have been reduced for the Final EIS. Therefore, the impacts on visual resources would be less than described in the Draft EIS. In the Final EIS, impacts on visual resources are not addressed under the heading of Visual Resources, but are addressed as part of the discussion of naturalness and special features in the Wilderness Values section.

5. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles, or vandalism. However, no cultural resource sites have been recorded in the Muddy Creek WSA. Only 42 acres of mineral-related surface disturbance is projected and the area is closed to ORV use by the BLM land use plan. Visitation is light (150 visitor days per year) and mainly primitive type use. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, impacts on cultural resources are not significant issues for the Muddy Creek WSA.

6. Recreation: The public has expressed concern that wilderness designation would change recreational use from motorized to primitive, or conversely, that without wilderness designation motorized recreation would eliminate or reduce opportunities for primitive recreation. Recreational use of the Muddy Creek WSA is light (estimated 150 visitor days per year) and would be primitive with or without wilderness designation because the entire WSA is closed to ORV use by the San Rafael Management Framework Plan. Therefore, impacts on recreation use are not significant issues for analysis in the Final EIS.

7. Wild Horses: The 7 to 15 head of wild horses which utilize the northern and western portions of the WSA would be protected by the Wild Free-Roaming Horse and Burro Act of 1971 (as amended), with or without wilderness designation. The removal of the excess wild horses, generally by the use of saddle horses, can take place inside and outside the WSA. Removal requires the construction of temporary corrals for holding the captured animals. Because of the rough topography in the WSA, almost all of the temporary facilities would be outside the WSA boundary. Occasionally, the removal requires the use of a helicopter to assist in the roundup. When this is the case, the helicopter would not be landing inside the WSA. Wild horse populations are also inventoried by the use of helicopter over the WSA, but landing is not required. Therefore, impacts on wild horses are not significant issues for analysis in the Final EIS.

- Issues Analyzed in Detail

The significant issues for the Muddy Creek WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on water resources.

4. Impacts on mineral exploration and production.

5. Impacts on wildlife habitat and populations including special status species.

6. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the adequacy of the BLM Wilderness Inventory; local government's position on wilderness and their responsibilities in the area; the ability to develop resources in the region should wilderness areas be established; the need to restrict or encourage ORV use; existing or future water rights; mineral values; threatened and endan-gered plant species; and vegetation and wildlife relationships. See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 61, for responses to specific comments about the Muddy Creek WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During the public comment period for the Draft EIS, BLM received two proposals that would combine the Crack Canyon and Muddy Creek WSAs. The largest proposal would also add about 19,960 acres of State land, 115 acres of Capitol Reef National Park, and 120,150 acres of BLM lands to the Muddy Creek WSA. These alternatives were not analyzed because inclusion of State and Park Service lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1). Thus, the two WSAs are separated from each other by Federal lands which are not under study for possible wilderness designation.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness; and (2) All Wilderness (Proposed Action) (31,400 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

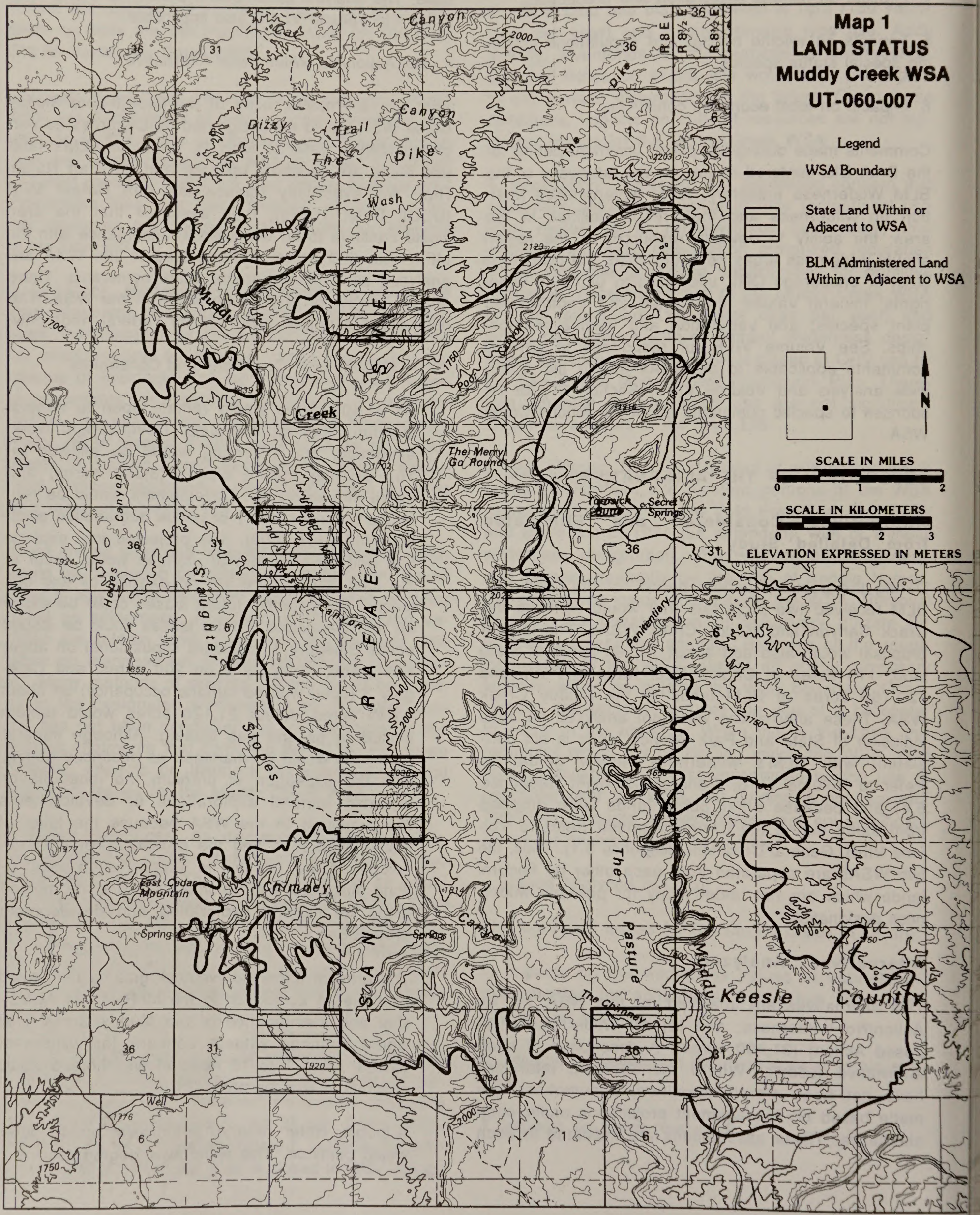
With this alternative, none of the 31,400-acre Muddy Creek WSA would be designated by Congress as part of the NWPS (refer to Map 1). Although BLM's land use plans are regularly updated and the San Rafael RMP will eventually replace the San Rafael MFP (USDI, BLM, 1979a), it is assumed that the area would continue to be managed in accordance with the MFP. The 640 acres of State land in the WSA are analyzed as remaining under State ownership. There are no private or split-estate lands in the WSA. The figures and acreages given are for Federal lands only.

- Management Conditions and Constraints

All 31,400 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on 167 existing mining claims (3,340 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809). It is projected that exploration and development of uranium would occur in the long term. There are no existing oil and gas leases, but potential future leases could be explored and developed. Future leases could be issued under Category 1 (standard stipulations) on about 640 acres, Category 2 on 200 acres, and Category 3 (open with no surface occupancy) on about 9,440 acres. About 21,120 acres would remain closed to oil and gas leasing. Although mineral resources would be managed as described above, with the exception of uranium, no locatable or leasable mineral explorations or developments are projected in the WSA because the level of known resources and the probability of their development are too low to support such assumptions. Appendix 6 in Volume I explains the methodology for mineral exploration and development projections.

The present domestic livestock grazing use would continue as authorized in the MFP (1,194 AUMs). Use and maintenance of the Muddy Creek Trail would continue without concern for wilderness values. From 7 to 15 head of wild horses would continue to use the area.

A public water reserve withdrawal on 40 acres would continue. This withdrawal segregates the


Map 1
LAND STATUS
Muddy Creek WSA
UT-060-007
Legend
WSA Boundary
State Land Within or Adjacent to WSA
BLM Administered Land Within or Adjacent to WSA
SCALE IN MILES
0 1 2
SCALE IN KILOMETERS
0 1 2 3
ELEVATION EXPRESSED IN METERS
N
T. 24 S.
T. 25 S.
R. 8 E.
R. 9 E.
R 8 E
R 8½ E
Cat Canyon
Dizzy Trail
The Dike
Wash
Muddy Creek
Poor Canyon
The Merry Go Round
Tomsich Butte
Secret Springs
Hayes Canyon
Slaughter Canyon
Stopes Canyon
Penitentiary
East Cedar Mountain
Chimney Spring
Chimney Springs Canyon
The Pasture
The Chimney
Muddy Keesle Country
Well
RAFAEL SWELL

lands from all public land laws and nonmetalliferous mineral location.

The entire WSA acreage, including 7 miles of vehicular ways, would continue to be closed to ORV use.

The entire 31,400-acre area would continue to be closed to commercial woodland product harvest. There is no harvest of forest products at the present time, nor is any expected.

The entire area would continue to be managed under VRM Class II on 31,400 acres.

- Action Scenario

Given the management plans described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in about 42 acres of surface disturbance due to uranium exploration and development in the northeastern and southern portions of the WSA, including up to 9 miles of access roads. Exploratory drilling would be conducted within the WSA to delineate additional ore reserves. Depending on the location of these reserves, they would either be developed through existing underground workings or new mines would be developed. Additional road building would be required, and facilities needed to support underground mining could be situated on lands currently in the WSA. The ore would be processed off-site. Exploration and development could provide up to 40 permanent jobs for each of the two operations projected for the WSA.

No disturbance from ORV use is projected because of management restrictions and rugged terrain.

Primitive recreational use is expected to increase over the current estimated use of 150 visitor days per year at a rate of 2 to 7 percent annually. No motorized recreational use is expected.

- All Wilderness Alternative (Proposed Action)

With this alternative, all 31,400 acres of the Muddy Creek WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There is one State section (640 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). There are no private or split-estate lands within the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

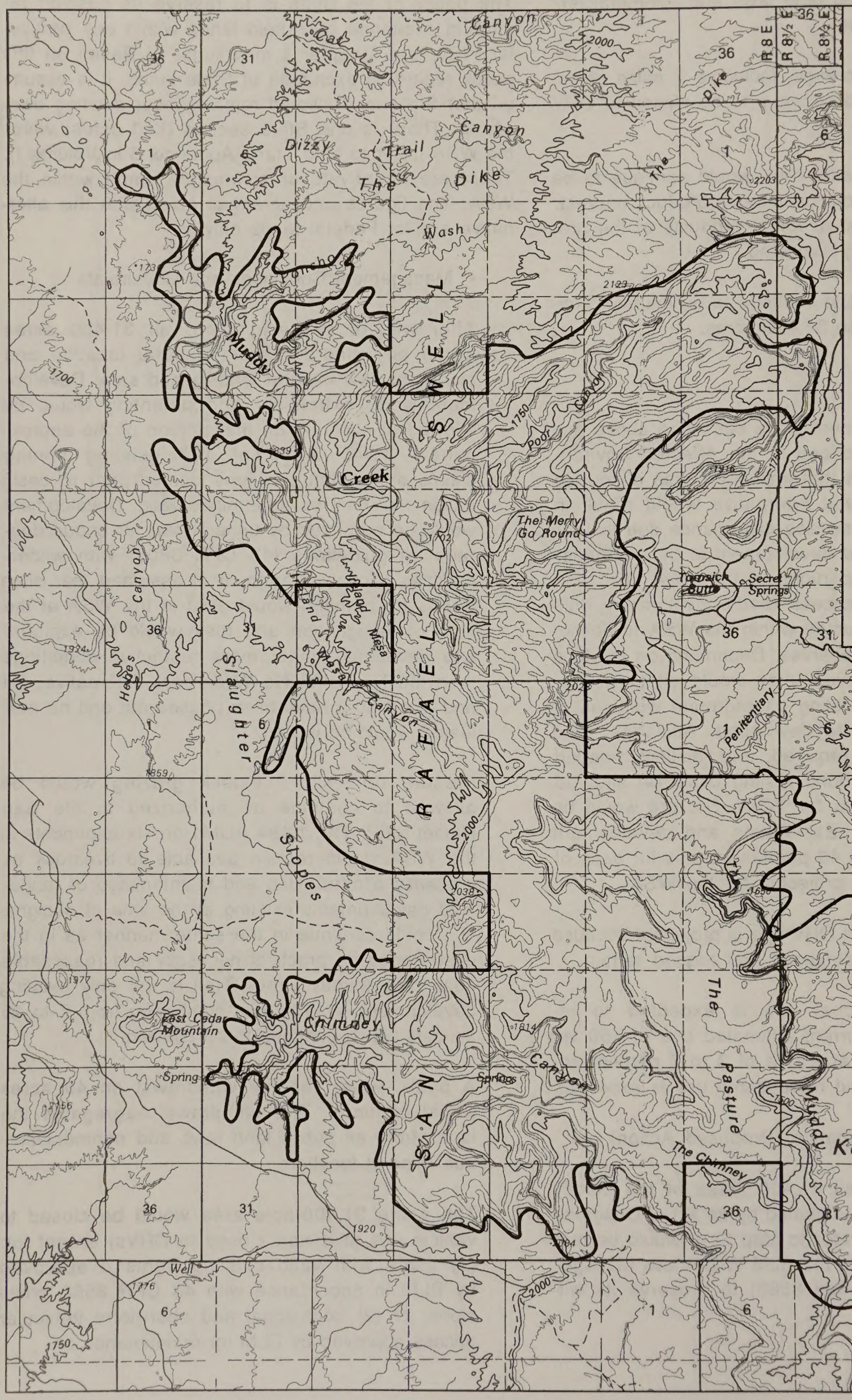
After wilderness designation, all 31,400 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 3,340 acres of 167 existing mining claims or any future claims located prior to designation that may be determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with wilderness as a consideration. It is assumed that such claims for uranium would exist in the WSA at the time of designation and they would be explored and developed under more restrictive conditions than the No Action/No Wilderness Alternative. Oil and gas leases have been phased out and no new leases would be issued.

Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The 1,194 AUMs on six allotments in the WSA would remain available to livestock as presently allotted. Use and maintenance of rangeland developments existing at the time of designation could continue in the same manner as in the past, based on practical necessity and reasonableness. The Muddy Creek Trail is the only existing development. Wild horses numbering from 7 to 15 animals would continue to be allowed.

A public water reserve withdrawal on 40 acres would continue. This withdrawal segregates the lands from all public land laws and nonmetalliferous mineral location.

The entire 31,400-acre area would be closed to vehicle use (it is now closed to ORVs) except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of

MUDDY CREEK WSA



Map 2

ALL WILDERNESS ALTERNATIVE

Muddy Creek WSA

UT-060-007

Legend

All Wilderness Alternative (31,400 acres)

N

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

approved livestock developments. Approximately 7 miles of an existing vehicular way in the Chimney Canyon drainage area would not be available for vehicular use except as indicated above. This way is passable only by foot or horseback at present. About 2.5 miles of the WSA boundary (in two locations) follow existing gravel and dirt roads that would remain open to vehicular travel. Two roads dead end on State lands (T. 25 S., R. 8 E., secs. 2 and 16) adjacent to the WSA boundary, and these roads would remain open to vehicular access.

Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood (for on-site use) if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned. Commercial harvest of pinyon-juniper for firewood, fenceposts, or Christmas trees in the WSA is not allowed.

Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 12 acres would be disturbed with the All Wilderness Alternative. This surface disturbance would be due to uranium exploration and development in the northeastern and southern portions of the WSA. Mines adjacent to the WSA in these two areas have been major producers of uranium in the past. Exploratory drilling within the WSA will be conducted to delineate additional ore reserves. Depending on the location of these reserves, they would either be developed through existing underground workings or new mines would be developed. Up to 4 miles of roads would be required and facilities needed to support underground mining could be situated on lands currently in the WSA. The ore would be processed off-site. Up to 20 permanent jobs could be provided for each of the two operations projected for the WSA.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain.

Primitive recreational use is projected to increase over the current estimated use of 150 visitor days per year at a rate of 2 to 7 percent annually.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA (31,400 acres) is of sufficient size to meet wilderness study criterion.

- Naturalness

The major imprints surrounding the Muddy Creek WSA were excluded during the boundary inventory process. What remains of note are two ways, the Muddy Creek range trail, an airstrip, two cabin structures, an old vehicle, and two mine shafts. These imprints occurred before 1976 (unless otherwise noted).

A way, approximately 7 miles long, follows the cliff contours through the Pasture and into the canyon drainage of the Chimney. Positioned in the red mudstone of the Carmel Formation, the old road cut has eroded severely, making passage possible only by foot or horseback. The way is more visible in some parts than in others. In general, it has become a useful passage route that blends well with its surroundings. Another way, extending approximately 0.25 mile into the northeastern boundary, was developed without authorization in 1983. The route has been reclaimed and is now unnoticeable.

MUDDY CREEK WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	Alternatives: All Wilderness (31,400 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 42 acres of the WSA because of uranium exploration and development and development of access to in-held State lands. These values would be indirectly reduced in quality on up to an additional 3,140 acres. Class A scenery would be reduced in quality in the disturbed and surrounding areas.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 12 acres because of uranium exploration and development on valid mining claims and development of access to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 942 acres. Special features would be preserved overall, although Class A scenery could be reduced in quality in disturbed and surrounding areas.
Impacts on Vegetation	Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected because the 42 acres of projected surface disturbance would affect only 0.1 percent of the vegetation in the WSA. There would not be impacts on vegetation from ORV because the area would continue to be closed to ORVs.	Vegetation types and threatened, endangered, or other special status plant species would be protected by this alternative because projected disturbance would be reduced from 42 acres to 12 acres and ORV use would not be allowed. Appropriate inventories, clearances, and consultation with FWS would be completed prior to surface disturbance.
Impacts on Water Resources	This alternative would not significantly alter present or future water quality or uses. Only 0.1 percent (42 acres) of the WSA would be disturbed and there would be no restrictions on water use, imposed by wilderness management.	Water quality would receive additional protection because the potential for surface disturbance would be reduced. In the long term, future water diversions and new consumptive uses in the Muddy Creek system upstream of the WSA may be restricted or precluded. Potential upstream uses include irrigation, cooling water for coal-fired generation of electricty, coal mining, and municipal use.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	Alternatives: All Wilderness (31,400 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Mineral and energy exploration and production would not be affected because mineral leasing, location of mining claims and mineral developments would not be restricted for the protection of wilderness values.	Wilderness designation would limit potential exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. Although some production would occur, opportunities for production of an unknown portion of the uranium in th eWSA would be foregone. No other significant locatable or leasable mineral production would be foregone because the probability of development is low even if the area is not designated wilderness.
Impacts on Wildlife Habitat and Populations	Only about 0.1 percent (42 acres) of the wildlife habitat in the WSA would be directly disturbed and mitigation would be required. ORV use would not be allowed. Therefore, wildlife habitat and popula-tions including special status species would not be significantly affected. However, small portions of potent habitat for peregrine falcon and black-footed ferret could become unsuitable for reintroduction of the species.	Approximately 0.04 percent (12 acres) of the wildlife habitat would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude over the short and long term.
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 1.2 percent (80 jobs) by the year 2010. Primitive recreation-related local expenditures would increase by 2 to 7 percent per year over the next 30 years. Federal revenues from commercial recreation permitting (currently $30 annually) would continue. Livestock grazing would contribute $23,880 annually in livestock sales and $1,839 in Federal revenues. Present and future oil and gas leases could contribute up to $20,560 annually in Federal and State lease revenues.	Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/ No Wilderness Alternative. Up to 40 fewer jobs would be provided by locatable mineral activities. Recreation-related expenditures would not be affected because present use is mainly primitive and would ocntinue to increase by 2 to 7 percent per year. The potential for commercial recreation use and resulting Federal revenues (currently $30 annually) would increase. Livestock grazing sales and Federal revenues would continue. Up to $20,560 in Federal and State lease revenues would be foregone each year.

MUDDY CREEK WSA

The Muddy Creek range trail is located in the upper northwestern corner of the WSA. The trail is used by livestock and wild horses to access the Muddy Creek drainage.

Associated with the way leading into the canyon of the Chimney is an abandoned airstrip, two cabin structures near a spring, and an old station wagon buried in the wash. The airstrip is located near the wash bottom on level and wide-open terrain. Over the years, erosional patterns have begun to cut across the strip, and sparse vegetation is returning. One old cabin and a chicken coop are located near a spring about 1 mile west of the airstrip. Halfway between the strip and cabins is the old station wagon buried to the roof in the wash.

Two mine shafts are located adjacent to the WSA's northeastern boundary. Several other mining shafts are located in the surrounding area.

These imprints combined cover approximately 2 percent (628 acres) of the WSA. The remaining acreage (30,772 acres) could be considered unspoiled in character. All 31,400 acres meet the naturalness criterion for areas under wilderness review. No surface disturbing activities have occurred since the wilderness inventory.

- Solitude

The WSA offers outstanding opportunities for solitude. The major canyons and rugged remote terrain offer miles of opportunities for users to experience isolation. Steep cliffs, narrow passages, and broken terrain effectively shroud lines of sight and suppress sounds for any substantial distance within these canyons. Off-site intrusions and influences are essentially nonexistent within the canyons.

The higher reaches of the WSA, above the canyon drainages, are rough and broken in character and offer vantage points for views of volcanic intrusions to the west and south and of erosional patterns of the San Rafael Swell .To the north and east off-site intrusions are essentially nonexistent when viewed from these vantage points. Vegetation cover is limited and does not effectively screen visitors; however, the broken and rough terrain does allow for separation and the feeling of seclusion. Expansive views of the natural surroundings give the feeling of remoteness.

All in all, the entire Muddy Creek WSA contains outstanding opportunities for solitude.

- Primitive and Unconfined Recreation

Tubing and kayaking of wild, small, desert rivers is becoming a popular recreation activity. The Muddy Creek drainage has been explored by a small number of floaters, and inquiries on the area have increased over the past 5 years.

The river offers two different adventures during a short floating season. One will take the floater down an open, twisting canyon segment. The second involves some technical maneuvering through a deep narrow passage stream with rapids and relatively swift current. Any floater finds the Muddy Creek an outstanding primitive adventure.

Hiking, backpacking, and horseback riding are other recreational opportunities available in the WSA. The rugged and remote character of the area, red-walled cliffs, pinnacles, knobs, isolated tracts of land, arches, and archaeologic remnants all contribute to making these activities high-quality recreational experiences. The striking scenery also makes outstanding opportunities for sightseeing, photography, and artistic endeavors of high quality.

All 31,400 acres of the WSA meet the outstanding recreation criterion set for areas under wilderness review.

- Special Features

The Muddy Creek WSA offers supplemental features of geologic, scenic, archaeologic, and ecologic values. These features enhance the other opportunities available within the unit.

The canyons of the WSA offer many exposed geologic strata and formations, including cliffs, knolls, alcoves, caves, and arches. The upper reaches provide dramatic views of the twisted and carved character of the area surrounded by the volcanic and swelling action of the land. The Chute is a good example of the unusual erosional pattern of a drainage through some of the oldest formations exposed in the San Rafael Swell.

The archaeological values of the WSA are unknown; however, scattered evidence has been found by recreationists and ranchers along the Muddy Creek drainage. Remnants of cowboy camps and mining activities of the 1940s are also present in several places of the WSA and might be historic in value. These qualities have not been evaluated.

MUDDY CREEK WSA

Two herds of wild horses frequent the WSA in the west, north, and east portions. Numbers in the herds range from 7 to 15 horses.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are three animal species (black-footed ferret, bald eagle, and peregrine falcon) and two plant species (Maguire daisy, Erigeron maguirei var. maguirei, and Wright fishhook cactus, Sclerocactus wrightiae) listed as endangered that may be found near or within the WSA. Also, two threatened species, the Jones cycladenia (Cycladenia humilis var. jonesii) and the Last Chance townsendia (Townsendia aprica), may occur in or near the WSA. There are nine animal species and five plant species that are considered sensitive that may occur in the WSA. Cougar, which is a wildlife species associated with wilderness, may occasionally visit the area. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

The entire WSA is rated Class A for scenic quality. It has approximately 20 miles of perennial streams.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of saltbush-greasewood and galleta-threeawn shrub steppe. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is a Prevention of Significant Deterioration (PSD) Class II attainment area and currently meets Class II standards of air quality classification (1977 Clean Air Act amendments). The nearest Class I area is Capitol Reef National Park, located approximately 12 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from Castle Valley and the Green River-Moab area. A large point source includes powerplants in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles (Aerocomp, Inc., 1984).

Geology and Topography

The Muddy Creek WSA is within the Colorado Plateau Physiographic Province and is located along the southwestern flank of the San Rafael Swell. During the Eocene Epoch, the area began to be uplifted, creating an upwarp in the existing sedimentary sections. A period of erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent northeast-trending uplift on the Colorado Plateau. Elevations range from 5,000 to 7,000 feet. Geologic formations cropping out in the WSA range from Permian White Rim Sandstone on the east to the Jurassic Carmel Formation on the west. The formations dip to the west at an angle of less than 10 degrees.

The White Rim Sandstone crops out along the lower portion of the Muddy Creek drainage and its tributaries. It is white to buff, fine-grained, cross-bedded, massive, eolian sandstone with limestone occurring at the base. The Chute is one of the major canyons carved into this sandstone.

The Kaibab Limestone is another formation that crops out above the White Rim and along the Muddy Creek and its associate tributaries. It is a light gray to brown, sandy, cherty limestone. The formation contains many chert geodes with quartz and calcite crystals.

The Moenkopi, exposed in the surrounding area of the Chute, consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-gray and red shale, and conglomerate. The Moenkopi is known as an oil and gas producer in the Grassy Trail field to the northeast. Towards the base of the formation is the Sinbad Limestone Member.

Situated along the cut cliff of the Muddy Creek drainage is the Chinle Formation. This formation consists of sandstone, varigated shale, and conglomerate, all of which are lenticular and intertonguing. The formation is a uranium producer and composed of four members: Temple Mountain, Monitor Butte, Moss Back,

and Church Rock. This formation is known to contain vertebrate and invertebrate fossils.

The Wingate Formation lines the cliff faces of the Muddy Creek Canyon drainages. It consists of buff, orange, and brown, massive cross-bedded, medium-grained sandstone and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls.

The Carmel Formation is found along the WSA's western and northwestern boundary. It consists of brown to gray, sandy limestone, red thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

Soils

Soil types were placed into broad classes from photo interpretation of landscapes and knowledge of dominant soil types in similar locations. Soil characteristics are shown on Table 2.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock Outcrop	35	10,990	0.0	0
Shallow andloamy soils on sloping structural benches	40	12,560	1.0	5
Moderately deep to very deep stony soils on moderately steep to steep alluvial fans	25	7,850	1.0	10
Totals	100	31,400		

Source: Hansen, 1985.

Wind is an important erosive agent in the WSA; however, water actions move the most soil. Erosion potential is low. Because of the lack of vegetation groundcover, exposed bedrock, and patterns of brief, intense summer thunderstorms, locally severe erosion problems are present. This is especially true on steep slopes and exposed wash channels. A summary of erosion estimates is shown in Table 3.

About 70 percent of the soils within the WSA are classified as strongly saline and 30 percent are slightly saline. The average annual salt production from the soils within the WSA is estimated to be 151 lb per acre. The potential for seedling establishment would

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	25	7,850	78,500
Medium	5.0	-	-	-	40	12,560	62,800
Low	1.0	65	20,410	20,410	-	-	-
Very Low	0.1	-	-	-	-	-	-
None	0.0	35	10,990	-	35	10,990	-
Totals		100	31,400	20,410[a]	100	31,400	141,300[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre, 0.65 under present conditions; 4.5 if disturbed.

be fair on only 10 percent of the WSA where soils are moderately deep and slopes are tolerable. The remaining 90 percent is classified as unsuitable for seedling establishment because of rock, rock outcrops, shallow soils, steep slopes, and saline/alkaline soils.

Vegetation Including Special Status Species

The major vegetation types in the WSA are pinyon-juniper woodland, pinyon-juniper woodland/desert shrub, desert shrub, greasewood and grassland. The pinyon-juniper woodland type is found on foothills and mesas. Stands in the WSA are sparse and often contain a desert shrub understory. Dominant species are pinyon pine and Utah juniper. Major desert shrub species are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat.

Greasewood and grassland make up the remainder of the WSA. Greasewood is mainly found on valley floors, bottom lands, and floodplains of perennial and intermittent streams where salty water tables are available at least part of the year. Other salt-tolerant plants associated with this type are tamarisk, shadscale, alkali sacaton, and salt grass. Also found are cottonwood, rabbitbrush, big sagebrush, black sagebrush, and curly grass.

Dominant grassland species are blue grama, Indian ricegrass, and sand dropseed. Other grasses include western wheatgrass, Fendler threeawn, needle-and-thread, and squirreltail. Although Muddy Creek flows through the WSA, it is not considered a riparian area due to a lack of riparian vegetation. Table 4 summarizes existing vegetation types.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland/desert shrub	14,896	47
Desert shrub	8,160	27
Pinyon-juniper woodland	6,953	22
Greasewood	692	2
Grassland/desert shrub	699	2
Total	31,400	100

Source: USDI, BLM, 1989

The San Rafael Swell, of which the WSA is a part, provides habitat for a large number of rare plant species. Nine threatened, endangered, Category 1 and 2 candidate species may occur in the WSA (refer to Table 5).

Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenia humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barnebyi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 in Volume I

The Muddy Creek WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types in the WSA are listed on Table 6.

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Saltbush-greasewood	21,952	70
Galleta-threeawn shrubsteppe	9,448	30
Total	31,400	100

Source: USDI, USGS, 1978.

Water Resources

The Muddy Creek WSA is in the Muddy Creek drainage which is a tributary of the Dirty Devil River in the Upper Colorado River hydrologic subregion.

Muddy Creek bisects the WSA from northwest to southeast for about 20 miles and is the major perennial water source. A spring in the southwestern portion of the WSA is the only other known water in the WSA. It is also considered perennial. There may be some small ephemeral or intermittent seeps and/or

waterholes that have not been recorded. There are no developed waters in the WSA. Water use in the unit is primarily for livestock and wildlife. Muddy Creek is used for recreation such as innertubing during high flows and hiking during low flows.

The WSA is within Water Right Adjudication Area 94. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in certain areas. The main stream of Muddy Creek is fully appropriated. There are no areas of significant groundwater development in this drainage area.

The water quality standards for Muddy Creek and tributaries, from the confluence with Fremont River to the Highway U-10 crossing are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Water quality in Muddy Creek is generally poor, but adequate for wildlife and livestock needs. Upstream agricultural practices may present some problems for human use of water in terms of taste, total dissolved solids, salinity, nutrients, and coliform bacteria. Quality of the water from the spring is better than that of the creek. No specific data on water quality are available.

Muddy Creek originates on the Manti LaSal National Forest over 30 miles upstream of the WSA. It crosses national forest, private, BLM-administered, and scattered sections of State land before entering the WSA. Present and potential upstream uses include irrigation, cooling water for coal-fired generation of electricity, coal mining, and municipal uses in Emery County.

Mineral and Energy Resources

The energy and mineral ratings are given in Table 7. Appendix 5 in Volume I explains the mineral and energy rating system.

The WSA contains deposits of vanadium and could contain copper and manganese that are currently listed as strategic and critical materials (USDoD, 1988). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability[a]	Certainty[b]	
Oil and Gas	f 2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of natural gas
Tar Sand	f 2	c3	Less than 10 million barrels of oil in-place
Potash	f 2	c2	Less than 1 million metric tons
Geothermal	f 2	c1	Low temperature
Uranium/Vanadium	f 4	c4	Greater than 1,000 metric tons of uranium oxide
Manganese	f 2	c1	100,000 metric tons of 40-percent manganese
Copper	f 2	c2	Less than 50,000 metric tons
Gypsum	f 2	c4	Less than 5 million metric tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Leasable Minerals

Currently, there are no active drilling, mining, or exploration activities for leasable minerals.

- Oil and Gas

The WSA has established oil and gas categories as shown in Table 8. There are currently no mineral leases in the WSA.

Table 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	640	2
2. Open with special stipulations[a]	200	1
3. Open with no surface occupancy	9,440	30
4. No leasing	21,120	67
Total	31,400	100

Source: USDI, BLM, 1975a.

[a]Special stipulations have been developed to protect the Muddy Creek drainage.

To have an oil and gas field, certain conditions must be met. These conditions include a source for petroleum, porous and permeable rock (reservoir rock), and traps. Traps can be either stratigraphic, structural, or a combination of both.

Structural traps are caused by folding, faulting, fracturing, and intrusions of salt plugs.

The San Rafael Swell is a structural trap. The interior of the swell has been eroded away, probably allowing any petroleum contained in the structure to escape. The swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the swell. The Ferron gas field, 24 miles north of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance gas field, 8 miles to the southwest, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability and porosity of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail field, 54 miles to the northeast, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 1 mile east of the WSA's southeastern boundary. The well was plugged and abandoned on February 1, 1959. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Muddy Creek WSA would probably be small pools and/or fields.

The favorability rating of f2 indicates that potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas (SAI, 1982). Positive evidence of resource occurrence is some distance away or in a situation that may be considered unrelated to the geology of the WSA. Therefore, the certainty that this resource exists is low (c1) (SAI, 1982).

- Tar Sand

Minor tar sand occurrences can be found along the eastern and northeastern boundaries of the WSA. These deposits may extend into the WSA and would be found within the Kaibab Limestone.

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving behind the heavy fraction, or tar substance. Other chemical processes may be involved. The San Rafael Swell is estimated to contain 445 to 545 million barrels of oil in-place, with most of it in the Moenkopi Formation. The nearest deposit of Moenkopi to the WSA is in the Family Butte deposit located 2 miles northeast and is a part of the San Rafael Swell Special Tar Sand Area (STSA). The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of asphaltic material (tar sand). The Muddy Creek WSA is not within the San Rafael Swell STSA (USDI, BLM, 1984c).

The low favorability rating of f2 for tar sand indicates potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. The certainty that these deposits exist is moderately high (c3) (SAI, 1982). It is unlikely the tar sand within the WSA will be developed due to small-sized deposits and economic factors.

- Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousand feet thick in the area of Moab where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating of f2 indicates that, if deposits occur in the Muddy Creek WSA, they would generally contain less than 1,000,000 metric tons of potash. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it unlikely that the potash resource in the WSA would be developed.

- Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal water (between 20 degrees and 90 degrees Centigrade). Water extracted at these temperatures can be used for direct heating purposes. It seems very unlikely that this resource, assuming it exists, would ever become

economical to use considering the probable great depth of the resource, the associated high drilling costs, and the lack of nearby potential users. The potential is rated as low (f2/c1) (SAI, 1982).

- Locatable Minerals

There are 167 mining claims covering approximately 3,340 acres.

- Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These deposits are scattered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock Members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member. Two mines are adjacent to the northeastern boundary of the WSA. Together the mines produced a little over 2,911 lb of uranium oxide from the 1950s to 1970s. Several other mines located near these two and outside the southern boundary of the WSA have produced up to 51,528 lb of uranium oxide.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these other minerals occur in sufficient grades or quantities within the WSA to be minable. These metals indicate a hydrothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The southern uranium belt, which extends through the eastern part of the WSA, is most favorable for the occurrence of ore deposits. Moderate and large-size ore bodies are found in the southern belt (Hawley et al., 1968). The large ore body of the Delta Mine, located in the southern belt and 1 mile south of the WSA, occurs in a sandstone lens of the Monitor Butte Member. The ore body is enclosed in red, purple, and pale-green mudstone and attains a maximum thickness of 20 feet. The main ore minerals are uranite and carnotite and are believed to be deposited by solutions that traveled laterally along bedding plane fractures until the sandstone lens was reached. The ore grade is relatively rich (greater than 1 percent uranium oxide).

The ore-bearing solutions responsible for the deposition of the Delta ore body could have deposited similar ore bodies in the immediate vicinity. The WSA has a high rating of f4 with a certainty of c4 to the WSA, indicating a high potential for a large, overall tonnage of ore (greater than 1,000 metric tons of uranium oxide) (SAI, 1982). It is believed, though, that individual ore bodies within the WSA, if present, would probably be scattered and small to moderate in size. The Chinle Formation outcrops on the eastern side of the WSA and the thickness of the overburden increases to the west. Most surface deposits in the area have been discovered and subsurface deposits would require drilling for exploration and development. The western and mid-portions of the WSA are also very remote and composed of rough terrain. Cost for drilling would increase due to these combined factors, whereas the economic potential is greater on and near the outcrop.

- Manganese

Manganese deposits in the area are estimated to be chiefly small and low grade, occurring in the Morrison and Summerville formations. The nearest known deposits are 38 miles northeast of the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low favorability rating of f2 indicates a deposit size of up to 100,000 metric tons of 40-percent manganese. However, the WSA is favorable for only very small accumulations, several tons at the most. The low certainty rating (c1) was assigned due to inconsistency in data (SAI, 1982).

- Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is the Copper Globe Mine located about 7 miles north of the Muddy Creek WSA. The mine produced 2 or 3 metric tons of ore copper between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The favorability rating of f2 indicates a potential for small copper deposits in the WSA (less than 50,000 metric tons of contained copper). The certainty level for the resource is low (c2) (SAI, 1982).

- Gypsum

The Carmel Formation is reported to contain a bed of industrial grade gypsum in the far northwestern portion of the WSA. The BLM has given gypsum a favorability rating indicating a potential for low tonnage. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million metric tons). It is unlikely that any gypsum would be developed due to distance of mines to market and related transportation concerns.

- Salable Minerals

Although the potential exists for use of rock materials from the WSA, it is considered to be very low due to limited demand and high availability of these materials elsewhere in more accessible locations.

Wildlife Including Special Status Species

The Muddy Creek WSA provides habitat for a limited variety of wildlife species. Muddy Creek is a perennial water source; however, use is limited due to difficult access. A few rock water holes occur in the WSA and are evident especially after rain. These can not be relied upon by wildlife as a permanent water source, as they evaporate during extended dry periods. During winter months, snow (when available) provides a water source. Vegetation is also a limiting factor due to low density, limited species composition, and bare rock surfaces.

The WSA provides habitat for low density populations of mule deer. Twelve desert bighorn sheep were sighted along the San Rafael Reef (approximately 2 miles to the southeast of the WSA) in 1983. None of the WSA has been identified as crucial habitat for this species.

The WSA provides habitat for coyote, bobcat, cottontail rabbit, blacktail jackrabbit, woodrat, ringtail, badger, Ord Kangaroo rat, gray fox, kit fox, whitetail antelope squirrel, chipmunk, rock squirrel, bat, mice, and vole.

Habitat for various small bird species is found within the WSA. The species diversity and population sizes are small due to the lack of a diverse habitat. The highest density of avian fauna occur along Muddy Creek. Few individual raptors are found in the WSA. Of those present, golden eagle, prairie falcon, American kestrel, red-tailed hawk, ferruginous hawk, and rough-legged hawk (winter resident) are the most common. Waterfowl and shore birds generally do not exist in the WSA. Chukars in the WSA are usually found within 1 mile of Muddy Creek. Mourning dove nest within the WSA.

Several species of snakes and lizards can be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, and common tree lizard are the most common. Great Basin gopher snake, striped whipsnake, western rattlesnake, and western terrestrial gartersnake account for the majority of snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Mountain lion may occasionally visit the area but, with low deer numbers, are a rare occurrence. No documented sightings are recorded.

The portion of Muddy Creek flowing through the WSA has been classified by the UDWR as a limited value, nongame fishery, Class V stream. Speckled dace, flannel mouth sucker, bluehead or green sucker, and roundtail chub are species found in this portion of the Muddy Creek. Tadpole shrimp (crustaceans) may be present in the various water holes.

The peregrine falcon (an endangered species) is thought to be a possible visitor to the WSA. No known sightings or identified critical habitat exist, but the potential habitat (12,266 acres) is there. Bald eagles may be found along the Muddy Creek searching for food in the winter. No known sightings have occurred in the WSA. The FWS has also identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle is a BLM sensitive species. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, southern spotted owl, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

There are no potential or existing wildlife management facilities within the WSA, and no projects for vegetation treatment have been identified.

MUDDY CREEK WSA

Forest Resources

The juniper-pinyon woodland is found in sparse quantity on 21,849 acres within the WSA. Because of the remoteness from populated areas and availability of woodland products closer to population centers, harvest of the pinyon-juniper woodland in the WSA has been minimal and is not expected to increase in the foreseeable future, as the entire WSA is closed to the harvest of woodland products.

Livestock and Wild Horses/Burros

The Muddy Creek WSA contains portions of six livestock grazing allotments where 20 grazing permittees have authorized grazing use of up to 1,194 AUMs (refer to Table 9).

There is only one range improvement project in the WSA, the Muddy Creek Trail, located in the upper northwestern corner of the WSA. The trail is used by livestock and wild horses as access to the Muddy Creek drainage. There are no potential grazing improvements identified in the WSA.

Two separate herds of wild horses frequent the western and northern parts of the WSA. Herd numbers range from 7 to 15. One other herd has been seen adjacent to the WSA's eastern boundary, near Penitentiary Canyon but are not known to use the WSA.

Predator control was not conducted during the 1986-1987 period in the grazing allotments that comprise the Muddy Creek WSA (USDA, APHIS, 1988).

Visual Resources

The Muddy Creek WSA consists of several incised drainages and major canyons, volcanic and colorful rolling terrain, large rounded knobs of arch-forming sandstone, alcoves and caves, and red stair-stepped mesas.

One major canyon drainage, Muddy Creek, cuts through the length of the WSA. Many other tributaries carve their way to the Muddy Creek Canyon. These canyons cut through and expose successively the dark red Carmel Mudstone, pink and tan Navajo Sandstone, grayish Kayenta Sandstone, red and gold Wingate Sandstone, and the buff, brown-dripped Coconino Sandstone. Major tributary canyons of the WSA are Willow Springs Wash, Hebes Canyon, the Chimney, and the Chute.

Near the northwestern boundary of the WSA is colorful pink, purple, and grayish rolling terrain. Atop the canyons are large rounded knobs of arch-forming sandstone. The Hondo Arch is a dominant visual feature in the WSA's eastern part.

From most viewpoints in the upper levels of the WSA's canyon system, the landscape would be classified panoramic in that there is little impression of visual boundaries and distant views are seldom blocked by landforms in the foreground. From within the canyons, the landscape would be classified enclosed. Views within the canyons are dominated by vertical red and gold sandstone walls.

Table 9
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Lone Tree	106,650	10,140	5,270	507	958 Cattle	12/16-05/31	8
Red Canyon	36,380	400	2,237	25	508 Cattle	10/16-03/15	6
McKay Flat	47,350	4,865	2,228	224	416 Cattle	11/01-04/15	1
Mussentuchit	52,360	2,175	1,994	80	286 Cattle	10/15-05/31	2
Hondo	11,980	10,600	224	198	48 Cattle	11/01-05/31	2
Rock Springs	87,750	3,220	4,414	160	600 Cattle	11/01-05/31	1
Totals	342,470	31,400	16,367	1,194	2,816		20

Source: BLM File Data.

MUDDY CREEK WSA

The southeastern portion of the WSA is referred to as Keesle Country. The terrain is deep red in color, formed by mesas situated in a stair-stepped fashion as the country dips gently to The Chute. Here the White Rim Sandstone is exposed by a dramatic cut of Muddy Creek. Buff, tan, and rust colored rocks are rounded, cracked, and carved into a deep, narrow passage. The walls are dripped with a dark brown-black color and the landscape is one of outstanding and interesting visual quality.

The entire WSA (31,400 acres) is classified as having Class A scenery which means it contains the most outstanding visual characteristics of the physiographic region. The sensitivity level of this area has been rated high due to the outstanding visual quality. Based on these factors, the entire WSA falls within the VRM Class II management area. Appendix 7 in Volume I explains the BLM VRM system.

Cultural Resources

Only 160 acres of this area have been inventoried. Based on inventory figures from the Last Chance Planning Unit (Hauck, 1977) potential site densities are expected to be moderate (115 sites per 23,000 acres) within the unit. Most additional sites would probably be lithic scatters, but other types of sites may also be present. No sites have been formally recorded in the WSA, but several have been located by recreationists and ranchers along the Muddy Creek. No known National Register sites, existing or proposed, are in the WSA.

Recreation

Because of the remoteness and rough terrain of the WSA, recreation use is sparse and concentrated near available access points. Two roads lead to the eastern and southeastern boundaries. At these points, the WSA can be entered by way of the Muddy Creek drainage and its tributaries. Recreational use of these areas includes hiking, backpacking, sightseeing, floating down the creek, and horseback riding.

The upper stretch of the Muddy Creek is wide and labyrinthian in character. During the early spring months when runoff is high, this portion of the stream is floated by recreationists in inner tubes, kayaks, and small inflatable craft. The high water period usually is very short (one to four weeks) and during some seasons the river is not floatable. This stretch, however, is used year-round for hiking and horseback riding.

The lower stretch of the Muddy Creek, known as the Chute, has been floated by only a few groups. The canyon is narrow and twisting, made up of a series of rapids and relatively swift current. Small inflatable craft, inner tubes, and kayaks have also been used in this portion of the river. Technical maneuvering is required by the floater. High water levels are necessary for floating; however, flood stages are dangerous due to the confined character of the drainage.

An old mining trail exists in the area of the Pasture and the Chimney. The trail is badly eroded in places and can only support travel by foot or horseback. Some recreationists have taken advantage of this trail to gain access into the remote canyons of the Chimney.

Motorcycle riding occasionally occurs on the two main access roads (Reds Canyon and Hidden Splendor) to the WSA. During the low water months, recreationists using these roads explore some of the old uranium mines located adjacent to the WSA's eastern boundary. These access roads are also used by sightseers, drawn to the area to view Hondo Arch and explore some of the old mine and cowboy camps that spot the area.

The San Rafael MFP (USDI, BLM 1979a) closes the WSA to ORV use in accordance with 43 CFR 8340. The closure applies to the 7 miles of vehicular way. Similar areas found in other parts of the resource area are not proposed to be designated closed to ORV use.

There are no recreational facilities within the unit. Several primitive camping spots exist along the Muddy Creek drainage, but use of these is very sporadic. Several wild game trails and an old mining exploration trail have been used by recreationists.

Recreation use in the WSA is estimated to be up to 60 visitor days per year for hiking, horseback riding, and backpacking, with river floating averaging up to about 40 visitor days per year. Commercial recreation use involves about 140 visitor days annually. Total annual recreation use for all activities in the WSA is estimated at about 240 visitor days per year. All recreational use inside the WSA is considered to be primitive in nature.

Land Use Plans

The WSA is BLM-administered public land except for one State section (640 acres). The current policy of the State is to maximize economic returns from State

lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. The 640 acres of in-held State land are under lease for grazing (UDNRE, DSLF, 1988).

There are no recreational withdrawals within the WSA nor are there valid rights-of-way within or adjacent to the WSA.

Physical and legal access to the WSA is provided by a road through Reds Canyon and another through Hondo Country to Tomsich Butte on the eastern portion of the WSA. The Hidden Splendor road gives access to the southern portion of the WSA and one other road lends access to the western boundary of the WSA near Cedar Mountain.

No other lands contiguous to the WSA are being considered by other agencies for wilderness.

The area is identified in the San Rafael MFP for multiple-use management, subject to specific development restrictions (such as leasing Categories 3 and 4 and VRM Class II). Wilderness is not addressed in the MFP. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative. The WSA has also been identified in the BLM plan for its special values to be considered further as an Outstanding Natural Area (ONA)/Area of Critical Environmental Concern (ACEC).

In the Emery County Zoning Plan (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing).

The Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomic

- Demographics

The WSA is located in the south-central portion of Emery County. Table 10 shows the baseline and projected total population data for Emery County.

Table 10
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980, the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

Emery County contains 4,449 square miles of land. About 82 percent of the county is owned by the Federal Government, 11 percent by the State, and 7 percent by private residents.

- Employment

Table 10 shows the baseline and projected total employment for Emery County to the year 2010.

Coal mining and operation of Utah Power and Light Company's Huntington and Hunter power plants are Emery County's most important sources of employment. The local economy is most affected by changes in the coal market and has had periods of boom and bust. Green river has not grown in the past 30 years. Major employment for Green River includes mining, government, agriculture, and tourism.

Emery County is part of the Southeast MCD. Table 11 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the

leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent and that services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

Table 11
Southeast Multi-County District Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and dispersed recreation.

Table 12 summarizes local sales and Federal revenues related to the Muddy Creek WSA. Appendix 9 in Volume I identifies multipliers used to estimate sales and revenues.

Table 12
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$16,700	0
Livestock Grazing	$23,880	$1,839
Recreational Use	$ 984	30
Total	$41,564	$1,869

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Production from mines and prospects within and adjacent to the WSA has brought some income and temporary employment to residents of the area (approximately 30 work years). The WSA contains 167 mining claims. Regulations require a $100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Twenty livestock operators have grazing use in the WSA. Based on the consumption of 1,194 AUMs of forage by cattle, it is estimated that the WSA accounts for $23,880 of livestock sales, including $5,970 of ranchers' returns to labor and investment.

Recreation use in the WSA is low and related expenditures are locally insignificant. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for Muddy Creek WSA is estimated at 240 visitor days per year, resulting in total estimated expenditures of $984 annually.

The WSA generates Federal revenues from grazing and commercial recreation use. Based upon 1,194 AUMs of forage consumed by livestock in the WSA and a grazing fee of $1.54, the WSA annually accounts for $1,839 of Federal revenue grazing fees. One half of this is allocated back to the local BLM District for range development projects. The amount of Federal revenue received from commercial recreation permitting is about $30 annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives section for Muddy Creek WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the

Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would, however, be protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on all 31,400 acres, management under oil and gas leasing Category 4 (closed to leasing) on 21,120 acres and oil and gas leasing Category 3 (no surface occupancy) on 9,440 acres, and ORV closure on all 31,400 acres.

In the foreseeable future, disturbance of approximately 42 acres from uranium exploration and development would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Most special features, including geological, archaeological, and historic features, perennial streams, wild horses, wildlife associated with wilderness, and special status species, would not be significantly affected because the disturbance would be minor (involving only 0.1 percent of the WSA). Also, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Some Class A scenery would be reduced in quality in the disturbed and surrounding areas.

During the period of activity, the visual and audible disturbance from mineral exploration and development would temporarily reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 10 percent (3,140 acres) of the WSA could be so affected in the foreseeable future.

Because the entire WSA would be closed to vehicular use, no disturbance from ORV activity is anticipated in the future.

The gradual increase in visitor use would not be expected to significantly reduce wilderness values because the additional use would be primitive in nature and the WSA is large enough to incorporate the additional use adequately.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation, and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 42 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on 3,140 acres. Most special features would not be significantly affected. Some Class A scenery would be reduced in quality in the disturbed and surrounding areas.

- Impacts on Vegetation Including Special Status Species

Implementation of the No Action/No Wilderness Alternative would result in surface disturbance on 42 acres due to locatable mineral activities. The entire 31,400 acres would be closed to off-road vehicle use. This level of disturbance which would directly affect about 0.1 percent of the WSA would not adversely affect any vegetation type in the WSA.

There is a slight potential that individual special status plant species could be lost by locatable minerals exploration and development. This situation would only exist where such minerals operations would occur on sites of 5 acres or less, where a plan of operations and approval are not required under 3809 regulations. The Endangered Species Act and subsequent regulations apply to these operations and any loss would be inadvertent. The habitats of these species are widespread and extend beyond the WSA boundaries. Before authorizing any surface-disturbing activities (mineral activities subject to 3809 regulations), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected.

- Impacts on Water Resources

Mineral exploration and development in the northeastern and southern portions of the WSA would

generally be shallow and would not significantly change groundwater quality or quantity.

Due to restrictions imposed by oil and gas Categories 3 and 4 (closed to surface occupancy on 9,440 acres and closed to leasing on 21,120 acres), closure to off-road vehicle use on the entire 31,400 acres, and potential surface disturbance on 42 acres would not decrease water quality in the Muddy Creek drainage. No water developments or improvements have been identified for the WSA, and water resource development opportunities would continue to be minimal.

Existing and future water uses within and upstream of the WSA would not be affected because there would be no restrictions on uses imposed by wilderness management.

Conclusion: The No Action/No Wilderness Alternative would not alter present or future water quality or uses.

• Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action\No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife species, particularly those sensitive to surface disturbance, would be adversely affected with disturbance on 42 acres (0.1 percent of the habitat in the WSA) due to activities associated with locatable minerals. Up to 12,266 acres of potential peregrine falcon habitat exist in the WSA. Although the presence of this species and the black-footed ferret has not been confirmed, portions of the potential habitat in the WSA could be impacted and lost to future introductions of peregrine falcon and possibly to natural establishment of the three species.

Existing oil and gas Categories 3 and 4 (9,440 acres closed to surface occupancy and 21,120 acres closed to leasing) and the off-road vehicle closure on the entire 31,400-acre WSA would protect most of these habitats from surface disturbance. However, there is a slight potential that individual animals of the three endangered and eight Category 2 candidate species that may occur in the WSA could be disturbed by locatable minerals exploration. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under the 3809 regulations. The Endangered Species Act and subsequent regulations apply to these operations and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species.

Prior to authorizing any surface-disturbing activities (locatable minerals operations larger than 5 acres), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status animal species would be preserved with the level of surface disturbance projected with this alternative.

The 42 acres of disturbance would have adverse impacts to wildlife if the limited watering places were affected. Since wildlife populations in the WSA are currently at rather low levels, disturbance would not affect large numbers of animals, but changes in vegetation, cover, and water could have an impact to the few individuals present. No wildlife management facilities or vegetation treatment projects exist or are planned within the WSA; therefore, the low habitat potential would likely remain as at present.

Conclusion: Only about 0.1 percent (42 acres) of the wildlife habitat in the WSA would be directly disturbed and mitigation would be required. ORV use would not be allowed. Therefore, wildlife habitat and populations including special status species would not be significantly affected. However, small portions of potent habitat for peregrine falcon and black-footed ferret could become unsuitable for reintroduction of the species.

• Impacts on Local Economic Conditions

WThere would not be changes in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected.

Domestic livestock grazing (1,194 AUMs) would continue as authorized in the San Rafael MFP.

Annual recreation use would continue to increase at a 2 to 7 percent rate. Federal revenues from commercial outfitting (currently $30) would continue.

The potential for local economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, with the exception of uranium, prospects are marginal and there is limited possibility that potential resources would be utilized. In the long term, up to 80 jobs could be provided by two projected mining operations in the WSA. This would add about 1.2 percent to the Emery County workforce by the year 2010. Up to $20,560 per year in Federal oil and gas lease revenues could be generated within the WSA in the future.

Conclusion: Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 1.2 percent (80 jobs) by the year 2010. Primitive recreation-related local expenditures would increase by 2 to 7 percent per year over the next 30 years. Federal revenues from commercial recreation permitting (currently $30 annually) would continue. Livestock grazing would contribute $23,880 annually in livestock sales and $1,839 in Federal revenues. Present future oil and gas leases could contribute up to $20,560 annually in Federal and State lease revenues.

All Wilderness Alternative (Proposed Action) (31,400 Acres)

• Impacts on Wilderness Values

Designation and management of all 31,400 acres as wilderness would contribute to the preservation of the wilderness values in the Muddy Creek WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for solitude and primitive recreation would be protected on all 31,400 acres. Resources that could be considered as special features in the WSA would also be protected, including Class A scenery, geologic features, archaeological and historical values, wild horses, perennial waters, endangered and sensitive species, and wildlife associated with wilderness.

Although protected, complete preservation of wilderness values would not be assured because of the existence of valid existing rights. In the foreseeable future, disturbance of up to 12 acres (0.04 percent of the WSA) is anticipated from exploration and development of valid uranium mining claims in the northeastern and southern portions of the WSA. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas.

Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 3 percent (942 acres) of the WSA would be affected. Most special features would not be significantly affected because the disturbance would be minor. In addition, appropriate measures would be taken to protect endangered and other special status species and cultural values prior to any surface-disturbing activity. Class A scenery would be reduced in quality in the disturbed areas. Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. The disturbance would probably not be substantially noticeable in the area as a whole.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for other long-term developments is not accurately known, but would be less with this alternative than with No Action/No Wilderness due to application of mitigation that would protect wilderness values subject to valid existing rights.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for

solitude and primitive recreation would be directly lost on 12 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 942 acres. Special features would be preserved overall, although some Class A scenery would be disturbed and reduced in quality.

• Impacts on Vegetation Including Special Status Species

With this alternative, surface disturbance in the WSA due to long-term exploration and development of mining claims would be only 12 acres as compared to 42 acres with the No Action/No Wilderness Alternative. Prior to any surface disturbance, BLM would conduct site-specific clearances of the potentially disturbed areas, as discussed for the No Action\No Wilderness Alternative. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, potential populations of threatened, endangered, or other special status plant species would be preserved with the All Wilderness Alternative.

ORV use would continue to be precluded with this alternative and this would have a positive impact on habitat for the threatened, endangered, or other special status plant species noted in the Vegetation Including Special Status Species section.

Conclusion: Vegetation types and populationsof t hreatened, endangered, or other special status species would be protected.

• Impacts on Water Resources

Since precipitation is low and the estimated soil disturbance is only 12 acres, no significant sedimentation or change in total dissolved solids, including salt production, would occur. Approximately 20 miles of Muddy Creek, a perennial stream, flows through the WSA. Muddy Creek provides opportunities for diversified recreational use such as float boating during a 1- to 4-week period each spring. Even though existing water uses would not be affected, wilderness designation could hamper future proposals or projects that would consumptively use water upstream of the WSA, or significantly alter flow through the WSA. Projects would be hampered because changes in use, changes in points of diversion, or transfer of water rights could be protested by the Federal government to maintain flow through the WSA. Potential upstream water uses include irrigation, cooling water for steam power generation, coal mining, and municipal uses in Emery County.

Conclusion: In the short term, wilderness designation would not alter water quality or uses. In the long term, future water diversions and new consumptive uses in the Muddy Creek System upstream of the WSA may be restricted or precluded.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

  Designation of the WSA could have only a small impact on exploration for oil and gas. Oil and gas leases have been phased out and no new leases would be issued. However, 21,120 acres are closed to leasing with the existing San Rafael MFP (67 percent of the WSA). Undiscovered oil and gas resources could not be explored or produced; however, potential of the area is considered low.

With this alternative, the entire 31,400 acres would not be leased (only 640 acres could be leased and realistically developed with the No Action/No Wilderness Alternative). Since size and economic factors are expected to preclude development of tar sand with the No Action/No Wilderness Alternative, wilderness designation would not significantly affect the potential use of this resource.

The potash-bearing rocks in the WSA are projected to be low grade, thin, and discontinuous. With wilderness designation, the WSA could not be leased; however, this would not be a significant impact due to the low likelihood of development.

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

• Locatable Minerals

There are 167 mining claims covering 3,340 acres of the WSA. Claims located prior to wilderness designation could continue to be

worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam and those not current in assessment or not showing a valid discovery would be declared null and void. New claims could not be located after designation.

With the exception of uranium, it is unlikely that exploration or development of locatable minerals would occur in the foreseeable future, even without wilderness designation. Because only valid claims could be developed following designation and only a portion of the uranium in the WSA would be in valid claims, recovery of an unknown portion of the uranium in the WSA would be foregone. Therefore, this alternative would probably not result in any significant loss of recoverable copper, manganese and gypsum resources but, in the long term, loss of uranium recovery would be important.

- Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these materials within the WSA is projected, because such materials are available at much more accessible locations.

Conclusion: Wilderness designation would limit exploration and development of uranium to valid mining claims at the time of designation. An unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be foregone.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat and opportunities to find solitude.

There are no proposed wildlife management facilities nor vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state except for the 12 acres disturbed due to locatable minerals activity. Increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife populations. Potential habitats for the endangered bald eagle, peregrine falcon, black-footed ferret, and eight Category 2 candidate species would be protected from potential surface-disturbing activities. Mining claim development projected for 0.04 percent (12 acres) of the WSA could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA. Prior to any surface disturbance, site-specific clearances would be made and, if necessary, consultations with FWS would be made and appropriate mitigation measures would be enforced.

Conclusion: Approximately 0.04 percent (12 acres)of the habitat in the WSA would be disturbed. Wilderness designation would protect all wildlife species and provide additonal solitude,

- Impacts on Local Economic Conditions

Current trends inpopulation, employment, and local income distribution would not be affected. Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative.

Valid existing mining claims could be developed, but designation would preclude new leases and claims from being established in the WSA. Except for uranium, the potential for mineral development is low in the foreseeable future, and it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. Over the long term, exploration and development of the uranium resource could proceed on valid claims filed at the time of designation. It is assumed that such claims would exist and exploration and development would occur under more restrictive conditions than the No Action/No Wilderness Alternative. It is anticipated that up to 20 jobs could be provided with each of the two projected mining operations. This would result in a total of up to 40 jobs or one-half of those projected to be available with the No Action/No Wilderness Alternative. This would be equivalent to only 0.6 percent of the projected employment in Emery County for the year 2010. In addition, any local income related to assessment of future mining claims or income associated with possible uranium mining in the distant future would be lost.

Livestock use and ranchers' income would continue as at present with $23,880 annually of livestock sales

and $5,970 of ranchers' returns to labor and investment.

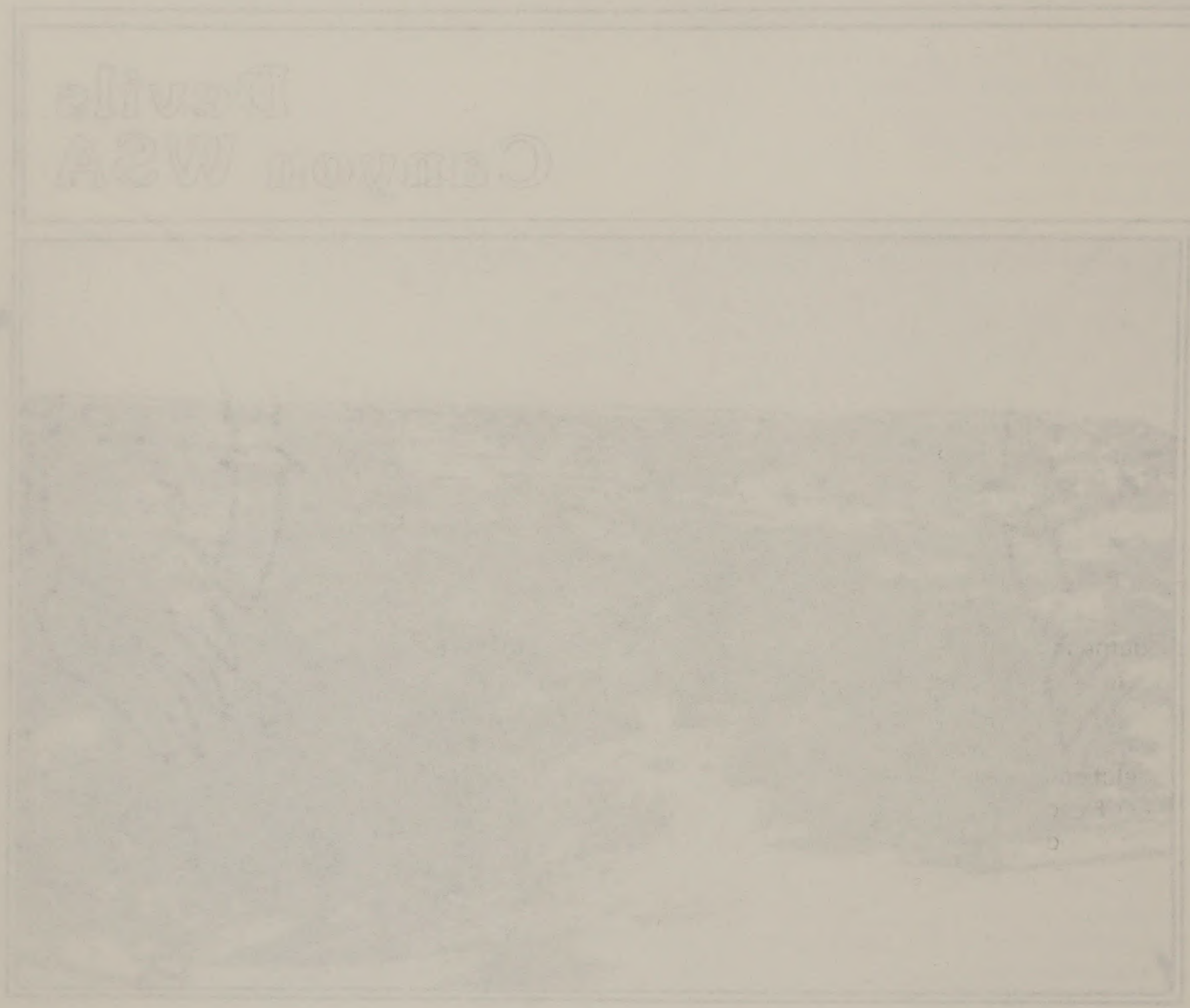
The loss of 10,280 acres potentially available for mineral lease would cause a potential loss of $20,560 per year (at $2.00 per acre) lease fees to the Federal Treasury. The State would have received half of the revenues.

Annual recreation visitor use would continue to increase at a 2 to 7 percent rate. The potential for commercial outfitting would increase with the publicity generated from designation. Federal revenues from permitting of commercial recreational use (currently $30 annually) would increase accordingly.

Depending on the degree of impacts on use of water from Muddy Creek, wilderness designation could impede or interfere with major economics developments in Emery County. The magnitude of the potential impact is unknown.

Conclusion: Over the long term, wilderness designation would cause a slight change in local economic conditions. Up to 40 fewer jobs would be provided by locatable minerals activities. Recreation-related expenditures would not be affected because present use is mainly primitive and would continue to increase by 2 to 7 percent per year. The potential for commercial recreation use and resulting Federal revenues (currently $30 annually) would increase. Livestock grazing and related sales and Federal revenues would continue. Up to $20,560 in Federal and State lease revenues would be foregone each year.

Devils Canyon WSA



DEVILS CANYON WSA

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DEVILS CANYON WSA

(UT-060-025)

INTRODUCTION

General Description of the Area

Devils Canyon WSA is in the San Rafael Swell region of Emery County, Utah. It contains approximately 9,610 acres of BLM-administered land. The WSA is of a rectangular configuration, roughly 7.5 miles east-west and 2.5 miles north-south.

Devils Canyon is characterized by a rugged, twisting canyon, fingered with several tributary drainages. Elevations in Devils Canyon range from 6,200 feet in the bottom and up to 7,400 feet on top. Devils Canyon and some of its side drainages have acute pour-offs and narrow, twisting routes.

Surrounding Devils Canyon are rolling and colorful mesas. The southwestern portion of the WSA consists of sparsely vegetated pink, red, cream, and purple soils. Elevation in this area averages 6,200 feet. The northeastern part of the WSA is heavily vegetated and consists of rounded knobs and flat top benches.

The WSA is adjacent to Interstate-70 (I-70) on the north, running parallel for approximately 7 miles. It is situated on the south side of the Interstate and is bordered by the Justensen Flat road on the east, a portion of the Kimball Draw road on the south, and State land on the west. The nearest towns are Emery (12 road miles), Ferron (20 road miles), and Castle Dale (28 miles), all to the north of the WSA.

The area has an arid to semiarid desert climate. Average precipitation ranges from 8 to 10 inches and temperatures range from 15 to 100 degrees Fahrenheit (F). About 15 inches of snow fall between October and April.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. The anticipated surface disturbance presented in the Draft EIS (256 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 256 acres reported in the Draft EIS to no surface disturbance for the Final EIS.

2. Approximately 4 miles of the northern boundary of the WSA have been set back from the existing edge of Interstate 70 (I-70) to the edge of the Federal Highway Administration right-of-way for I-70. The rights-of-way for I-70 were issued in 1963 and 1964. Under Section 317 of the 1958 Public Law 85-767, public lands in such rights-of-way pass from administration by the Department of the Interior to the Federal Highway Administration at the time of the grant. The BLM Wilderness Inventory and Draft EIS map erroneously showed the existing I-70 lane as the WSA boundary.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Devils Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. The disturbance estimate for the WSA has been reduced from 256 acres to no disturbance in the Final EIS. Perennial streams or other natural water sources are lacking in the WSA. Therefore, the sediment yield from the WSA would not

STATEWIDE POCKET MAP WSA NO. 62 SEE VOL.I

increase and thre would not be secondary impacts to water quality. Impacts on soils are not significant issues for analysis in the Final EIS.

2. Mineral Resources: The public has expressed concern that wilderness designation would interfere with or prevent mineral exploration, development, and production.

There are no existing tar sand or oil and gas leases within the WSA. Potential oil and gas deposits are small with a low certainty that they exist. The quality of the tar sand is poor with the potential for only small deposits. There are no mining claims inside the WSA, and projected uranium and other locatable mineral deposits are thought to be small with a low certainty of occurrence. More accessible deposits of gypsum and salable minerals exist outside the WSA. For these reasons, mineral exploration or development would not occur in the foreseeable future with or without wilderness designation (see Appendix 6 in Volume I). Therefore, impacts on mineral and energy exploration and production are not analyzed in detail in the Final EIS.

3. Forest Resources: The only forest resources in the WSA are 8,456 acres of scattered pinyon and juniper trees. The WSA is closed to harvest of forest products under the San Rafael MFP; thus, there would be no change to existing management with or without wilderness designation. Therefore, impacts to forest resources are not significant issues for analysis in the Final EIS.

4. Livestock Management: The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements, moving of livestock, and by preventing future range improvements, and placing restrictions on predator control. However, under the Wilderness Management Policy (BLM Manual 8560) there shall be no curtailments in grazing simply because an area is wilderness. Grazing reductions have already been imposed as a result of a grazing EIS.

There are no proposed rangeland developments which would be precluded by wilderness designation. Since motorized vehicles are seldom used for livestock management in this WSA, little effect on management of livestock grazing is expected. Many methods of predator control would be allowed in the designated wilderness area. Predator control has not been conducted for several years in the grazing allotments that comprise the WSA. For these reasons, impacts on livestock management are not significant issues for analysis in the Final EIS.

5. Visual Resources: As discussed above, no surface disturbance is projected for the WSA in the Final EIS. Therefore, visual resources would not be affected. Visual resources are not addressed in the Final EIS as a separate topic, but are addressed in relation to naturalness and special features in the Wilderness Values sections.

6. Economic Conditions: The public, including State and local government, is concerned that wilderness designation would preclude mineral or other economic developments and adversely affect local economic conditions. Others believe that primitive recreation use would increase following wilderness designation and would contribute to the local economy.

There are no existing or anticipated mineral developments or proposals for lands or realty activities which would be impaired with or without wilderness designation. Because no economic developments are expected, and because recreational use is only 550 visitor days per year, impacts on economic conditions are not significant issues for the Final EIS.

7. Wild Horses: The 10 to 15 head of wild horses which frequent the WSA would be protected by the Wild-Free Roaming Horse and Burro Act of 1971 (as amended) with or without wilderness designation.

The removal of the excess wild horses, generally by the use of saddle horses, can take place inside and outside the WSA. Removal requires the construction of temporary corrals for holding the captured animals. Because of the rough topography in the WSA, almost all of the temporary facilities would be outside the WSA boundary. Occasionally, the removal requires the use of a helicopter to assist in the roundup. When this is the case, the helicopter would not be landing inside the WSA. Wild horse numbers are also inventoried by the use of helicopter over the WSA but landing is not required. Therefore, impacts on wild horses are not significant issues for analysis in the Final EIS.

- Issues Analyzed in Detail

The significant issues for the Devils Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on wildlife habitat and populations including special status species.

4. Impacts of wilderness designation on the preservation of cultural resources.

5. Impacts of wilderness designation on recreational use of the WSA.

Comments made during the public comment period for the Draft EIS centered mainly on the need for and adequacy of the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, ORV use, the position of and the responsibilities of local government, threatened and endangered plant species, and mineral values.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 62, for responses to specific comments about the Devils Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

An alternative that would add about 8,520 acres of Federal and 1,870 acres of State lands on the south and west sides of the WSA was suggested in the public comments. This alternative is not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment 3.1).

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness (Proposed Action); and (2) All Wilderness. A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative (Proposed Action)

With this alternative, none of the 9,610-acre Devils Canyon WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated and the San Rafael RMP will eventually replace the San Rafael MFP (USDI, BLM, 1979a), it is assumed that the area would con-tinue to be managed in accordance with the MFP. No State, private or split-estate lands are located within the WSA (refer to Map 1).

- Management Conditions and Constraints

All 9,610 acres would remain open to mineral location (mining claims) and sale of rock materials. Presently, there are no mining claims within the WSA but development work, extraction, and patenting would be allowed on future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809). There are no existing oil and gas leases, but future leases could be developed under Category 1 (standard stipulations) on about 3,075 acres and Category 3 (no surface occupancy) on about 6,535 acres.

Although mineral resources would be managed as described above, no locatable or leasable mineral exploration or developments are projected in the WSA because the level of known resources and the probability of their development are too low to support those assumptions. Appendix 6 in Volume I explains the mineral and energy development projections.

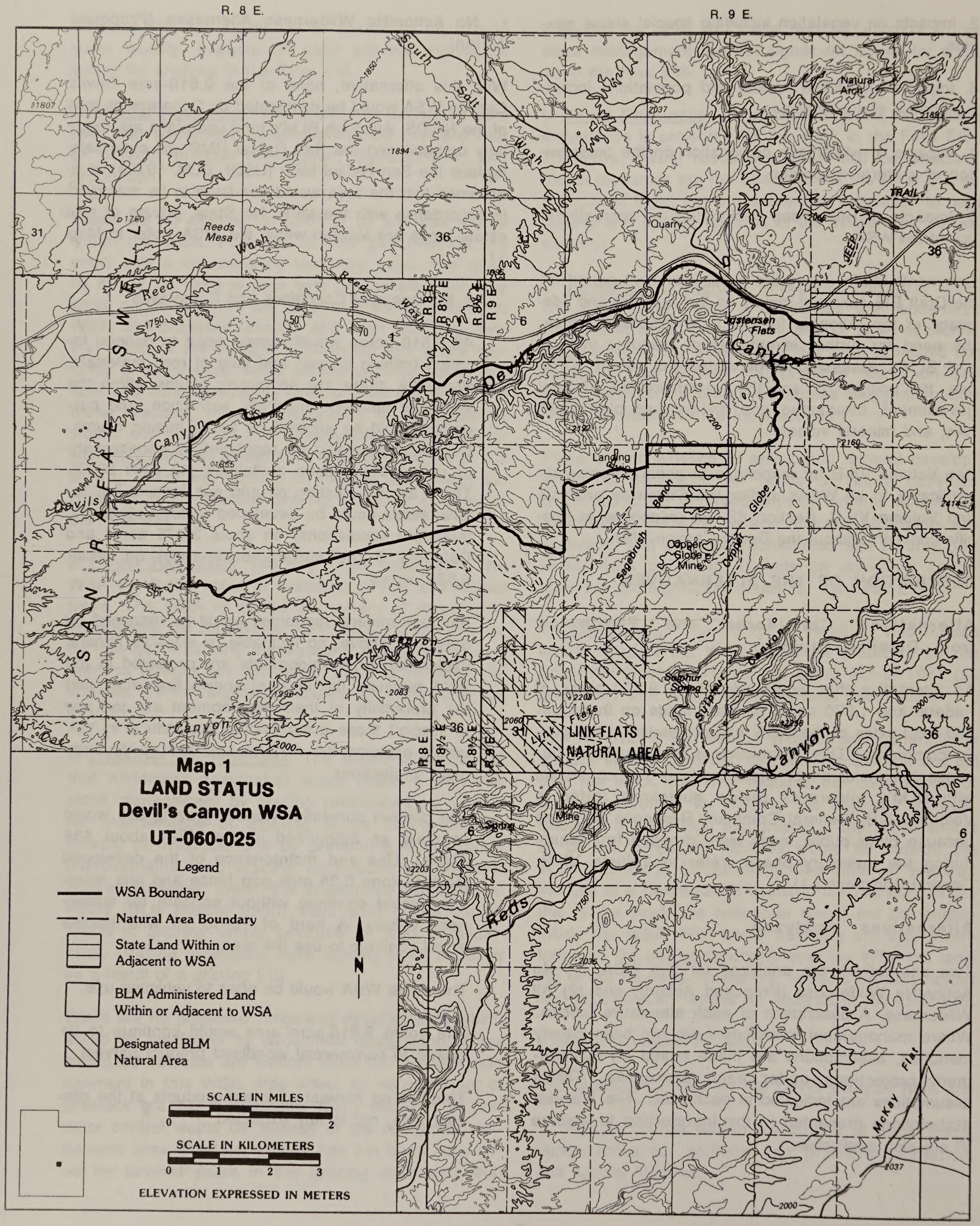
The present domestic livestock grazing use would continue as authorized in the MFP (about 434 AUMs). Use and maintenance of the developed facilities (one 0.25 mile gap fence and one reservoir) would continue without concern for wilderness values. A herd of 10 to 15 wild horses would continue to use the area.

The entire WSA would be open to vehicular use.

The entire 9,610-acre area would continue to be closed to commercial woodland product harvest.

There is no harvest of forest products at the present time, nor is any expected.

DEVILS CANYON WSA



The area would continue to be managed under VRM Class II on all 9,610 acres. The majority of the WSA would continue to be managed as part of the I-70 scenic corridor to protect scenic values.

- Action Scenario

Given the management plans described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would not result in any surface-disturbance from development. No locatable or leasable mineral-resource exploration or development is anticipated. No rangeland, wildlife habitat, watershed projects, or other developments are planned. Currently, ORV use is occurring on about 18 percent of the WSA. In the future, it is likely that disturbance from dispersed ORV use could affect up to 40 percent of the WSA.

It is projected that recreation use will increase above the current estimated use of 550 annual visitor days at a rate of 2 to 7 percent annually. About 73 percent of the use would continue to be vehicular in nature.

- All Wilderness Alternative

With this alternative, all 9,610 acres of the Devils Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character. No State lands are located in the WSA; however, there are three sections adjacent to the WSA (refer to Map 1). The three State sections likely would not be exchanged. (Refer to Volume I for further information on State lands.) The figures and acreages given under this alternative are for Federal lands only. No State, private, or split-estate lands are located in the WSA.

- Management Conditions and Constraints

After wilderness designation, all 9,610 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on valid mining claims located prior to wilderness designation. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with wilderness as a consideration. Existing oil and gas leases have been phased out and new leases would not be issued.

Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The 434 AUMs on three allotments in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of designation (in this case one 0.25 mile gap fence and one reservoir) could continue in the same manner as in the past, based on practical necessity and reasonableness.

Except for the Justensen Flat Reservoir, which retains little water due to siltation, no water resource facilities or treatments are located in the Devils Canyon WSA, and none are currently planned.

The entire 9,610-acre area would be closed to vehicle use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. The approximately 2 miles of the Devils Canyon drainage and about 1,680 acres traditionally used by ORVs in the area would not be available for vehicular use except as indicated above. About 8 miles (or 35 percent) of the WSA boundary follow existing gravel and dirt roads which would remain open to vehicular travel.

Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means for use in the wilderness.

Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Action Scenario

No surface disturbance is projected. Implementation of the All Wilderness Alternative would preclude mining claim location and mineral leasing. Therefore, no locatable or leasable mineral exploration or development would occur following wilderness designation. No rangeland, wildlife habitat, watershed projects, or other developments

DEVILS CANYON WSA

R. 8 E. R. 9 E.

T. 23 S.

T. 24 S.

Map 2

ALL WILDERNESS ALTERNATIVE

Devil's Canyon WSA

UT-060-025

Legend

All Wilderness Alternative (9,610 acres)

Natural Area Boundary

N

SCALE IN MILES

0 1 2

SCALE IN KILOMETERS

0 1 2 3

ELEVATION EXPRESSED IN METERS

are planned following wilderness designation. No disturbance from ORV use is projected due to wilderness management restrictions.

Primitive recreational use is expected to increase over the current estimated use of 150 visitor days per year at a rate of 2 to 7 percent annually. All motorized recreational use would be precluded.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA (9,610 acres) is of sufficient size to meet the wilderness values criteria. The WSA is about 7.5 miles long (east to west) and 2.5 miles wide (north to south).

- Naturalness

The major imprints surrounding the Devils Canyon WSA have been excluded by boundary determinations during the BLM Intensive Wilderness Inventory (USDI, BLM, 1980). What remains of note is a reservoir, gap fence, and an accumulation of ORV trails and camp areas.

The reservoir is located in the Justensen Flats area of the WSA. It has silted in over the years and holds little or no water. The gap fence is along the southeast boundary of the WSA and is approximately 0.25 miles long. Both the reservoir and fence are substantially unnoticeable.

Extensive ORV use and vehicular traffic have caused imprints (such as trails and camp sites) in the Justensen Flats, Sagebrush Bench, and Kimball Draw areas of the WSA.

The most heavily used areas are Justensen Flats and the Devils Canyon entrance where six to eight trails and several camp areas have become well established by heavy traditional spring and fall use. It is not uncommon to see campers and trailers within this area during the spring and fall months. BLM recreation use statistics have been collected in this area since 1976 and have shown a steady number of users each year. Over 100 people and 10 camping units have been recorded on the Justensen Flats area during Easter weekend. The impacted area on Justensen Flats involves about 660 acres.

The Sagebrush Bench area is used by recreational ORVs and individuals looking for wild horse herds. An old road leads from Link Flats to an open valley and airstrip. Some vehicular camping takes place in the valley, but mostly trails exist where ORVs have explored. Recreational use in this area is at least half that occurring in Justensen Flats. It has become a special traditional spot for those who make the effort to get there. There are not as many ORV trails in this area as are found on Justensen Flats. Overall, about 60 acres have been affected.

The Kimball Draw area has rolling topography spotted with pinyon pine and juniper or brush. Recreationists travel into the area in search of wild horses or for ORV play. Access is obtained easily by way of Kimball Draw and the old seismic line that makes up the WSA's southern boundary. ORV impacts are not as concentrated as those found in Justensen Flats and consist mainly of two-wheel tracks. Approximately 960 acres are marked by ORV tracks in this portion of the WSA.

These imprints combined cover approximately 18 percent (1,680 acres) of the WSA. Of the 18 percent affected by existing ORV use, about 7 percent (660 acres) has been significantly impacted and does not meet the naturalness criterion for areas under wilderness review, while 11 percent (1,020 acres) does meet the naturalness criterion. Overall, 93 percent (8,950 acres) of the WSA meets the naturalness criterion.

DEVILS CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives No Action/No Wilderness (Proposed Action)	 All Wilderness (9,610 Acres)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be reduced on up to 3,844 acres of the WSA from increased ORV activity. Special features would be disturbed. ORV monitoring and enforcement of protective measures would be necessary to assure that impacts on special features, such as special status species, would not be significant.	Wilderness designation would preserve the wilderness values in the WSA. Visitor use restrictions may be necessary to prevent congestion within Devil's Canyon.
Impacts on Vegetation	Vegetation types would not be affected by implementation of this alternative. Continued ORV use would result in the loss of individual plants of special status species. However, ORV use would be monitored and protective measures taken to protect the viability of populations of threatened, endangered, and other special status plant species.	By eliminating ORV use, wilderness designation would provide additional protection to vegetation, including all populations of threatened, endangered, or sensitive plants which may occur in the WSA.
Impacts on Wildlife Habitat and Populations	Increased ORV use would result in adverse impacts on wildlife habitat and populations including special status species on about 40 percent (3,844 acres) of the WSA. Monitoring of ORV use and enforcement of protective measures would be necessary to ensure that impacts would not be significant.	By eliminating ORV use, wilderness designation would protect all wildlife species and provide additional solitude.
Impacts on Cultural Resources	Intentional or unintentional damage to archaeological sites may occur due to continued vehicular access and ORV use. Cultural resource management would continue without regard to preservation of other wilderness values.	Cultural resources would be protected under this alternative. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.
Impacts on Recreation	The quality of primitive recreation would be reduced on 40 percent (3,844 acres) of the WSA in the Justensen Flat, Sagebrush Bench, Kimball Draw, and upper Devils Canyon areas. Both primitive and mechanized recreational use would increase 2 to 7 percent over the next 30 years. Primitive use may eventually decline.	Primitive recreational values would be protected. Primitive recreational use would increase from the current 150 annual visitor days up to as much as 1,307 visitor days per year by the end of 30 years. Existing (400 annual visitor days) and projected (up to 3,486 annual visitor days by the end of 30 years) ORV recreational use would be eliminated. ORV use in the San Rafael region would probably not decline because there are other ORV play areas near but outside the WSA.

- Solitude

Portions of the WSA offer outstanding opportunities for solitude. These areas are limited to 3 miles of the western portion of the Devils Canyon drainage and several of the canyon's southeastern most fingers. In these areas the steep cliffs and twisting character of the canyon effectively shroud lines of sight and suppress sounds for a substantial distance. Off-site intrusions and influences are essentially nonexistent within these specific areas.

Approximately 3 miles of the WSA's northernmost boundary consists of the I-70 right-of-way (including the Devils Canyon view area). I-70 parallels the WSA and makes a significant grade to the Moore Road-Copper Globe turnoff on the east and Salt Wash to the west. I-70 receives a large volume of traffic, especially in the form of semitrucks and trailers. A Utah Department of Transportation study revealed that over 1.8 million people traveled along I-70 through the San Rafael Swell in 1987. Travel along I-70 is projected to increase and more than 2,700 vehicles a day are expected to travel I-70 across the swell by the year 2005 (Utah Department of Transportation, 1987).

There are specific areas within the WSA where solitude is negatively influenced by the continual traffic noise of I-70. These areas include: (1) the northern portion from the right-of-way to the Devils Canyon drainage; (2) the Justensen Flats area; and (3) specific points throughout the Devils Canyon drainage. There are other areas, such as the high country on the southern side of Devils Canyon and the southwestern portion of the WSA, where sounds of I-70 are present. In these areas, however, sounds are intermittent and are not as distinguishable as in the north.

Justensen Flats, approximately 600 acres in size, is situated along a portion of I-70 where traffic is clearly visible. I-70 makes a steep incline here and constant noise from vehicles can be heard. The majority of the area is flat with open grassland and some clusters of pinyon pine and juniper trees. Solitude is lacking in this area.

The northern portion of the WSA, from the I-70 rights-of-way to the Devils Canyon drainage lacks solitude due to the closeness of I-70 and its constant traffic noise.

Within the Devils Canyon drainage, there are specific points where the constant travel along I-70 can be heard to a degree that it becomes distinguishably dominant over the area's natural sounds (i.e., wind, insects, etc.). The canyon is narrow and confined. On the east end approximately 1,100 acres are affected by I-70 sounds. Only an approximately 1-mile-wide strip of land along the southern side of the WSA is free from the noise influence of I-70.

The WSA's size and relatively narrow configuration in conjunction with the sounds of continual traffic on I-70 outside of the WSA result in a lack of outstanding solitude qualities in some portions of the WSA. All in all, 73 percent of the WSA (7,050 acres), involving an area roughly 7 miles long and 1.25 miles wide, meets the outstanding criterion for solitude. The remaining 27 percent (2,560 acres) does not meet the criterion.

- Primitive and Unconfined Recreation

The WSA contains opportunities for primitive and unconfined recreation, mostly for hiking and backpacking, on 3,200 of the 9,610 acres. These activities primarily are confined to either the eastern portion of the WSA or to the Devils Canyon drainages because of the rugged and incised character of the topography splitting the WSA. The Devils Canyon drainage is one of the WSA's few places where recreational opportunities are outstanding and probably where the main flow of visitors occurs. It is also the main focal point and makes up the most interesting terrain of the WSA. Hunting and horseback riding are constrained because of the lack of game, rugged topography, and lack of water sources.

- Special Features

Special features in this unit that were identified during the wilderness inventory include scenic and geologic values, and a small wild horse herd of approximately 10 to 15 animals.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There is one animal species (black-footed ferret) and two plant species (Maguire daisy, Erigeron maguirei var. maguirei, and Wright fishhook cactus, Sclerocactus wrightiae) listed as endangered that may be found near or within the WSA. Also, two threatened species, the Jonesii cycladenia (Cycladenia humilis var. jonesii) and the Last Chance townsendia (Townsendia aprica), may occur in or near the WSA. There are nine animal species and five plant species that are considered

sensitive that may occur in the WSA. Cougar, which is a wildlife species associated with wilderness, may occasionally visit the WSA. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information. The entire WSA is rated Class A for scenic quality.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland and galleta-threeawn shrub steppe. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is a PSD Class II attainment area and currently meets Class II standards of air quality classification (1977 Clean Air Act amendments). The nearest Class I area is Capitol Reef National Park, about 30 miles south. Canyonlands National Park, another Class I area, is about 54 miles southeast of the WSA.

Potential pollution sources include industrial and vehicular emissions originating primarily from the Castle Valley of Emery County. A large point source includes powerplants in the Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles (Aerocomp, Inc., 1984).

Geology and Topography

The Devils Canyon WSA is located along the western flank of the San Rafael Swell. During the Eocene Epoch the area began to uplift, creating a bulge in the existing formations. A period of erosion began, carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent northeast-trending uplift on the Colorado Plateau.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations exposed in the WSA range from the Jurassic-Triassic Kayenta Sandstone to the Jurassic Carmel Formation. The formations dip to the west at less than 10 degrees. The Kayenta Formation is found in the far eastern portion of the WSA. It is composed of red argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

Navajo Sandstone, another colorful formation, is found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are caves, buttes, and knolls. The Carmel Formation forms the outer rolling terrain of the WSA. It consists of brown to gray sandy limestone, red thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope. None of the exposed formations in the WSA are particularly fossiliferous. Elevations in the WSA range from 6,200 to 7,400 feet.

Soils

Table 2 describes soil characteristics and land types and Table 3 describes erosion condition.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock Outcrop	35	3,363	0.0	5
Shallow loamy soils on sloping structural benches and ledges	40	3,844	1.0	5
Moderately deep and deep loamy soils on gently sloping structural benches and mesas	15	1,442	0.1	1
Deep and stony soils on steep canyonsides	10	961	1.0	10
Totals	100	9,610		

Source: Hansen, 1985.

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Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	10	961	9,610
Medium	5.0	-	-	-	40	3,844	19,220
Low	1.0	50	4,805	4,805	15	1,442	1,442
Very Low	0.1	15	1,442	144	-	-	-
None	0.0	35	3,363	-	35	3,363	-
Totals		100	9,610	4,949[a]	100	9,610	30,272[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre, 0.5 under present conditions; 3.2 if disturbed.

The WSA contains two general soil mapping units differentiated by canyons and benches. Wind is a minor erosive agent, with water actions moving the most soil.

Although erosion potential is low, groundcover and exposed bedrock, coupled with intensive summer thunderstorms, can create locally severe erosion problems. This is especially true on steep slopes and in exposed wash channels.

Approximately 80 percent of the WSA is classified as slightly saline and the remaining 20 percent is moderately saline. The average annual salt production from soils within the WSA is estimated to be 106 lbs per acre. Fair seedings could be established on only 15 percent of the WSA while the remaining 85 percent is unsuited for seeding due to rock outcrops, shallow soils, or steep slopes.

Vegetation Including Special Status Species

The main vegetation types in the WSA are pinyon-juniper woodland and desert shrub-saltbush (refer to Table 4).

The pinyon-juniper woodland is found on the foothills and mesas and other areas of relatively high elevation and precipitation. The woodland stops at lower elevations due to low precipitation, high temperatures, and salty substrate.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	8,456	88
Desert shrub-saltbush	1,154	12
Total	9,610	100

Source: USDI, BLM, 1989

The desert-shrub vegetation type is found on gravelly, clayey benches and gently sloping sandy lowlands.

Species belonging to the Chenopodiaceae and Compositae families dominate type and include Mormon tea, shadscale, rabbitbrush, snakeweed, blackbush, mat saltbush, fourwing saltbush, Castle Valley clover, black sagebrush, and wild buckwheat.

Other common plants are curly grass, Indian ricegrass, sand dropseed, sandhill muhly, blue grama, western wheatgrass, Fendler threeawn, needle-and-thread, squirreltail, and globemallow. There are no riparian vegetation areas within the WSA.

The San Rafael Swell, of which the WSA is a part, provides habitat for a large number of rare plant species. Nine threatened, endangered, Category 1 and 2 candidate species may occur in the WSA (refer to Table 5).

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Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenia humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barnebyi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 in Volume I

The Devils Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA are listed on Table 6.

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	7,688	80
Galleta-threeawn shrubsteppe	1,922	20
Total	9,610	100

Source: USDI, USGS, 1978.

Water Resources

The Devils Canyon WSA is in the Muddy Creek drainage which is a tributary of the Dirty Devil river in the Upper Colorado River hydrologic subregion.

There is one major drainage within the WSA, Devils Canyon, with several tributary drainages associated with it. These drainages are ephemeral, flowing only during rains or thundershowers, and snowmelt. The Justensen Flat Reservoir is the only known water source in the WSA, although there may be intermittent seeps in the bottom of Devils Canyon drainage.

The WSA is within Water Right Adjudication Area 94. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in certain areas. There are no areas of significant groundwater development in this drainage area.

The water quality standards for Muddy Creek and tributaries, from confluence with Fremont River to Highway U-10 crossing are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stock watering).

The Justensen Flat Reservoir is silted and retains little water. No water quality data are available

Mineral and Energy Resources

The energy and mineral resource rating summary for Devils Canyon WSA is given in Table 7. The mineral and energy resource rating system is explained in Appendix 5 in Volume I.

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of natural gas
Tar Sand	f 2	c4	Less than 10 million barrels of oil
Potash	f 2	c2	Less than 1 million metric tons
Geothermal	f 2	c1	Low temperature
Uranium/Vanadium	f 4	c2	Greater than 1,000 metric tons of uranium oxide
Manganese	f 2	c1	Less than 100,000 metric tons of 40-percent manganese
Copper	f 2	c2	Less than 50,000 metric tons
Gypsum	f 2	c4	Less than 5 million metric tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

The WSA contains deposits of vanadium and manganese that are currently listed as strategic and critical materials (USDoD, 1988).

- Leasable Minerals

There are no known deposits of any leasable minerals in the WSA. Currently, there are no active drilling, mining, or exploration activities of leasable minerals.

- Oil And Gas

The San Rafael Swell is a structural trap. The interior of the swell has been eroded away, allowing any petroleum contained in the structure to escape. The swell could only serve now as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the swell. The Ferron gas field, 11 miles northwest of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance gas field, 18 miles to the southwest, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability and porosity of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail field, 46 miles to the northeast, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

No oil and gas wells have been drilled within the WSA. One well was drilled adjacent to the southern boundary and was plugged and abandoned in 1962. Thus far, oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Devils Canyon WSA would probably be as small pools or fields.

The favorability rating of f2 indicates that potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas in-place (SAI, 1982). Less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas are considered to be recoverable. Positive evidence of resource occurrence is located some distance away in a deposit that may be unrelated to the geology of the Devil's Canyon area. Therefore, the resource has been assigned a low certainty of occurrence (c1) (SAI, 1982).

The WSA is managed according to oil and gas leasing categories as shown in Table 8. There are no mineral leases within the WSA.

Table 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	3,075	32
2. Open with special stipulations	0	0
3. Open with no surface occupancy	6,535[a]	68
4. No leasing	0	0
Total	9,610	100

Source: USDI, BLM, 1975a and 1989.

[a]Special stipulations have been developed to protect the Muddy Creek drainage.

- Tar Sand

Located within the eastern portion of the WSA are approximately 960 acres of the San Rafael Swell Special Tar Sand Area (STSA).

Minor tar sand occurrences can be found outside the eastern boundary of the WSA. These deposits may extend into the WSA and would be found within the Navajo and Kayenta Sandstone Formations.

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving behind the heavy fraction, or tar substance. Biodegradation also plays a role in the formation of bitumen. The San Rafael Swell is estimated to contain 445 to 545 million barrels of oil in-place, with most of it in the Moenkopi Formation. The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of asphaltic material (tar sand).

The favorability rating of f2 for tar sand indicates a potential for small deposits (less than 10 million barrels of oil in-place) to occur in the WSA (SAI, 1982). The certainty that this resource exists is high (c4). It is unlikely that the tar sand within the WSA would be developed due to small-sized deposits and economic factors (SAI, 1982).

- Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousand feet thick in the

area of Moab where potash is produced commercially. To the west, the formation thins considerably and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating of f2 indicates that, if deposits occur in the Devils Canyon WSA, they would generally contain less than 1 million metric tons of potash (SAI, 1982). The potash-bearing rocks are expected to be low grade, thin, and discontinuous. It is unlikely that the potash resource in the WSA would be developed.

- Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal resource associated with the WSA is low-temperature thermal waters (between 20 and 90 degrees Centigrade). Water extracted at these temperatures can be used for direct heating purposes. It seems unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and the lack of nearby potential users. The resource is rated as having a favorability of f2 and a certainty of c1 (SAI, 1982).

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA and there are presently no mining claims.

- Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These are scattered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable. These metals indicate a hydrothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The WSA is within the region's southern uranium belt, which is most favorable for the occurrence of ore deposits. Moderate- and large-size ore bodies are found in the southern belt, which roughly parallels the Muddy and Dirty Devil rivers (Hawley et al., 1968). The WSA lies between the outcrop belt of the Chinle and Morrison Formations and, although uranium is known from the intervening strata, no uranium occurrences are reported in the area (SAI, 1982). The favorable sources in the Chinle Formation probably underlie the WSA at a depth of about 700 feet along the east side to about 2,000 feet along the west side.

Even though the certainty for uranium occurrences within the WSA is low (c2), the WSA has a high favorability of f4 (SAI, 1982). The analysis was based on the WSA's location within a very favorable tract that contains the largest uranium deposits in the San Rafael Swell. It is believed that ore bodies, if found in the WSA, would be small, discontinuous, and at depths presently uneconomical to mine.

- Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville formations. The nearest deposits are about 9 miles west of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation underlies the WSA and, on this basis, the low rating of f2 indicates a deposit size less than 100,000 metric tons of 40-percent manganese (SAI, 1982). However, it is expected that the WSA most likely is favorable for only very small accumulations.

- Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is with the Copper Globe Mine located about 1 mile south of the WSA. The mine produced two or three tons of ore between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The favorability rating f2 indicates a potential for copper deposits in the WSA of less than 50,000 metric tons of contained copper. The certainty that this resource exists is low (c2) (SAI, 1982).

- Gypsum

The Carmel Formation is reported to contain a bed of industrial grade gypsum in the western portion of the WSA. BLM has given gypsum a favorability rating indicating a potential for small tonnage. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million metric tons). It is unlikely that any gypsum would be developed due to distance of mines to market and related transportation concerns. The best known deposits of gypsum are located outside of the WSA to the north (USDI, BLM, 1987).

- Salable Minerals

Although the potential exists for use of rock materials from the WSA, it is considered to be very low due to limited demand and high availability of these materials elsewhere in more accessible locations.

Wildlife Including Special Status Species

The Devils Canyon WSA provides habitat for a limited variety of wildlife species. The lack of perennial water sources limits the many forms of wildlife. During the winter, snow can provide water. Vegetation is also limited with low density and species composition.

The only big game species present in the WSA is mule deer. Deer can be found in the side canyons and along the ridges and benches north and south of Devils Canyon. The deer are mainly winter visitors due to the lack of water in the summer. Devils Canyon is contained within the UDWR Deer Herd Management Unit 29.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, black-tail jackrabbits, wood rats, ring-tails, badgers, Ord kangaroo rats, gray foxes, kit foxes, white-tail antelope squirrels, chipmunks, rock squirrels, bats, mice, and voles.

Habitat for various bird species is found in the WSA. The species' diversity and population sizes are small. Few raptors exist in the WSA, with golden eagle, prairie falcon, American kestrel, ferruginous hawk, red-tailed hawk, and rough-legged hawk being the major species. Chukar and mourning dove may also be found in the WSA.

Cougar may occasionally visit the area in the winter to prey on deer. The probability of such an occurrence is low due to the low density of deer.

Several species of snakes and lizards can be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, and western rattlesnakes account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

The FWS has identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle, a BLM sensitive species occurs in the area. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, southern spotted owl, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

None of the area is identified as crucial habitat, and there are no existing or proposed wildlife management facilities or vegetation treatments.

Forest Resources

The pinyon and juniper trees are found in sparse quantity on 8,456 acres in the WSA. Because the WSA is remote from populated areas and substantial woodland products are available closer to population centers, harvest of the pinyon and juniper trees has been minimal and is not expected to increase in the foreseeable future as the area is closed to harvest of forest products under the San Rafael RMP.

Livestock and Wild Horses/Burros

The Devils Canyon WSA contains portions of three livestock grazing allotments, as listed in Table 9. Range improvement projects in the WSA are limited to one 0.25-mile fence and one reservoir. There are no known plans for additional grazing developments within the WSA.

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Table 9
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
South Sid and Charley	20,480	1,015	952	42	136 Cattle	11/16-06/15	1
Lone Tree	106,650	8,535	5,270	386	958 Cattle	12/16-05/31	8
Globe Link	6,590	60	600	6	100 Cattle	11/01-04/30	1
Total	133,720	9,610	6,822	434			10

Source: BLM File Data.

Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the Devils Canyon WSA (USDA, APHIS, 1988).

A herd of approximately 10 to 15 wild horses frequents the WSA.

Visual Resources

The Devils Canyon WSA consists of one incised drainage, and undulating and colorful tablelands. The canyon and its tributaries are typified by deep narrow sandstone walls alternating from white-buff to dark reds. Devils Canyon, the major drainage of the WSA, contains walls averaging 450 to 550 feet in the northeastern portion, becoming shallower as the canyon drains to the southeast.

The eastern topographic relief, outside of the canyons, consists of rolling mesas, assorted buff sandstone domes, and low cliffs averaging 40 to 150 feet. The western half of the WSA is typified by shallow, dissected, rounded drainages which appear coarse and grainy, with buff and dark-brown colors being prominent.

The WSA is classified as having Class A scenery characteristic of the physiographic region. The entire WSA is in the foreground/middleground zone visible from boundary roads. The sensitivity level has been rated high over 9,129 acres of the WSA and medium on the other 481 acres. A large part of the WSA is within the I-70 scenic corridor, where no development is allowed (USDI, BLM, 1979a) in order to protect the scenic values along I-70. Based on these factors, the entire WSA is within a VRM Class II management area.

Cultural Resources

A total of four archaeological sites have been recorded in the WSA (USDI, BLM, 1988b). All of these sites are located along Interstate 70 in the northeastern portion of the unit. The sites consist of lithic scatters located on ridge tops. Based on artifacts present, one of the sites is attributed to Fremont occupation and one is attributed to Archaic occupation. The cultural and temporal affiliations of the remaining sites are unknown. Two of the sites contain buried deposits and are considered to be eligible for nomination to the National Register of Historic Places.

Only one linear inventory has been conducted in the WSA; thus, data are not available for computing site density estimates. Additional sites are undoubtedly present in the WSA. These would probably consist mostly of surface artifact scatters; however, rock shelters and rock art sites may also be present.

Recreation

The majority of the recreational use in the WSA occurs in the Justensen Flats, Sagebrush Bench, and Kimball Draw areas. Recreational activities include ORVs, vehicular camping, hiking, and wild horse viewing. The San Rafael MFP (USDI, BLM, 1979a) categorizes the WSA as open to ORV use in accordance with 43 CFR 8340.

The spring months, especially Easter and Memorial Day, receive the greatest amount of visitation. On each of these days, an average of about 100 people have been observed associated with ORV use in each of the Justensen Flats, Link Flats, and Copper Globe areas. The Kimball Draw area is used moderately by ORVs. The terrain is flat to rolling tables with sparse to moderate vegetation coverage. Several established

ORV (motorcycle) trails and various wild horse trails lead toward Devils Canyon drainage. The eastern and western portions of the Devils Canyon drainage are explored frequently by ORVs (but limited to about 2 miles due to terrain). Total ORV use in the WSA is estimated to be 300 visitor days over Easter weekend and an additional 100 visitor days during the remaining season of use. These estimates are based on field observations.

Opportunities for hiking and backpacking exist within the Devils Canyon drainage. Access to the canyon is relatively easy with a high-clearance type vehicle. There is no water available in the canyon, and temperatures in the summer may reach over 100 degrees. Thus, extended hikes would be difficult. Travel within the WSA would be restricted in the Devils Canyon drainage where routes to the upper reaches are limited. Numerous game trails surround the Devils Canyon drainage. These trails have the potential of being used as hiking trails. It is not known if, or how many, people use the Devils Canyon WSA for hiking, backpacking, or other primitive types of recreational activities. It is estimated, however, that there are less than 150 visitor days of annual use for these activities.

Overall, total annual recreation use is about 550 visitor days in the WSA.

Land Use Plans

The WSA is BLM-administered public land. There are no State-owned lands in the WSA. However, the Utah State Legislature passed S.C.R. No. 1 in 1986 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of WSAs or wilderness area. There are no private or split-estate lands in the WSA.

Interstate-70 is adjacent to the WSA on the north for approximately 7 miles. Rights-of-way were issued to the Bureau of Public Roads (now Federal Highway Administration) for the Utah Department of Highways along this particular border of the WSA. Physical and legal access to the WSA is by a BLM-maintained road through Justensen Flats, a county-maintained road through Kimball Draw, and I-70 where it parallels the WSA for 7 miles.

There are no contiguous lands under consideration by other agencies for wilderness.

The area is identified for multiple-use management by the BLM. It is managed in accordance with the San Rafael MFP (USDI, BLM, 1979a). Wilderness is not addressed in the MFP. However, wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

In the Emery County Zoning Plan (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing).

The Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is located in the south-central portion of Emery County. Table 10 shows the baseline and projected total population data for Emery County.

Table 10
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980, the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of

the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

Emery County contains 4,449 square miles of land. About 82 percent (3,648 square miles) of the county is owned by the Federal government, 11 percent (489 square miles) by the State, and 7 percent (312 square miles) by private residents.

- Employment

Table 10 shows the baseline and projected total employment for Emery County to the year 2010.

Coal mining and operation of Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's most important sources of employment. The local economy is most affected by changes in the coal market and had periods of boom and bust. Green River has not grown in the past 30 years. Major employment for Green River includes mining, government, agriculture, and tourism.

Emery County is part of the Southeast MCD. Table 11 shows the baseline (1980) and projected employment by source for the MCD to the year 2010.

Table 11
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent and that services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

- Sales and Revenues

Present economic-related activities in the WSA include livestock production and recreation. Past economic-related activities included mineral exploration and leasing. Table 12 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 12
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Livestock Grazing	$8,680	$668
Recreational Use	$2,255	0
Total	$10,935	$668

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Ten livestock operators have a total grazing privilege of 434 AUMs within the WSA. If all this forage were utilized, it would account for $8,680 of livestock sales, including $2,170 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. Motorized recreational use is moderate. Related local expenditures are low and insignificant to the local economy. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that the Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for Devils Canyon WSA is estimated at about 550 visitor days per year for a total recreational expenditure of $2,255.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 12).

Oil and gas leases in the WSA cover have been phased out and no Federal revenues result from mineral leasing.

The livestock permittees in the WSA can graze their cattle on up to 434 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $668 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Descriptions of the Alternatives section for Devils Canyon WSA.

No Action/No Wilderness Alternative (Proposed Action)

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on the entire 9,610 acres and management under oil and gas leasing Category 3 [no surface occupancy] on 6,535 acres).

No development would be expected in the foreseeable future that would affect wilderness values.

The only conflict with wilderness values in the foreseeable future is ORV activity. ORV activity occurs in approximately 18 percent of the WSA. Much of the WSA can be accessed by vehicles and, in the foreseeable future, new trails formed by ORV use and sights and sounds during the period of activity could reduce naturalness and opportunities for solitude and primitive recreation in the accessible portions of the unit. As much as 40 percent (3,844 acres) of the WSA could be affected during periods of use. Special features including Class A scenery, special status species, wildlife associated with wilderness, wild horses, and archaeological values, would be disturbed. Monitoring and enforcement of protective measures would be necessary to ensure that impacts to these values would not be significant. The projected gradual increase in visitor use would be expected to reduce wilderness values because the additional use would be largely vehicular in nature.

Conclusion: Naturalness and opportunities for solitude and primitive recreation would be reduced in quality on up to 3,844 acres of the WSA. Special features would be disturbed. ORV monitoring and enforcement of protective measures would be necessary to assure that no significant impacts occur.

- Impacts on Vegetation Including Special Status Species

Implementation of the No Action/No Wilderness Alternative would not result in any surface disturbance from mineral-related activities. Thus, there would be no affect to any vegetation type in the WSA. However, continued ORV use in Justensen Flats, Sagebrush Bench, Kimball Draw, and about 2 miles of the upper Devils Canyon drainage could impact individual plants of the two threatened, three endangered, and four Category 1 & 2 candidate species that may occur in the WSA and individual plants may be lost. However, the habitats of these species are widespread and extend beyond the WSA boundaries. Intensive monitoring efforts would continue in the foreseeable future. BLM would initiate a public awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation. Because necessary measures would be taken to protect these species, special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Vegetation types would not be affected by implementation of the No Action/No Wilderness Alternative. Continued ORV use would result in the loss of individual plants of special status species. However, ORV use would be monitored and protective measures taken to protect the viability and populations of threatened, endangered, and other special status plant species.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife could be affected by an increase in the availability of water through the

cleanout and maintenance of one reservoir. No wildlife management facilities or vegetation projects now exist or are planned within the WSA.

Since no surface disturbance from mineral-related activities is anticipated there would be no impact to wildlife habitat or populations with this alternative. However, continued ORV use in Justensen Flats, Sagebrush Bench, Kimball Draw, and about 2 miles of the upper Devils Canyon drainage could adversely affect the black-footed ferret and eight other Category 2 candidate animal species which may occur in the WSA. BLM would initiate intensive inventory and monitoring efforts to determine if populations of these species actually exist within the WSA and if they would be threatened from continued ORV use. BLM would also prepare a management plan which would consider various management options for habitat preservation.

Conclusion: Wildlife habitat and populations including special status species would be adversely affected by ORV use. Monitoring and enforcement of protective measures would be necessary.

- Impacts on Cultural Resources

No surface disturbance is expected within the foreseeable future. The entire WSA would remain open to mineral location and leasing, but no activity is projected.

The WSA would remain open to ORV use and vehicular access under this alternative. ORV activity currently constitutes the major recreational use of the unit and may increase in the future. Archaeological sites, including four recorded sites, may be unintentionally damaged as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of vehicular traffic. Artifacts may be broken or shallowly buried deposits may be disturbed and exposed to erosional processes. In addition, general vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens et al., 1981).

With this alternative, archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without the restrictions of wilderness values maintenance.

Conclusion: Intentional or unintentional damage to archaeological sites may occur due to continued vehicular access and ORV use. Cultural resource management would continue without regard to preservation of other wilderness values.

- Impacts on Recreation

The entire 9,610 acres would remain open for ORV use as identified in the San Rafael MFP. Justensen Flats, Sagebrush Bench, and Kimball Draw areas all receive traditional ORV use. Primitive recreation values would be foregone in those areas and surrounding areas which comprise about 40 percent (3,844 acres) of the WSA.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Cordell and Hendee, 1982; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year over the next 30 years. At this rate, overall recreational use is expected to increase from 550 current visitor days per year to between 1,036 and 4,793 visitor days at the end of 30 years. Assuming that the 2 to 7 percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 150 visitor days per year to between 283 and 1,307 visitor days per year over the next 30 years. Likewise, recreational activities utilizing vehicles (primarily camper units and motorcycles) would increase from 400 visitor days per year to between 754 to 3,486 visitor days.

Conclusion: The quality of primitive recreation would be reduced on 40 percent of the WSA (3,844 acres) in the Justensen Flat, Sagebrush Bench, Kimball Draw, and upper Devils Canyon and surrounding areas. Both primitive and mechanized recreational use would increase 2 to 7 percent over the next 30 years, although primitive use may eventually decline.

All Wilderness Alternative (9,610 Acres)

- Impacts on Wilderness Values

Designation and management of all 9,610 acres as wilderness would preserve the wilderness values in the Devil's Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural

ecological change. Naturalness would be protected on 8,950 acres that meet and 660 acres that do not meet the criteria for naturalness. Solitude would be protected on approximately 7,050 acres that meet and 2,560 acres that do not meet the standards for outstanding opportunities. Primitive and unconfined recreation would be protected on approximately 3,200 acres that meet and 6,410 acres that do not meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including Class A scenery, special status species, geologic features, wild horses, and wildlife associated with wilderness, would also be protected.

Vehicular activity would generally cease with ORV closure, improving opportunities for naturalness, solitude and primitive recreation. It would be administratively difficult to totally eliminate ORV use from the area, even with signing and patrol. This is due not only to the amount of ORV use occurring in and adjacent to the WSA, but also because much of the terrain of the WSA is readily accessible by vehicles. A heavy concentration of ORV use and vehicular traffic occurs in the Justensen Flats area and the head of Devils Canyon drainage, and it would be difficult to prevent continuation of this use. ORV tracks in the vicinity of Sagebrush Bend and Kimball Draw and within the Devils Canyon drainage would reclaim over time, if use could be restricted. Established trails and camps on Justensen Flats are significant imprints and may never reclaim to a point of being unnoticeable.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values. Opportunities for primitive recreation, including hiking, backpacking, and scenic observation, would be much more attractive with wilderness designation because ORV use would be eliminated. In Devils Canyon, where use would probably concentrate, solitude opportunities may become less than outstanding due to congestion. Limitations on use may be necessary to enhance wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA.

• Impacts on Vegetation Including Special Status Species

Wilderness designation would aid in the protection of vegetation, notably the two threatened, three endangered, and four Category 1 and 2 candidate species which may occur in the WSA. Due to ORV closure, the need for monitoring and other special measures would be reduced.

Conclusion: Wilderness designation would provide additional protection to vegetation including populations of threatened, endangered and other special status species which may occur in the WSA.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife, including the one endangered and eight Category 2 candidate species which may occur in the WSA, would benefit from additional solitude.

Increases in primitive-recreation visitor use could have a small negative impact on wildlife, although visitor/wildlife encounters would be infrequent due to low wildlife populations.

Conclusion: Wilderness designation would protect all wildlife species and provide additional opportunities for solitude.

• Impacts on Cultural Resources

Since the entire WSA would be closed to vehicular access and no mineral-related surface disturbance is expected, little intentional or unintentional impacts to cultural resources would occur under this alternative.

As primitive recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts and illegal excavation or sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility of wilderness designation may encourage large scale commercial looting. The buried sites in the WSA may meet these requirements (Wylie, 1988). The benefits of protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any adverse effects of increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restriction of wilderness designation (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied.

Conclusion: Cultural resources would be protected by this alternative. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.

- Impacts on Recreation

The entire 9,610 acres of the Devils Canyon WSA would be closed to recreational ORV use. Approximately 400 visitor days of traditional ORV use occurring in Justensen Flats, Sagebrush Bench, Kimball Draw and upper Devils Canyon drainage areas (1,680 acres) would be foregone. In addition, up to 3,486 annual visitor days of ORV play activity and/or vehicular camping and sightseeing in the WSA that could occur in 30 years without designation would be precluded. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the San Rafael region.

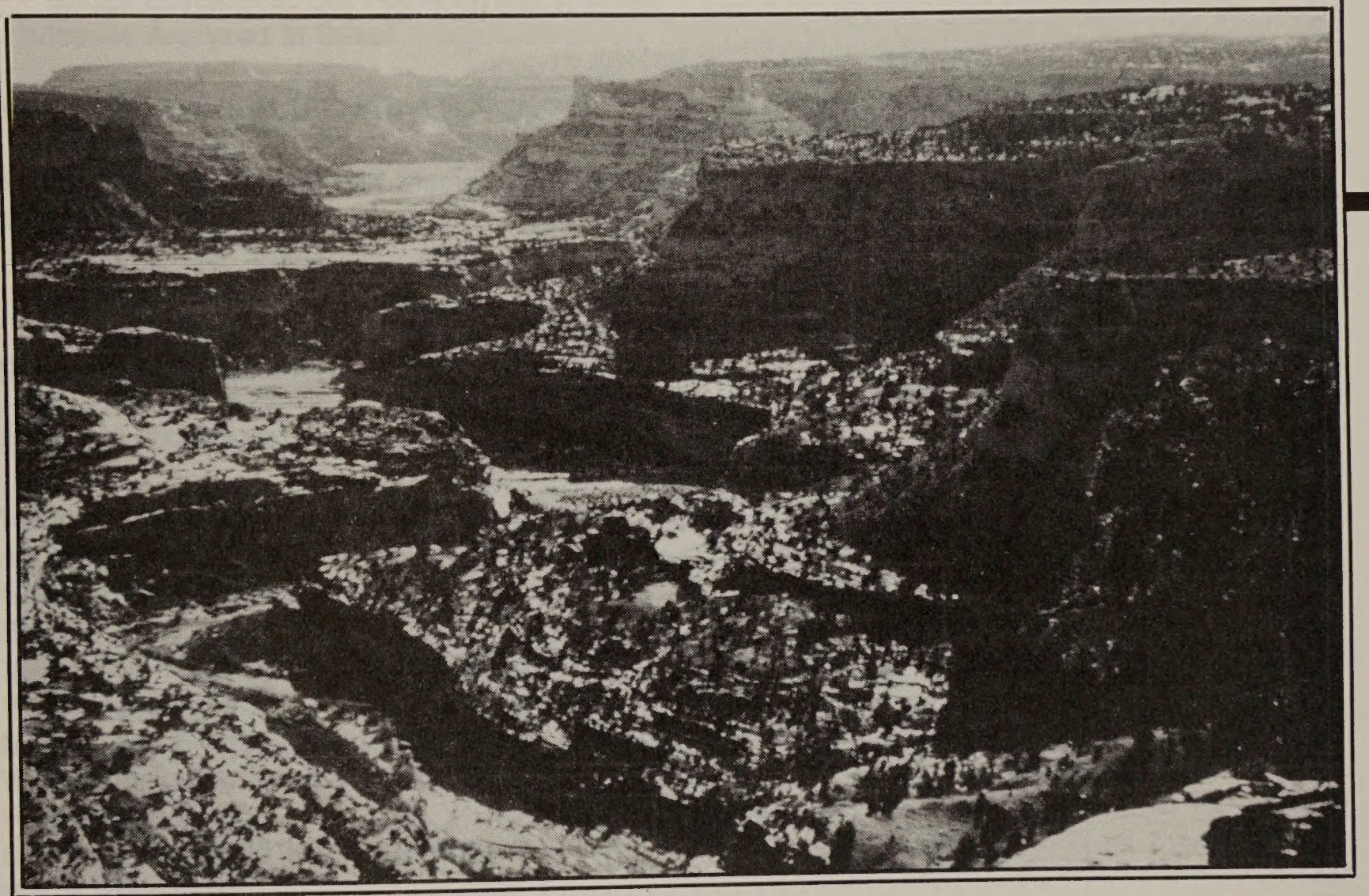
However, this alternative would benefit primitive recreation opportunities by eliminating ORV impacts and by increasing management attention and public recognition of primitive recreational values.

Primitive recreational use is estimated to increase about 2 to 7 percent per year over the next 30 years in relation to population increases and current trends of recreational use. It is estimated that following designation, primitive recreation use could increase from the present 150 visitor days per year to between 283 and 1,307 visitor days per year.

Overall, wilderness designation would result in a decline in total recreation use in the WSA. The loss of potential ORV visitor days of use would only be partially offset by the potential increase in visitor days attributed to primitive recreation.

Conclusion: Primitive recreational values would be preserved within the WSA. Primitive recreational use would increase to be up to 1,307 visitor days per year by the end of 30 years. Between 400 and 3,486 visitor days per year of ORV use in the WSA would be precluded. ORV use in the San Rafael region would probably not decline.

Sids Mountain WSA



SIDS MOUNTAIN/SIDS CABIN WSA

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SIOS MOUNTAINSIDE CABIN WSA

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SIDS MOUNTAIN/SIDS CABIN WSA

(UT-060-023/UT-060-023A)

INTRODUCTION

General Description of the Area

Sids Mountain/Sids Cabin WSA is in the San Rafael Swell region of Emery County, Utah. The WSA contains approximately 80,970 acres of BLM-administered lands, including Sids Mountain, a portion of the San Rafael River, numerous canyons and drainages, arches, spires, and benches of the northwestern part of the San Rafael Swell. The WSA is roughly 8 miles wide (east to west) and 22 miles long (north to south).

The WSA is situated north of Interstate-70 (I-70), west of the San Rafael Campground, and southwest of Buckhorn Canyon. The nearest towns are Castle Dale (16 miles), Huntington (20 miles), and Ferron (12 miles).

The topography of the WSA can be divided into four categories: colorful badlands and mesas, deep canyon drainages, parklands, and unusual rock formations.

The rolling badlands are a colorful mix of soils, cliffs, and mesas. This type of topography is found in the western portion of the WSA. Elevations here range from 5,100 to 6,800 feet. As the topography rises in elevation, mesas become more prominent and colors are less varied.

The majority of the WSA is cut by an intricate canyon system. The predominant canyons of this system are Bullock Draw, McCarty Canyon, Coal Wash, Salt Wash, Saddle Horse Canyon, Eagle Canyon, Cane Wash, Virgin Springs Canyon, and the Little Grand Canyon. Each of these drainages is characterized by massive sandstone walls, fingered tributary canyons, and long winding and twisting routes. Water has been the major erosive agent of these drainages.

Perched above and between these canyons are flat to rolling parklands. Vegetation cover is dominated by grasses, and boundaries are established by sandstone rock formations. Elevations in these areas range from 6,000 to 6,400 feet. Secret Mesa, Cactus Flats, No Mans Mountain, and Sids Mountain best depict these parklands.

Spotted throughout the WSA are interesting and unusual rock formations. Many of these features have been named by their historic finders, such as Joe and His Dog, Devils Monument, Devils Racetrack, Bottle Neck Peak, the Blocks, and Chimney Rock. Several large arch formations also are scattered throughout the area.

The area is warm and arid to semiarid. Temperatures range from 5 to 100 degrees Fahrenheit (F). Average annual precipitation is 8 to 12 inches, most of which occurs in the form of rain. About 15 inches of snow fall between October and April.

The Sids Mountain/Sids Cabin WSA comprises the northwest portion of the San Rafael Swell, while immediately to the east the Mexican Mountain WSA includes the northeast part of the San Rafael Swell. The Devils Canyon WSA is adjacent to the south of the Sids Mountain/Sids Cabin WSA, separated by I-70.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. In October 1985 BLM acquired a 440-acre parcel of private land, (T. 20 S., R. 10 E., secs. 34 and 35) entirely within the Sids Mountain/Sids Cabin WSA. This 440-acre parcel meets the criteria in Section 202 of the FLPMA for designation of a WSA. Called Sids Cabin WSA (UT-060-023A), this area is very similar to the surrounding 80,530 acres Sids Mountain WSA. For analysis purposes these two units have been combined as the 80,970-acre Sids Mountain/Sids Cabin WSA.

2. Small portions of the boundary of the WSA (T. 22 S., R. 10 E., secs. 3, 16, and 21) have been redrawn to correct errors in the Draft EIS maps. These changes did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

STATEWIDE
POCKET MAP
WSA
NO. 63
SEE VOL.I

In addition, approximately 2 miles of the southern boundary of the WSA have been set back from the existing edge of I-70 to the edge of the Federal Highway Administration right-of-way for I-70. The rights-of-way for I-70 were issued in 1963 and 1964. Under Section 317 of the 1958 Public Law 85-767, public lands in such rights-of-way pass from administration by the Department of the Interior to the Federal Highway Administration at the time of the grant. The BLM Wilderness Inventory and Draft EIS maps erroneously showed the existing I-70 lane as the WSA boundary.

3. The Draft EIS identified a Partial Wilderness Alternative of 78,408 acres. This alternative was designed to analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics and to avoid conflicts with traditional ORV access routes in Saddle Horse Canyon, North and South forks of Coal Wash and Bullock Draw. In response to public comments received on the Draft EIS, the Partial Wilderness Alternative has been revised for the Final EIS. The new Partial Wilderness Alternative includes Saddle Horse Canyon, an increase of 1,236 acres. This increase along with the 440 acres of Sids Cabin WSA brings the total acreage in the Partial Wilderness Alternative to 80,084 acres. The Partial Wilderness Alternative is BLM's proposed action (refer to Map 3).

4. The anticipated surface disturbance presented in the Draft EIS (370 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 370 acres reported in the Draft EIS to 83 acres of surface disturbance for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Sids Mountain/Sids Cabin WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation, mineral development, land treatment, or ORV use would occur on soils that are not easily reclaimed, leading to unacceptable increases in soil erosion. Within the foreseeable future, the anticipated surface disturbance from mineral developments and access to State in-held lands in the Sids Mountain/Sids Cabin WSA without wilderness designation would be 83 acres and mitigation would be required through the unnecessary and undue degradation requirements of 43 CFR 3809 and other appropriate regulations. In addition, about 90 percent (79,450 acres) would remain closed to ORV use as outlined in the current land use plan. Therefore, soil erosion is not a significant issue for analysis in the Final EIS.

2. Forest Resources: The only forest resources in the WSA are 72,598 acres of scattered pinyon pine and juniper trees and small pockets of Douglas fir on the high areas of Sids Mountain. Demand is low, there is limited access, and volume of wood is low. In addition, in the WSA is closed to harvest of woodland products under the present BLM land use plan. For these reasons, impacts on forest resources are not significant issues for the Sids Mountain/Sids Cabin WSA.

3. Visual Resources: As discussed above for vegetation, estimates of surface disturbance have been reduced from 370 acres to 83 acres for the WSA in the Final EIS. Therefore, visual resources would not be significantly affected. Visual resources are not addressed in the Final EIS as a separate topic, but are addressed in relation to naturalness and special features in the Wilderness Values sections.

- Issues Analyzed in Detail

The significant issues for the Sids Mountain/Sids Cabin WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on water resources.

4. Impacts on mineral exploration and production.

5. Impacts on wildlife habitat and populations including special status species.

6. Impacts on livestock management.

7. Impacts on the preservation of cultural resources.

8. Impacts on recreational use of the WSA.

9. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the following:

1. Adequacy of BLM's Wilderness Inventory.

2. Adequacy of and rationale for BLM's proposed action.

3. BLM's assessments of wilderness values.

4. Local citizens' and officials' position toward wilderness in the San Rafael Swell.

5. Impacts on threatened and endangered plant species.

6. Impacts on resources such as minerals, air quality and water near the WSA.

7. Rationale for allowing ORV use.

8. Rationale for precluding ORV use.

9. Importance of mineral resources within the WSA.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 63, for responses to specific comments about the Sids Mountain/Sids Cabin WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Alternatives that would add up to 6,750 acres of Federal and 2,720 acres of State lands on the eastern and northwestern boundaries of the WSA were suggested in the public comments. These alternatives are not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1).

Alternatives Analyzed

Three alternatives are analyzed for the Sids Mountain/Sids Cabin WSA: (1) No Action/No Wilderness; (2) All Wilderness; and (3) Partial Wilderness (Proposed Action). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections for each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 80,970-acre Sids Mountain/Sids Cabin WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, and the San Rafael RMP will replace the San Rafael MFP (USDI, BLM, 1979a), it is assumed that the WSA would continue to be managed in accordance with the MFP. The 5,031 acres of State land within the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase.

- Management Conditions and Constraints

The WSA would remain open to mineral location with the exception of about 968 acres that are withdrawn from location of claims for nonmetalliferous minerals. Development work, extraction, and patenting would be allowed on 291 existing mining claims (5,820 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 CFR 3809), without concern for wilderness values. It is assumed that exploration and development of uranium would occur in the long term. The existing post-FLPMA oil and gas leases (520 acres) and future leases could be developed under leasing Category 1 (standard stipulations) on 5,760 acres and Category 3 (no surface occupancy) on 18,560 acres. The remaining acreage in the WSA (56,650 acres) would continue to be managed as Category 4 (no leasing). The San Rafael Swell Special Tar Sand Area (STSA) has about 2,500 acres in the WSA. With the No Action/No Wilderness Alternative, competitive combined hydrocarbon leasing could occur on all 2,500 acres, as

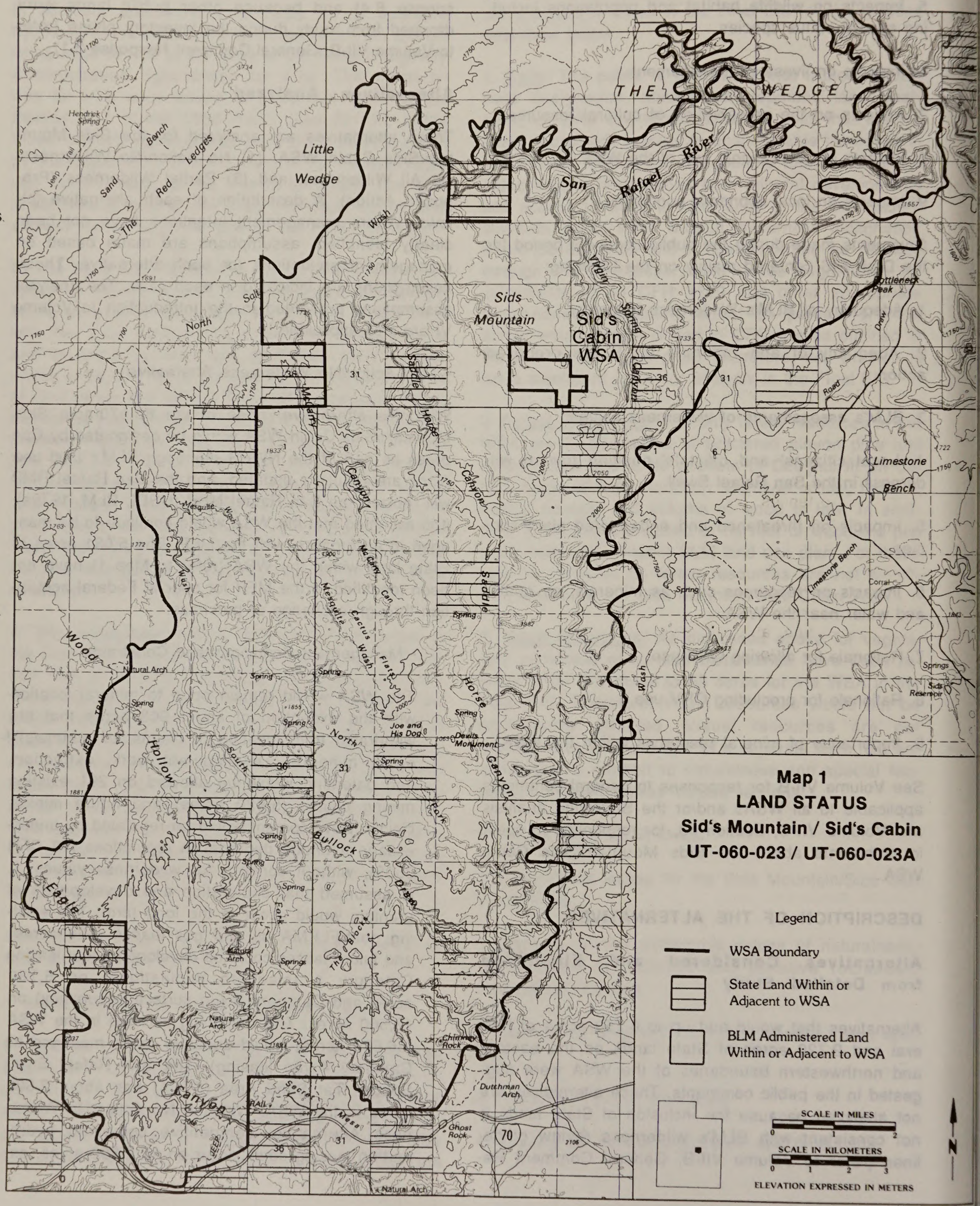
SID'S MOUNTAIN / SID'S CABIN WSA

R. 9 E. R. 10 E. R. 11 E.

T. 20 S.

T. 21 S.

T. 22 S.



Map 1
LAND STATUS
Sid's Mountain / Sid's Cabin
UT-060-023 / UT-060-023A

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES 0 1 2

SCALE IN KILOMETERS 0 1 2 3

ELEVATION EXPRESSED IN METERS

N

provided for in the MFP amendment documented in the Utah Combined Hydrocarbon Leasing Regional Final EIS Record of Decision (USDI, BLM, 1984c). During the designated time frame, no application was made to convert existing oil and gas leases to combined hydrocarbon leases and no competitive leasing has not occurred.

Although mineral resources would be managed as described above, with the exception of uranium, no locatable or leasable mineral explorations or developments are projected in the WSA because the level of known resources and the probability of their development are too low to support such assumptions. Appendix 6 in Volume I explains the methodology for mineral and energy exploration and development projections.

The present domestic livestock grazing use in the WSA would continue as authorized in the MFP (currently estimated at 2,425 AUMs). Existing developments (including two reservoirs, 2 miles of fence, one water tank, one trough and pipeline, three gap fences, and one trail could be used and maintained. There are no current plans for additional range improvements.

Public water reserve withdrawals would remain in effect on 968 acres. These reserves withdraw the lands from all public land laws and nonmetalliferous mineral location.

Approximately 79,450 acres would remain closed to ORV use except as future changes may be made in BLM land use plans. About 27 miles (1,520 acres) of primary way, trails, and wash bottoms would remain open to ORV use.

The entire WSA would remain closed to woodland product harvest as discussed in the MFP. There is no harvest of forest products at the present time, nor is any planned.

The WSA would continue to be managed under VRM Class II (80,970 acres).

- Action Scenario

Given the management plans described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in about 83 acres of surface disturbance. About 73 acres would be disturbed by uranium exploration and development in the northeastern and eastern portions of the WSA. Up to 20 miles of access roads would be required. Up to four developments would consist of expanding existing mine workings and additional road construction. The ore would be processed off-site. Exploration and development could provide up to 40 jobs per operation.

In addition, about 10 acres would be disturbed due to development of access to in-held State lands. No other disturbance is anticipated.

No disturbance from ORV use is projected because of present management restrictions and because vehicular traffic is restricted to about 27 miles of ways, wash bottoms and trails due to rugged terrain.

It is projected that recreational use will increase over the current estimated use of 2,500 visitor days per year at a rate of 2 to 7 percent annually. About 500 of the current visitor days involve ORV activity. About 20 percent of future recreational use would continue to involve vehicular activity.

- All Wilderness Alternative

With this alternative, all 80,970 acres of the Sids Mountain/Sids Cabin WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). The WSA would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy, it is assumed that State lands would remain under existing ownership. There are eight State sections (5,031 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). There are no private or split-estate lands in the WSA. The figures and acreages with this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 80,970 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on the approximately 5,820 acres of the 291 existing mining claims if

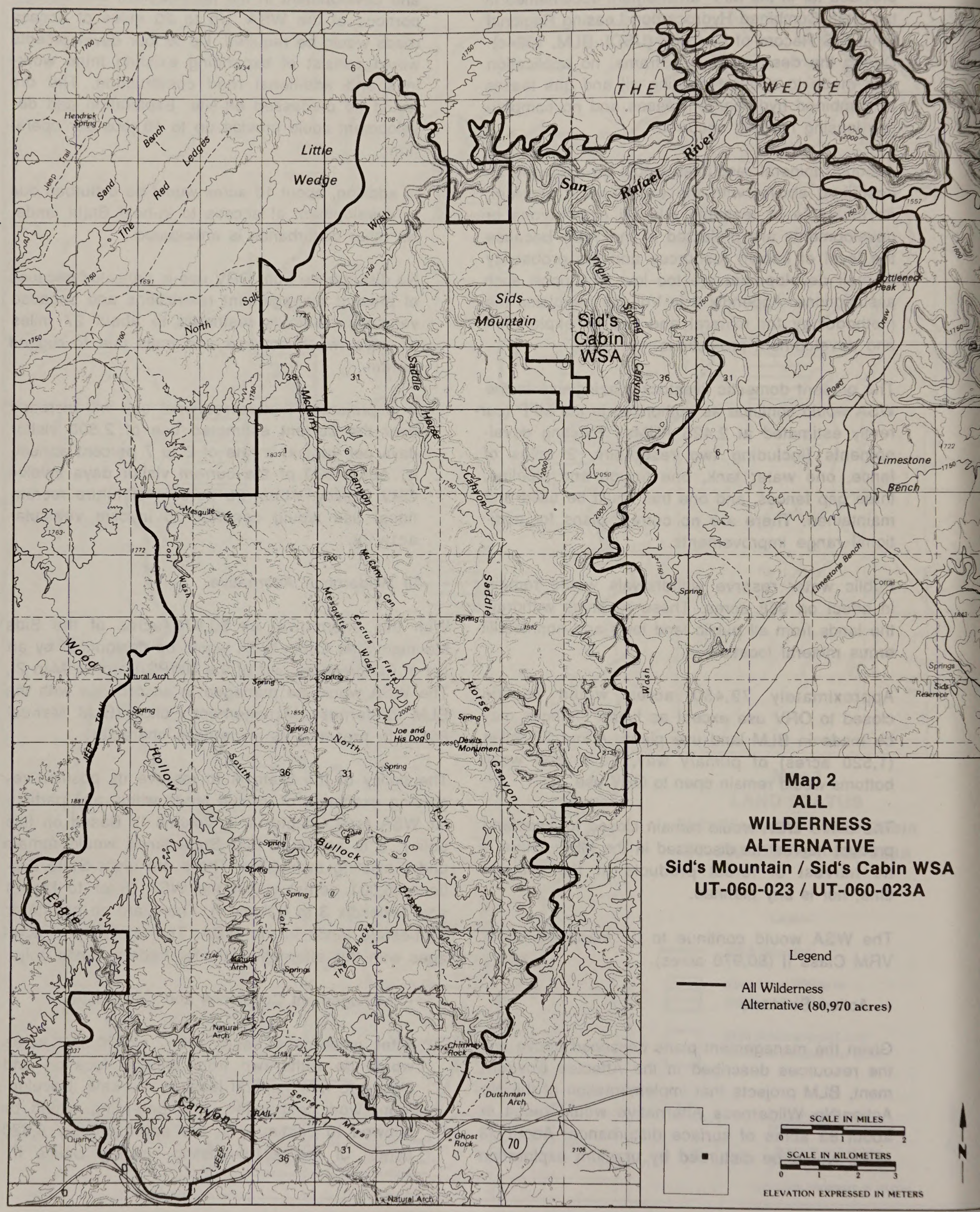
SID'S MOUNTAIN / SID'S CABIN WSA

R. 9 E. R. 10 E. R. 11 E.

T. 20 S.

T. 21 S.

T. 22 S.



Map 2
ALL WILDERNESS ALTERNATIVE
Sid's Mountain / Sid's Cabin WSA
UT-060-023 / UT-060-023A

Legend

All Wilderness Alternative (80,970 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. It is assumed that such claims for uranium would exist in the WSA at the time of designation and they would be explored and developed under more restrictive conditions than the No Action/No Wilderness Alternative. Existing oil and gas leases involving about 520 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown prior to wilderness designation. None are projected because the level of known resources and the probability of their development are low. New leases would not be issued. Competitive combined hydrocarbon leasing on 2,500 acres of the San Rafael Swell STSA located in the WSA would not be allowed.

Present domestic livestock grazing would continue as authorized in the San Rafael MFP. The estimated 2,425 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland improvements (including 2 miles of fence, two reservoirs, one water tank, one trough and pipeline, three gap fences, and trail) that are existing at the time of designation would continue in the same manner as in the past based on practical necessity and reasonableness.

Public water reserves would remain in effect on 968 acres. These reserves withdraw the lands from all public land laws and nonmetalliferous mineral location.

The entire 80,970-acre area would be closed to ORV use except for (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved rangeland developments. About 27 miles of existing vehicular ways within the WSA would not be available for vehicular use except as indicated above. The approximately 21 miles of roads that border the WSA would remain open to vehicular use.

Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood for use in the wilderness, if accomplished by other than mechanical means.

Visual resources would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 32 acres would be disturbed with the All Wilderness Alternative. About 22 acres would be disturbed by exploration and development of uranium under more restrictive conditions than the No Action/No Wilderness Alternative. Up to 10 miles of access roads would be required. Existing workings would be expanded and new access roads would be developed in the northeastern and eastern portions of the WSA. The ore would be processed off-site. Up to 20 jobs could be provided by each of the four projected operations.

Ten acres could be disturbed due to development of access to in-held State lands. No other disturbance is projected.

No disturbance from ORV use is anticipated because of wilderness management restrictions and rugged terrain.

It is projected that primitive recreational use will increase over the current estimated primitive-type use of 2,000 visitor days per year at a rate of 2 to 7 percent annually. No vehicular activity would be allowed.

- Partial Wilderness Alternative (Proposed Action)

With this alternative, 80,084 acres of the Sids Mountain/Sids Cabin WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics and to avoid conflicts with traditional ORV access routes (e.g., access routes into North and South Forks of Coal Wash, Bullock Draw, and Eagle Canyon). The maintenance of ORV routes would divide the wilderness area into two distinct sections on each side of North Fork Coal Wash. The south section would have about 9 miles of ORV access corridors (ways and wash bottoms) cherry-stemmed into the area. A small area subject to vehicle sounds from nearby I-70 also would not be included in this alternative. In addition, a small acreage along Buckhorn Draw would not be included due to low wilderness values and the influence of nearby vehicular traffic and recreation use. The nondesignated 886 acres would be managed

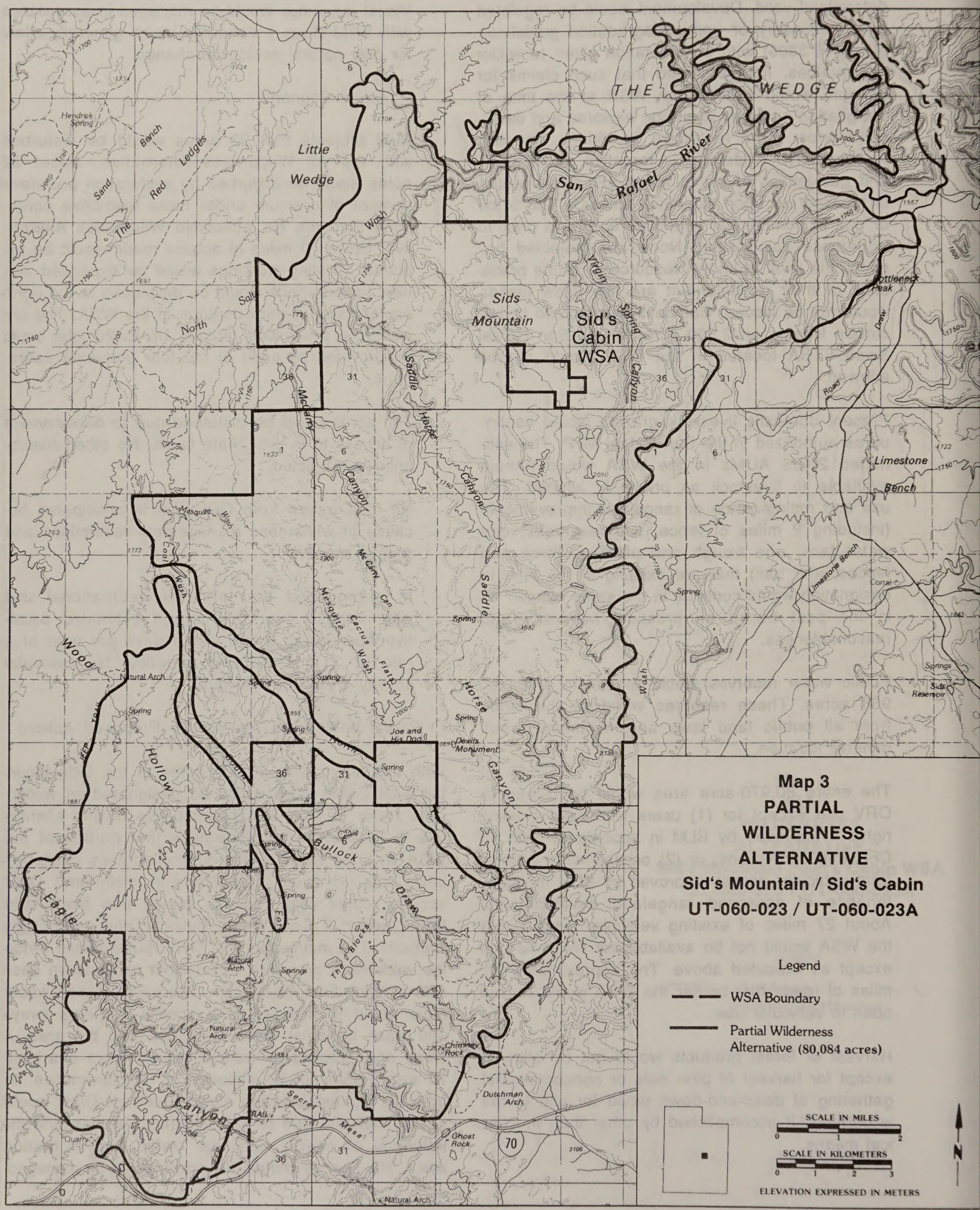
SID'S MOUNTAIN / SID'S CABIN WSA

R. 9 E. R. 10 E. R. 11 E.

T. 20 S.

T. 21 S.

T. 22 S.



in accordance with the San Rafael MFP, as described for the No Action/No Wilderness Alternative. The 80,084-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560), as described in the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is assumed that State lands would remain under existing ownership. There are four State sections (2,471 acres) in the portion of the WSA that would be designated wilderness (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

The 80,084-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. However, development work, extraction, and patenting would be allowed to continue on 5,820 acres of the 291 existing mining claims, providing they are valid. It is assumed that such claims for uranium will exist at the time of designation and that exploration and development will occur under more restrictive conditions than the No Action/No Wilderness Alternative. Existing oil and gas leases that cover 520 acres would be phased out upon expiration unless a find in commercial quantities is shown. None are projected. Competitive combined hydrocarbon leasing in that portion of the San Rafael Swell STSA located in the wilderness area would not be allowed. The 886-acre area not designated wilderness would be open to mineral location with the exception of about 160 acres that would remain withdrawn from location of claims for nonmetalliferous minerals. Development work, extraction, and patenting of future mining claims could occur if the claims are valid. The area not designated wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on about 200 acres, Category 3 (no surface occupancy) on about 475 acres, and Category 4 (no leasing) on about 211 acres. Development of future oil and gas leases could occur without concern for wilderness values, although the linear configuration of most of the 886 acres would constrain such development. Although minerals would be managed as described above for the nondesignated area, no locatable or leasable mineral explorations or developments are projected to occur there. This is because the level of known resources and the probability of their development are too low to support such assumptions. Appendix 6 in Volume I explains the methodology for mineral exploration and development projections.

Domestic livestock grazing would continue as authorized in the San Rafael MFP. The estimated 2,384 AUMs in the wilderness area would remain available to livestock as presently allotted. In the wilderness area, existing range developments could continue to be used and maintained in the same manner as in the past based on practical necessity and reasonableness. In the 886-acre nonwilderness area, grazing use of 41 AUMs would continue as authorized in the MFP, and vehicle access would be allowed in conjunction with livestock management.

In the 80,084-acre wilderness, public water reserves of 808 acres would remain in effect. In the 886-acre nondesignated area, 160 acres of public water reserves would remain in effect. These reserves withdraw the lands from all public land laws and nonmetalliferous mineral location.

The 80,084-acre wilderness area would be closed to ORV use. The 886-acre remainder of the unit would remain open to vehicular travel. About 14 miles of existing vehicular ways within the wilderness portion would no longer be available for vehicular use except for purposes identified under the All Wilderness Alternative.

Harvest of forest products in the wilderness area would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood (for use in the wilderness), if accomplished by other than mechanical means. The area not designated wilderness would also remain closed to woodland harvest based on decisions recorded in the San Rafael MFP.

Visual resources in the wilderness area would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The 886 acres not designated as wilderness would be managed as Class II as currently set forth in the San Rafael MFP.

SIDS MOUNTAIN/SIDS CABIN WSA

- Action Scenario

BLM projects that 24 acres of surface disturbance would occur in the designated portion of the WSA. About 22 acres of disturbance would occur as a result of locatable mineral activities (including up to 5 miles of access roads) as discussed in the All Wilderness Alternative. Two acres would be disturbed resulting from development of access to in-held State lands.

It is projected that 8 acres of surface disturbance would occur in the nondesignated portion occurring from the development of access to State lands.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain. Vehicular use would be limited to about 13 miles of ways, washes, and trails.

Both primitive-recreational use and ORV use is projected to increase over the current estimated use of 2,500 visitor days per year at a rate of 2 to 7 percent annually. Vehicular activity would comprise abou 11 percent of the total use.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA (80,970 acres) is of sufficient size to enhance the wilderness values present.

- Naturalness

The major imprints of man were excluded from the WSA by boundary determination during the BLM Intensive Wilderness Inventory (USDI, BLM, 1980). Imprints that remain are a stock pond and associated way, ORV trails, three mine portals, a 2-mile fence, about 19 miles of ORV tracks in four wash bottoms, approximately 8 miles of other ways, and some historical structures in the Sids Cabin area. These imprints are pre-FLPMA, unless otherwise noted below.

A stock pond and associated way are located along the WSA's western boundary. The pond and way are used lightly during the year and do not present a substantially noticeable impact.

Buckhorn Draw, a popular and well-traveled canyon, is used heavily for vehicular camping and ORV activities. Along the northeastern boundary of the WSA, are vehicular camping areas and associated ORV trails. Trash and fire rings tend to accumulate during the heavy-use spring months.

Two mine shafts are located in the northeast part of the WSA along Cane Wash. One other shaft can be found along the San Rafael River in the northwest part of the WSA. All three mine shafts date back to the 1950s. Erosional processes and vegetation cover surrounding these imprints have made them substantially unnoticeable.

In the Sids Cabin portion of the WSA, there is a historic cowboy cabin, small corrals, and several outbuildings. These imprints are noticeable.

Approximately 2 miles of fence made of cedar post, green steel posts, and barbed wire enters the WSA along the western border near Wood Hollow. The fence has been identified as being substantially unnoticeable.

About 19 miles of wash bottom are used periodically by ORVs. During periods of little rain, ORV tracks are noticeable. After rains and when these drainages flood, the ORV tracks are erased.

Located near Mesquite Wash is a way extending about 1.5 miles into the WSA. The way is kept noticeable by occasional vehicular traffic, mostly associated with livestock management activities and ORV recreation. Also, another way, about 3.5 miles long, heads into the Secret Mesa area of the WSA. The way is mostly evident for approximately 2 miles from the WSA's

SIDS MOUNTAIN/SIDS CABIN WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (80,970 Acres)	Partial Wilderness (80,084 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 83 acres of the WSA because of uranium exploration and development and development of access to in-held State lands. Vehicular use of about 29 miles of existing ways, trails, and wash bottoms and future mining and access roads to State inholdings, would detract from naturalness and opportunities for solitude and primitive recreation in the WSA. ORV use would also disturb wildlife, archaeological, and historic values. Overall, opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 16,194 acres. Class A scenery would be reduced in quality in the disturbed and surrounding areas. Wild and scenic river values of the 18 miles of the San Rafael River in the WSA would not receive additional protection.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 32 acres because of uranium exploration and development on valid mining claims and development of access to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 3,240 acres. Special features would be preserved overall, although some Class A scenery could be reduced in quality in disturbed and surrounding areas. The wild and scenic river values of the 18 miles of the San Rafael River in the WSA would receive additional protection.	Wilderness values would be protected in the designated area which is approximately 99 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 32 acres of the WSA because of uranium exploration and development of access to State in-held lands. Vehicular use of about 13 miles of existing ways, wash bottoms, and trails in the nondesignated area would detract from opportunities for solitude and primitive recreation. Wildlife associated with wilderness would be disturbed and the potential for vandalism of cultural resources would increase. Class A scenery would be reduced in quality in disturbed and surrounding areas. Overall, opportunities for solitude and primitive recreation would be reduced in quality on up to 9,518 acres. Wild and scenic river values of the 18 miles of the San Rafael River in the WSA would receive additional protection.
Impacts on Vegetation	Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected because the 83 acres of projected surface disturbance would affect only 0.1 percent of the vegetation in the WSA. Impacts from ORV use on 1,520 acres of access routes would be monitored and corrective measures taken should populations of threatened, endangered or other special status species be jeopardized.	Vegetation types and threatened, endangered, or other special status plant species would be protected by this alternative because projected disturbance would be reduced from 83 acres to 32 acres and ORV use would be eliminated. Appropriate inventories, clearances, and consultation with FWS would be completed prior to surface disturbance.	Because 99 percent of the WSA would be designated wilderness and 32 acres of surface disturbance are projected, impacts on vegetation would be about the same as with the All Wilderness Alternative. Special status species could be affected by ORV use on 886 acres and monitoring and corrective measures may be necessary.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (80,970 Acres)	Partial Wilderness (80,084 Acres) (Proposed Action)
Impacts on Water Resources	This alternative would not alter present or future water quality or uses. Only 0.1 percent (83 acres) of the WSA would be disturbed and there would be no restrictions on water uses imposed by wilderness management.	Water quality would receive additional protection because the potential for surface disturbance would be reduced. In the long term, future water diversions and new consumptive uses in the San Rafael River system upstream of the WSA may be restricted or precluded. Potential upstream uses include irrigation, cooling water for coal-fired generation of electicity, coal mining, and municipal use in Emery County.	Impacts would be about the same as with the All Wilderness Alternative because 99 percent of the WSA would be designated wilderness, the same amount of disturbance (32 acres) projected, and because the San Rafael River would flow through the designated area.
Impacts on Mineral and Energy Exploration and Production	Mineral and energy exploration and production would not be affected because mineral leasing, location of mining claims and mineral developments would not be restricted for the protection of wilderness values.	Wilderness designation would limit potential exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. Although some production would occur, opportunities for production of an unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be foregone because the probability of development is low even if the area is not designated wilderness.	Impacts and conclusions for mineral and energy exploration and development would be the same as for the All Wilderness Alternative because 99 percent of the WSA, including potential uranium development areas would be designated wilderness.
Impacts on Wildlife Habitat and Populations	About 0.1 percent (83 acres) of the wildlife habitat in the WSA would be directly disturbed and ORV use would continueon 1,520 acres of ways and washes. Populations of bighorn sheep, raptors, and special status species could be affected. Monitoring and enforcement of protective measures may be necessary.	Approximately 0.04 percent (32 acres) of the wildlife habitat would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude over the short and long term.	There would be no significant impacts to wildlife habitat or populations including threatened, endangered, or sensitive animal species due to locatable mineral development of new access. However, because ORVs would be used on 886 acres of ways and washes, big horn sheep, raptors and special status psecies could be affected. The potential for those impacts would be less than with the No Action/No Wilderness Alternative because 14 of the27 miles of access routes would be closed to ORV use.

SIDS MOUNTAIN/SIDS CABIN WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (80,970 Acres)	Partial Wilderness (80,084 Acres) (Proposed Action)
Impacts on Livestock Management	Livestock management and grazing levels would not be affected because access, grazing levels and management techniques would remain as at present.	Levels of livestock use would not be affected. The closure of 27 miles of roads, trails, and ways would result in changes in livestock management and supervision as they are currently practiced in the WSA. Restrictions on vehicle use would increase costs and cause inconvenience to the 68 permittees whose livestock graze in the WSA.	Levels of livestock use would not be affected. The closure of 13 miles of roads, trails, and ways would result in changes in livestock management and supervision as they are currently practiced in the WSA. Restrictions on vehicle use would increase costs and cause inconvenience to the 68 permittees whose livestock graze in the WSA.
Impacts on Cultural Resources	Impacts due to surface disturbance are expected to be minimal because only 0.1 percent (83 acres) of the WSA would be disturbed and mitiga-tion would be required. Intentional or unintention-al damage to archaeological sites including the four known sites may occur due to continued ve-hicular access and ORV use on 1,520 acres of ways and wash bottoms. Cultural resource man-agement would continue without regard for pro-tection of other wilderness values.	Very little impact to cultural resources is expect-ed under this alternative because potential dis-turbance would be reduced from 83 to 32 acres and ORV use would not be allowed. Cultural re-source management may be limited in scope and execution in order to protect other wilderness values.	Archaeological sites, including all of the recorded sites, would receive protection from wilderness desig-nation under this alternative. Sites in the nondesig-nated portion would continue to receive protection under existing laws because 99 percent of the WSA would be designated and disturbance would be about the same as with the All Wilderness Alternative. Im-pacts from direct disturbance would be about the same. Continued vehicular access to 886 acres may re-sult in intentional or unintentional damage to archaeo-logical sites.

SIDS MOUNTAIN/SIDS CABIN WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (80,970 Acres)	Partial Wilderness (80,084 Acres) (Proposed Action)
Impacts on Recreation	The quality of primitive recreation would be reduced on and near ORV-use areas and areas where other surface-disturbing activities occur. This could occur directly on 83 acres and indirectly on up to 20 percent (16,194 acres) of the WSA. Both primitive and motorized recreational use would increase by 2 to 7 percent annually over the next 30 years, but vehicules would be restricted to about 27 miles (1,520 acres) of ways and wash bottoms. Eighteen miles of the San Rafael River, a Wild and Scenic River Inventory Segment, would not receive additional protection.	Primitive recreational values in the WSA would be preserved overall, and primitive use would increase at a rate of 2 to 7 percent annually over the next 30 years. The quality of the primitive recreational opportunity would be directly reduced on 0.04 percent (32 acres) of the WSA and indirectly reduced on up to an additional 4 percent (3,240 acres) of the WSA. Up to 4,400 visitor days of future annual motorized recreational use that could occur by the year 2020 would be precluded. Because abou 20 percent of the existing recreational use is based on vehicular access, overall recreational use would temporarily decline following wilderness designation. The 18 miles of the San Rafael River, a Wild and Scenic River Inventory Segment, would receive additional protection.	Primitive recreational opportunities would be directly reduced in quality on the 13 miles (886 acres) of ways, trails, and wash bottoms left for vehicular use in the nondesignated area and 32 acres in the designated area. An indirect reduction in quality of the primitive recreation opportunity would occur on up to 9,518 acres. Both primitive and motorized recreation use would increase, but motorized recreation use would increase to only about half of that expected with the No Action/No Wilderness Alternative. All 18 miles of the San Rafael River, a Wild and Scenic River Inventory Segment, would receive additional protection.
Impacts on Economic Conditions	Present economic trends would not be affected. Locatable mineral activity could increase employment in Emery County by 2.4 percent (160 jobs) by the year 2010. Local recreation-related expenditures would contribute up to $89,380 annually to the local economy by the year 2020. Live-stock grazing would contribute $48,500 annually in livestock sales and $3,735 in Federal revenues. Present and future oil and gas leases could contribute up to $48,640 annually in Federal and State lease revenues. Federal revenues related to commercial recreation would increase.	Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Up to 80 fewer jobs would be provided by locatable mineral activities with this alternative. Recreation-related expenditures could contribute up to $71,340 annually to the local economy at the end of 30 years. Livestock grazing would continue to contribute $48,500 annually in livestock sales and $3,735 in Federal revenues. Up to $48,640 in Federal and State oil and gas lease revenues would be foregone each year. Federal revenues related to commercial recreation would increase.	Over the long term, partial wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Approximately 80 fewer jobs would be provided by locatable mineral activities with this alternative. This is equivalent to about 1.2 percent of the projected Emery County employment in the year 2010. Recreation-related expenditures could contribute up to $80,360 annually to the local economy at the end of 30 years. Livestock grazing would ocntinue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Up to $47,290 in Federal and State oil and gas lease revenues would be foregone each year. Federal revenues related to commercial recreation would increase.

southern boundary and washes out in several spots from there on. The route is kept evident by a small amount of intermittent use. Located west of the Secret Mesa way is another travel route into Eagle Canyon. The route is approximately 3 miles in length and is used by ORVs and motorcyclists venturing into Eagle Canyon from Justensen Flat or from the Utah Department of Transportation (UDOT) maintenance shed near I-70. The route is very evident and maintained by repeated vehicle use.

Since establishment of the WSA approximately one-half acre of the WSA has been disturbed. This disturbance is the result of unauthorized mining-claim assessment work near the Moore Road - I-70 junction. The area is being reclaimed to meet the nonimpairment standard.

These imprints combined, except for Sids Cabin and the travel route into Eagle Canyon, cover approximately 5 percent (4,000 acres) of the WSA, but are considered substantially unnoticeable; therefore, the 4,000 acres meet the naturalness criterion for areas under wilderness review. The route into Eagle Canyon (426 acres) and Sids Cabin (1 acre) are substantially noticeable and do not meet the naturalness criterion. The remainder of the WSA (76,543 acres) is natural and considered unspoiled in character.

- Solitude

The WSA offers outstanding opportunities for solitude. The many incised drainages allow travel through deep-walled canyons where the user can easily experience seclusion and isolation. The twisting character of the canyons and cliffs effectively screen lines of sight and suppress sounds. Some of the major drainages (i.e., Saddle Horse, Buckhorn, the North and South Forks of Coal Wash, and Bullock Draw) have wide, straight portions where screening and suppression of sounds are not afforded. Intrusions and influences outside the WSA are essentially nonexistent within the canyons, except the drainage of Eagle Canyon. There is about 0.25 of a mile impacted by the continual sounds of traffic on I-70. Beyond the travel route into the drainage to the northwest, sounds become less evident and sights of vehicles usually are not apparent except on the occasional days when ORV use is high.

The higher reaches of the WSA, consisting of rolling park lands, sandstone knobs, and interesting rock formations, are intermittently open and provide vantage points of the vast terrain. To the north and south are views of the varied canyons of the San Rafael drainage. The lower benchland of the Swell can be seen to the east, along with a vast view of Window Blind Peak, Assembly Hall Peak, Mexican Mountain, and the Book Cliffs. To the west, the scenery is dominated by the rising mesas of red ledges, the colorful character of the desert badlands, and by the distant Wasatch Plateau. Vegetation cover varies from grass to Ponderosa pine, and, at times, does not effectively screen visitors. The rolling terrain and the character of the interesting rock formations and knobs, however, do allow for separation and the feeling of seclusion. With an expansive view of the surroundings, a recreationist can experience the feeling of remoteness.

From specific points within the WSA, several dirt roads, traffic on I-70 (adjacent to southern boundary), and the two powerplants in Huntington and Castle Dale can be seen. These outside sights do not necessarily intrude upon the visitor's solitude and their observation may actually, as a comparison, emphasize the remoteness of the recreational experience. Traffic sounds from I-70 can be heard from specific points within the WSA. The level and intensity, however, changes with weather conditions and the position of the listener. In general, opportunities for solitude are diminished in areas of the WSA that are open, in direct line, and adjacent (within less than 2 miles) to the highway.

In summary, in over 95 percent of this WSA (76,970 acres) the opportunities for solitude are outstanding. In about 5 percent of the WSA (4,000 acres), opportunities for solitude are not outstanding. These include the wide major wash bottoms, Buckhorn Canyon, and a portion of Eagle Canyon.

- Primitive and Unconfined Recreation

In the spring, high water levels in the San Rafael River offer an outstanding opportunity to float the scenic passage of Little Grand Canyon. During low water periods, hiking the canyon becomes a popular activity. Many organized and educational groups take advantage of the recreation opportunity along the San Rafael River.

Outstanding opportunities for hiking, backpacking, horseback riding, rock scrambling, photography, art, and scenic viewing await the explorer in the majority of the WSA. Many isolated springs and pools of water during parts of the year provide an element of contrast to the dry, desolate character of the WSA. The interesting nature of the rock formations and canyon

drainages with their sheer-walled cliffs, arches, knobs, pinnacles, twisted passages, and historic and prehistoric remnants, all contribute to a high quality recreational experience.

The Sids Mountain/Sids Cabin WSA offers outstanding opportunities for primitive recreation throughout all 80,970 acres.

- Special Features

Special features found in the WSA include archaeologic, historic, scenic, geologic, ecologic, and wildlife values. They include known and suspected sites of the Fremont Indian culture, and historic travel and trade routes. Scenic values include the colorful and dramatic rock forms in the intricate canyon drainages. The entire WSA is rated Class A for scenic quality. Situated within the Navajo sandstone formation are many arches, caves, pinnacles, buttes, and knobs. Geologic values include the several formations exposed during the uplift of the San Rafael Swell.

The WSA has resource values that, although not included as such during the wilderness inventory, could be considered special features. There are three animal species (black-footed ferret, bald eagle and peregrine falcon) and three plant species (Maguire daisy, [Erigon Maguierei var. maguierei], San Rafael cactus [Pediocactus despanii], and Wright fishhook cactus [Sclerocactus wrightriae]) listed as endangered that may be found near or within the WSA. Also, two threatened species, the Jones cycladenia (Cycladenia humilis var. jonesii) and the Last Chance townsendia (Townsendia aprica), may occur in or near the WSA.

There are nine animal species and four plant species that are considered sensitive that may occur in the WSA. Cougar and desert bighorn sheep, which are wildlife species associated with wilderness, occur within the WSA. Refer to the Affected Environment and Vegetation and Wildlife Including Special Status Species sections for additional information. The WSA has approximately 24 miles of perennial streams. The San Rafael River is on the Nationwide Rivers Inventory list of rivers to be considered for possible inclusion in the National Wild and Scenic Rivers System.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland, galleta-threeawn shrub steppe, and saltbush-greasewood. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Affected Environment, Wilderness Values section of Volume I.

This WSA is within a 5-hour driving time from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is in a PSD Class II attainment area and currently meets Class II standards of air quality classification (1977 Clean Air Act, as amended). The nearest Class I area is Capitol Reef National Park, located approximately 45 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and Green River areas. A large point source includes powerplants located 8 miles west of the WSA in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles, although hazy conditions occasionally affect views to the north and west (Aerocomp, Inc., 1984).

Geology and Topography

The Sids Mountain/Sids Cabin WSA is located in the northwestern portion of the San Rafael Swell. During the Eocene Epoch, the area began to uplift, creating a bulge in the existing formations. A period of erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent north-trending uplift on the Colorado Plateau. Elevations in the Sids Mountain WSA range from 5,100 to 6,800 feet.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations cropping out in the WSA range from the Triassic Moenkopi Formation on the east to the Jurassic Carmel Formation on the west. The formations dip to the northwest at less than 10 degrees.

The Moenkopi Formation, exposed along the eastern border of the WSA, consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-

gray and red shale, and conglomerate. Toward the base of the formation is the Sinbad Limestone Member. The Moenkopi Formation is known as an oil and gas producer.

Also along the eastern boundary and exposed within the WSA's eastern drainages is the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and intertonguing. The formation is a uranium producer and is composed of four members: Temple Mountain, Monitor Butte, Mossback, and Church Rock.

The Wingate Formation forms the cliff faces of the WSA's major canyons. It consists of buff, orange, and brown, massive cross-bedded, medium-grained sandstone conglomerate and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and a siltstone-pebble conglomerate.

Navajo Sandstone is another colorful formation exposed in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow-colored caps appear as petrified dunes. Lenses of limestone up to 5-feet-thick occur in the upper half of the formation. Situated within this formation are many arches, caves, pinnacles, buttes, and knobs. The Navajo Sandstone makes up the greatest percentage of the WSA.

The Carmel Formation forms the western border of the WSA. It consists of brown to gray, sandy limestone, red, thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

Soils

The WSA contains five general soil characteristics as shown in Table 2. Wind is a minor erosive agent in the WSA, with water actions moving most soil.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	30	24,291	0.0	0
Shallow loamy soils on sloping structural benches.	25	20,261	1.0	5
Moderately deep to deep loamy soils on sloping alluvial fans some of which are gypsum affected	5	4,030	1.0	5
Deep and very deep loamy and sandy soils on nearly level benches and drainageways	10	8,141	0.1	1
Deep and very deep stony soils on steep alluvial fans	30	24,247	1.0	10
Totals	100	80,970		

Source: Hansen, 1985.

The erosion conditions for the WSA are shown in Table 3.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	30	24,159	241,590
Medium	5.0	-	-	-	30	24,599	120,795
Low	1.0	60	48,758	48,318	10	8,053	8,053
Very Low	0.1	10	8,053	805	-	-	-
None	0.0	30	24,159	-	30	24,159	-
Totals		100	80,970	49,123[a]	100	80,970	370,438[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.6 under present conditions; 4.6 if disturbed).

Overall, erosion potential generally is low. Because of sparse vegetation cover, the pattern of precipitation that comes in brief, intense summer thunderstorms can create locally severe erosion, especially on steep slopes and in exposed wash channels. About 30 per-cent (24,300 acres) of the WSA has high erosion potential when soils are disturbed.

Approximately 70 percent (56,670 acres) of the WSA is classified as strongly saline and the remaining 30 percent (24,300 acres) is slightly saline. The area is estimated to produce an average annual salt yield of 133 lb per acre. About 15 percent (12,145 acres) of the area is considered to be fair for seeding potential where soils are deep loams and low in salt content. Conditions such as rock outcrops, steep slopes, shallow soils, and high salt concentrations preclude successful seeding on the remaining 85 percent (68,825 acres) of the WSA.

Vegetation Including Special Status Species

The major vegetation type in the WSA is pinyon-juniper woodland. Other vegetation types include desert shrub, sagebrush-grassland, and riparian (refer to Table 4). Pinyon-juniper woodland vegetation is found on foothills and mesas and other areas of relatively high elevation and precipitation. Soils in these areas are typically shallow and rocky. The pinyon-juniper woodland does not extend to lower elevations due to lower precipitation, high temperatures, and saline substrate.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	72,598	89
Desert shrub	7,304	9
Sagebrush-grassland	588	1
Riparian	480	1
Total	80,970	100

Source: USDI, BLM, 1989

The desert shrub vegetation type is found in locations characterized by low precipitation, high temperatures, and rapid evaporation, mostly gravelly benches and gently sloping sandy lowlands. Soils are mostly shallow and rocky. Dominant shrubs are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandy muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell, including wavy-leaf oak, sand sagebrush, and purple sage.

The sagebrush-grassland and riparian vegetation types each make up only 1 percent (809 acres) of the WSA. The sagebrush-grassland type occurs on the drier portions of the pinyon-juniper woodland type and the wetter fringes of the desert shrub type. The major species of sagebrush are Bigelow sagebrush, bud sagebrush, pygmy sagebrush, tarragon, and fringed sagebrush.

Grassland vegetation dominates in a few scattered, isolated areas. The major grasses are curly grass, blue grama, Indian ricegrass, and sand dropseed.

A riparian vegetation type is located along the San Rafael River. The river is a perennial water source for streamside plant communities. Dominant plant species in this type are tamarisk, cottonwood, black greasewood, rabbitbrush, snakeweed, and alkali sacaton.

The San Rafael Swell, of which the WSA is a part, provides habitat for a large number of species of rare plants. Nine threatened, endangered, Category 1 and 2 candidate species may occur in the WSA (refer to Table 5). The habitat for all of these species extend beyond the boundaries of the WSA.

Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenis humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barneybi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 in Colume I.

The Sids Mountain/Sids Cabin WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-

Kuchler ecosystems map (USDI, USGS, 1978). The PNV types in the WSA are listed on Table 6.

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	36,239	45
Galleta-threeawn shrubsteppe	28,625	35
Saltbush-greasewood	16,106	20
Total	80,970	100

Source: USDI, USGS, 1978.

Water Resources

The Sids Mountain WSA is within the San Rafael River drainage which is a tributary to the Green River which is in the Upper Colorado River hydrologic subregion.

The major perennial water resources are about 18 miles of the San Rafael River and about 6 miles of the lower North Salt Wash. Portions of North Fork Coal Wash, Saddle Horse Canyon, Virgin Springs Canyon, and Cane Wash flow on an intermittent basis from springs and seeps. Many of these springs and seeps flow year-round, but the water eventually pools up and evaporates or returns to the streambed alluvium. Buckhorn Draw also contains springs on or near the northern border of the WSA. These springs flow year-round.

Water use in the WSA is primarily by wildlife and livestock. Most sources are remotely located and not easily accessible by man. The only developed water sources within the WSA are Wood Hollow Reservoir and Eagle Canyon Reservoir. Both are located near the southwestern edge of the WSA. Nonconsumptive use includes seasonal float boating, tubing, and limited fish habitat.

The San Rafael River originates approximately 6 miles upstream of the WSA at the confluence of Cottonwood and Huntington Creeks. The tributaries to the San Rafael River originate on the Manti-LaSal National Forest over 30 miles upstream of the WSA. The San Rafael River, including its tributaries, crosses National Forest, private, BLM-admininstered, and scattered sections of State land before entering the WSA. Present and potential upstream uses include irrigation, cooling water for coal-fired generation of electricity, coal mining, and municipal uses in Emery County.

The WSA is within Water Right Adjudication Area 93. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in certain areas. The mainstream of the San Rafael River is fully appropriated. There are no areas of significant groundwater development in this drainage area.

The water quality standards for San Rafael River and tributaries, from confluence with Green River to confluence with Ferron Creek, are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses including irrigation of crops and stockwatering).

Stream water quality is believed suitable for wildlife and domestic livestock. An odd taste of the water is a major concern for human use, especially during the irrigation season when return flows from upstream constitute a major portion of the total volume in the river. Agricultural chemicals also may be present and salinity is high. Coliform bacteria levels may become high enough during the irrigation season to present a human health hazard.

Water quality data on the remote springs are lacking. Based on geologic information, the water quality of the springs generally is assumed to be good.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Sids Mountain WSA is given in Table 7. Appendix 5 in Volume I describes the mineral and energy resource rating system.

The WSA contains deposits of vanadium (associated with uranium) and could contain copper and manganese that are currently listed as strategic and critical materials (USDoD, 1988). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

- Leasable Minerals

Currently, there are no active drilling, mining, or exploration activities for leasable minerals.

SIDS MOUNTAIN/SIDS CABIN WSA

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic-feet of natural gas
Tar Sand	f2	c4	Less than 10 million barrels oil in-place
Potash	f2	c2	Less than 1 million metric tons
Geothermal	f2	c1	Low temperature
Uranium/Vanadium	f3	c4	500 to 1,000 metric tons of uranium oxide
Manganese	f2	c1	Less than 100,000 metric tons of 40-percent manganese ore
Copper	f2	c2	Less than 50,000 metric tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Oil and Gas

The San Rafael Swell is a structural trap. The interior of the San Rafael Swell has been eroded away, allowing any petroleum contained in the structure to escape. The swell could only serve as a trap for formations below the Hermosa Formation, the lowest formation stratigraphically exposed in the swell.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 1 mile northwest of the WSA. The well was plugged and abandoned in 1975. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences that may occur within the WSA also would probably be small. Gas production is occurring from the Ferron field which is located approximately 10 miles west of the WSA.

The low rating of f2/c1 for oil and gas indicates that a low potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas.

The WSA is managed with oil and gas leasing categories as shown in Table 8. There are currently two existing post-FLPMA oil and gas leases covering approximately 520 acres.

Table 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	5,760	7
2. Open with special stipulations	0	0
3. Open with no surface occupancy	18,560	23
4. No leasing	56,650	70
Total	80,970	100

Source: USDI, BLM, 1975a.

- Tar Sand

A small tar sand occurrence has been reported in the eastern and northeastern part of the WSA, occurring within the Black Dragon Member of the Moenkopi Formation (SAI, 1982).

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving behind the heavy fraction, or tar substance. About 2,500 acres (3 percent of the WSA) are within the San Rafael Swell STSA. Within the entire STSA, the San Rafael Swell tar sand deposits are estimated to contain 445 to 545 million barrels of oil in-place. Small portions of the Red Canyon deposit (60 to 80 million barrels of oil in-place) and the Wickiup deposit (60 to 75 million barrels of oil in-place) are part of the San Rafael Swell deposits and indicate a potential for small deposits (less than 10 million total barrels of oil in-place) occurring in the WSA. The high certainty level recognizes tar sand deposits in the WSA. It is unlikely, however, that the tar sand within the WSA will be developed due to individually small-sized deposits and economic factors. If tar sand development were to occur, production would probably be by in-situ methods with a recovery rate of about 30 to 40 percent of the in-place deposits (USDI, BLM, 1984c). No applications to convert oil and gas leases to combined hydrocarbon leases occurred in the WSA.

- Potash

Potash occurs within an evaporite sequence of the Paradox Formation in the Hermosa Group. The formation is several thousands of feet thick near Moab where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The rating of f2/c2 indicates that, if potash deposits occur in the WSA, they generally would contain less than 1,000,000 metric tons of potash (SAI, 1982). The certainty level implies that no direct data occur within or very near the WSA, although the WSA is within a recognized evaporite basin. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it unlikely that the potash resource in the WSA would be developed.

- Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal waters (between 20 degrees and 90 degrees Centigrade). Water extracted at these temperatures can only be used for direct heating purposes. It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and a lack of a nearby population that could use the resource. The Sids Mountain WSA has a rating of f2/c1 indicating a low potential for this resource (SAI, 1982).

- Locatable Minerals

There are 291 mining claims covering approximately 5,820 acres.

- Uranium/Vanadium and Associated Minerals

The uranium/vanadium deposits that occur within the San Rafael Swell are generally small (500 to 1,000 metric tons of uranium oxide) and scattered. The deposits occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock members. Uranium/vanadium ore is found primarily in the Mossback Member in channel sands and as lenticular deposits in the Monitor Butte Member (SAI, 1982). The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with uranium/vanadium include copper, lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable. These metals indicate a hydrothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The northern part of the WSA is within the northern uranium occurrence belt. The ore bodies of the northern belt are smaller than those found in the southern belt (the southern belt being located in the southern third of San Rafael Swell) outside of the WSA. The northern belt parallels the San Rafael River. Here numerous uranium mines and occurrences are reported from within the WSA, chiefly along the northeastern and east-central border. Production from each of these mines has generally been less than 500 tons of uranium oxide. On this basis, the rating of f3/c4 suggests a high potential for moderate-sized uranium/vanadium deposits (500 to 1,000 metric tons of refined uranium oxide) (SAI, 1982). The Chinle Formation outcrops on the eastern side of the WSA. To the west, the depth of this formation increases. With most of the surface deposits probably discovered, additional discoveries would be subsurface and within the deeper western areas. Costs for exploration and drilling would be increased in this area as the overburden increased.

- Manganese

Manganese deposits in the area are small, low-grade, and occur in the Morrison and Summerville formations. The nearest known deposits are 6 miles north of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low rating of f2/c1 indicates a deposit size of up to 100,000 metric tons of ore averaging 40-percent manganese. However, the WSA is most likely favorable for only very small accumulations (SAI, 1982).

- Copper

Copper is usually associated with uranium deposits in the San Rafael Swell. The only exception is in the Copper Globe Mine located about 3 miles south of the Sids Mountain WSA. The mine produced two or three tons of ore between 1915 and 1920 and only has produced mineral specimens and jewelry pieces since then.

The rating of f2/c2 indicates a low potential for copper deposits in the WSA; if found, these deposits would be small in tonnage (less than 50,000 metric tons of contained copper) (SAI, 1982).

- Gypsum

The Carmel Formation is reported to contain a bed of industrial-grade gypsum in the southern portion of the WSA. BLM has given gypsum a favorability rating indicating a moderate potential of occurrence. If a deposit does exist within the WSA, it likely would be less than 5 million tons. It is unlikely that any gypsum would be developed due to market conditions, small size of the deposit, and location.

- Salable Minerals

Sand, gravel, and building stone are present along the San Rafael River. Surface collection of building stone has occurred just outside the WSA, to the east along the river road. Demand is limited and the present area is adequate. While sand and gravel deposits occur, they are not of commercial interest due to their location.

Wildlife Including Special Status Species

The Sids Mountain/Sids Cabin WSA provides habitat for a limited number of wildlife species. Except for the San Rafael River and a variety of seeps and springs, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock potholes are a good source following rain, but they can not be relied upon year-round by wildlife because they dry up during extended drought periods. During the winter, snow (when available) can provide water. Vegetation is also limiting due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer (less than one deer per square mile). Twenty-four desert bighorn sheep were reintroduced into the WSA in 1978 and 1979. In December 1983 the UDWR reported a sighting of 36 uncollared individual bighorn sheep (indicating offspring from the original transplants), accounting for a population of at least 60 desert bighorn sheep. In 1988 the UDWR estimated a population of 110 animals. UDWR has determined the carrying capacity for the north San Rafael herd to be up to 1,444 animals. The entire WSA is considered crucial yearlong desert bighorn sheep habitat.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, blacktail jackrabbits, woodrats, ringtails, badgers, Ord kangaroo rats, gray foxes, whitetail antelope ground squirrels, chipmunks, rock squirrels, bats, mice, voles, shrews, striped skunks, weasels, and red foxes.

Habitat for various small bird species is found within the WSA. The species diversity and population sizes are small due to the lack of a diverse habitat. The San Rafael River canyon, along with the various cliffs and canyons throughout the WSA, provide many nesting, roosting, and foraging opportunities for avian fauna. Few individual raptors are found in the WSA. Of those, golden eagles, prairie falcons, American kestrels, red-tailed hawks, ferruginous hawks, and rough-legged hawks are the most common. The entire WSA is considered by UDWR as yearlong raptor habitat. Waterfowl and shore birds exist where the San Rafael River flows through the WSA. Chukars may be found, but none have been sighted. Mourning doves are also found in the WSA.

Cougar may occasionally visit the area, but with low deer numbers they would be a rare occurrence. No documented sightings are recorded.

Several species of snakes and lizards could be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, and western rattlesnakes account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

The San Rafael River flows for about 18 miles through the northern part of the WSA. This portion of river has been classified by UDWR as a limited value, nongame Class 5 stream needing yearlong protection. Black bullheads, speckled dace, flannel-mouth suckers, bluehead or green suckers, round-tail chubs, and red shiners are the fish species found in the river. Tadpole shrimp (a crustacean) may be present in the various seeps, springs, or potholes.

UDWR has designated 23,360 acres as potential peregrine falcon (an endangered species) habitat in the WSA. Undocumented reports and documented sightings by UDWR indicate their presence. Bald eagles, also endangered, may be found along the San Rafael River during the winter. UDWR has designated 10,405 acres as potential eagle habitat. Bald eagles have been sighted west of the San Rafael campground. The FWS has

also identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle is a BLM sensitive species. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, southern spotted owl, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

Forest Resources

The major forest resource in the WSA is 72,598 acres of scattered pinyon pine and juniper trees. The entire WSA is closed to harvest of woodland products by the San Rafael MFP. In addition, because of remoteness from populated areas and availability of woodland products closer to population centers, harvest of the pinyon-juniper woodland in the WSA is not expected in the future.

Small pockets of Douglas fir are concentrated around steep heads of canyons and at higher elevations on Sids Mountain/Sids Cabin. Because of its remote, rugged location and small volume, this forest species is not commercially usable.

Livestock and Wild Horses/Burros

The Sids Mountain/Sids Cabin WSA contains portions of 15 grazing allotments involving 68 permittees. Table 9 gives data on allotments and grazing use within the WSA.

Range improvement projects in the WSA are limited to two miles of fence, two reservoirs, one water tank, one trough and pipe line, one trail, three gap fences and livestock management access routes. The access routes follow wash bottoms and major canyon drainages, including the North and South Forks of Coal Wash, Saddle Horse Canyon, Secret Mesa, Bullock Draw, and Eagle Canyon. These are used frequently by the ranchers as well as recreation ORVs. There are no plans for new livestock developments within the WSA.

Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the Sids Mountain/Sids Cabin WSA (USDA, APHIS, 1988).

Wild horses or burros are not known to use the WSA.

Visual Resources

The Sids Mountain/Sids Cabin WSA is composed of an intricate drainage system that flows to the north, eventually intersecting a main-stem drainage, the San Rafael River Canyon. The river drainage, known as the Little Grand Canyon, cuts its way in a southeasterly direction through 1,000-foot walls of sandstone. The landform pattern helps to give the WSA its outstanding visual qualities.

The many canyons of the WSA vary in visual character from wide, open wash bottoms with little color variation to deep, narrow, and rough canyons with vertical or steeply stepped walls. In some instances the scene can involve a long open view of the wash bottom and its canyon walls gently rising above, or an enclosed view dominated by red-and-gold sandstone walls.

The higher reaches of the WSA include secluded parks, excellent panoramic view points, and interesting landmarks and rock formations. The flatness of these parks is interrupted by sandstone monuments that rise above. Remoteness is emphasized by long-reaching views, and creative rock formations add focal points.

The entire WSA is classified as having Class A scenery containing the most outstanding characteristics of the physiographic region (Roy Mann Associates, 1977). The entire WSA has been rated high for its sensitivity level. The high level is based on the visual qualities assessed from I-70 and other prominent overviews in the area. Based on these factors, the entire 80,970-acre WSA is a VRM Class II area. Refer to Appendix 7 in Volume I for a description of the BLM VRM rating system.

Cultural Resources

A total of four archaeological sites have been recorded in the WSA (USDI, BLM, 1988). Two of the sites are located in Coal Wash and consist of a granary and a ceramic scatter. Both sites have associated Fremont-style petroglyphs. The remaining two sites are located adjacent to Interstate 70 in the southern portion of the WSA. One of these is a rockshelter containing a prehistoric midden and historic inscriptions dating to 1924. The other site is a prehistoric occupation-site located on a ridge top and contains hearths, middens, and buried strata. All four sites are considered to be eligible for nomination to the National Register of Historic Places based on their research potential.

SIDS MOUNTAIN/SIDS CABIN WSA

Table 9
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Buckhorn	40,970	700	3,615	49	796 Cattle	04/16-10/31	17
Fullers Bottom	11,560	6,192	772	125	359 Cattle	04/16-06/15 11/01-12/31	4
Salt Wash	37,880	3,759	2,995	92	400 Cattle	03/01-06/20 11/05-01/04	13
McCarty Canyon	5,420	5,343	174	161	97 Cattle	03/01-04/30	3
North Sids Mountain	3,100	3,100	90	90	9 Horses	08/01-05/01	1
South Sids Mountain	7,540	7,980	165	165	33 Cattle	05/06-10/15	1
North Sinbad	38,890	1,365	3,200	91	350 Cattle	11/01-05/01	8
North Sids and Charley	10,310	2,100	1,010	171	160 Cattle	03/01-05/15 11/01-01/15	2
Mesquite Wash	2,470	2,470	115	115	43 Cattle	04/01-06/20	1
Saddle Horse	10,630	10,592	220	215	63 Cattle	07/01-11/04	1
Oil Well Flat	38,470	6,589	2,738	411	425 Cattle	10/16-05/31	4
Coal Wash	18,100	17,821	386	363	159 Cattle	12/01-01/15 03/01-03/31 05/06-06/15	3
Wood Hollow	15,350	9,778	799	280	228 Cattle	03/01-06/15	6
South Sids and Charley	20,480	1,662	952	95	136 Cattle	11/16-06/15	1
Head of Sinbad	12,800	30	780	2	195 Cattle	06/16-10/15	3
Unallotted	0	1,489	0	0			
Total	273,970	80,970	18,011	2,425			68

Sources: BLM File Data.

Approximately 640 acres of land were intensively surveyed in the WSA as a result of the Central Coal Project, Muddy Planning Unit (Hauck, 1977). This sample represents 0.8 percent of the unit. No sites were located in any of the survey quadrants within the WSA. Site densities for the Muddy Planning Unit as a whole were computed and are considered to be moderate (333 sites per 23,000 acres or 9.27 sites per 640 acres). Although no sites were found in the WSA as a result of the Central Coal Project inventory, additional sites undoubtedly exist in moderate quantities. They would probably consist of additional rockshelter sites, petroglyph panels, and surface artifact scatters.

Traditional travel routes, including the Coal Wash-Iron Wash trail, have been established through the WSA since the 1800s and possibly earlier. These were used by the Spaniards, early-day cattlemen for cattle drives, and for supply shipments throughout the remote desert region. In some places a path has been worn in the slickrock, especially near the area called the Devils Racetrack. Several inscriptions of these early travelers can be found etched on rock faces within canyon drainages.

SIDS MOUNTAIN/SIDS CABIN WSA

Evidence of an old mine of historical interest is located within the central portion of the WSA. The ZCMI Mine was a venture that apparently was intermittently worked off and on over a period of years without ever producing anything of value. The mine location is described on legal forms as being in "the North Fork of Coal Wash, one-quarter mile north of Stinking Springs."

A cabin and associated corrals are located on the Sids Cabin portion of the WSA Limited information available about these structures indicates they may have been built as recently as the late 1930s or early 1940s. They are of historical interest as a typical example of a cow camp in this region.

Recreation

Recreational use of the Sids Mountain/Sids Cabin WSA and surrounding terrain is varied. The most popular activities are floatboating, hiking, horseback riding, and ORV exploration.

The San Rafael River drainage has become a popular area, and floatboating has become one of the most popular attractions (estimated 1,000 visitor days annually), where recreationists using rubber rafts, canoes, kayaks, and innertubes float the spring runoff of the San Rafael River through the Little Grand Canyon. The trip can be completed in one day, and many recreationists take advantage of the spectacular scenery, cultural evidence spotted along the cliffs, and the several side canyons that extend to the river's edge. The river has been included on the Nationwide Rivers Inventory list of rivers eligible for study and possible nomination to the National Wild and Scenic Rivers system (USDI, NPS, 1982). The inventory found that the San Rafael River possesses deep cut canyons and excellent scenic qualities in the San Rafael Swell. About 18 miles of the river are within the Sids Mountain/Sids Cabin WSA. Since it is an inventory-listed segment, BLM must, as part of its environmental review process, avoid or mitigate adverse impacts to these creeks and consult with the NPS before taking any action that could foreclose wild, scenic, or recreational river status (CEQ, 1980).

When the water of the San Rafael River lowers in midsummer, hikers, backpackers, and horseback riders take to the river bottom and side canyons. A new hiking guide to Utah identifies the San Rafael River drainage as an excellent hiking venture (Hall, 1982). The intricate canyon system of the WSA also provides some excellent hiking opportunities. Recreationists have taken advantage of these canyon bottoms for access to some of the unit's higher and rugged terrain. Some of the most popular areas for hiking and horseback riding are Sids Mountain, McCarty Canyon, Saddle Horse Canyon, Salt Wash, the North and South Forks of Coal Wash, Bullock Draw, the Blocks, Virgin Springs Canyon, and Cane Wash. Approximately 85 percent (68,450 acres) of the WSA can be reached only by foot or horseback. Hiking use is estimated at approximately 1,000 visitor days annually.

ORV use occurs in and around the WSA. Motorcycle riding seems to be the most popular ORV activity; however, four-wheel driving does take place. The wide canyon bottoms of the North and South Forks of Coal Wash, Saddle Horse Canyon, and parts of Bullock Draw are driven by ranchers, mineral explorers, and recreationists (especially for organized local ORV tours). Their trails follow what is believed to be the old Coal Wash-Iron Wash trail. In early days, this trail was the main access route to the San Rafael Swell from Castle Valley. It was used substantially as a stock driveway and also apparently saw use by freight wagons taking supplies from Castle Valley to the southern portions of the San Rafael Desert. It has also been suggested that this trail was a portion of a very early Spanish trade route. Evidence of what is thought to be Spanish crosses drawn on a rock face in the wash also adds to the suggestion. Other areas of ORV use include Salt Wash, Secret Mesa, the Devils Racetrack, and two routes into Eagle Canyon.

The San Rafael campground and Buckhorn Canyon, located outside of but adjacent to the WSA, receive a tremendous amount of ORV use, especially in the spring. During some recent years, over 1,000 campers were located in the Buckhorn Canyon during the Easter weekend. A popular recreation activity with these visitors is motorcycling. Use is concentrated in Buckhorn Canyon, surrounding the campground, and in the Wedge vicinity along the northern boundary of the WSA. Total estimated ORV use in the Sids Mountain/Sids Cabin WSA is 500 visitor days annually.

In the San Rafael MFP, ORV designation for the WSA is closed in accordance with 43 CFR 8340. This includes all 80,970 acres except for existing routes. The ORV decision in the MFP states that travel on existing roads would not be restricted. Existing roads include routes through the North and South Forks of Coal Wash, Saddle Horse Canyon, the two routes into Eagle Canyon, and Buckhorn Draw. The existing roads

referred to in the MFP are not the same as roads as defined by the Wilderness Act. Other similar areas exist outside the WSA in areas recommended open for ORVs.

Since the MFP decision in 1979, there has been concern over the negative implications of ORV closure in the resource area (especially traditional use areas such as Buckhorn Canyon) and the difficulty of enforcement (Hahn-O'Neil, 1982). Therefore, the ORV activities are being reconsidered and a recreation management plan is to be prepared that will provide more flexibility for traditional ORV use areas.

There are no recreational facilities within the WSA. A variety of foot trails and routes traverse the terrain into canyons, along wash bottoms, and across mesa tops. Many of these routes were used as traditional courses for cattle drives and supply shipments, as previously mentioned. Several mine sites and log structures also are present within the WSA.

Twenty-two specific areas within the WSA were covered in a study on existing and potential recreation use (Barry, 1976). In general, the study indicated that primitive-type recreation activities (i.e., hiking, backpacking, river floating, and scenic viewing) have the greatest future potential. Some increased ORV activities could occur in the area; however, these ORV trails would be limited to canyon bottoms and established routes, and the opportunity would not be much different from opportunities now found and utilized in other parts of the San Rafael Swell.

Total recreation use in the Sids Mountain/Sids Cabin WSA currently is estimated at about 2,500 visitor days per year. Thirty of these visitor days are commercial.

Land Use Plans

The WSA is BLM-administered public land except for eight State sections (5,031 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. Of the 5,031 acres of in-held State land, 960 acres are under lease for oil, gas, and hydrocarbons, and 4,391 acres are under lease for grazing. The only current activity on these lands is grazing (UDNRE, DSLF, 1988).

All other lands within the WSA are public lands with both surface and mineral estates managed by BLM.

There are no recreational or other withdrawals in or adjacent to the WSA. Two public water reserves (No. 16 and 107 BLM) are within the WSA. These withdrawals have been in effect since March 1914 and cover about 860 acres. The withdrawals affect only the location of claims for nonmetalliferous minerals (e.g., gypsum). No other withdrawals exist within or adjacent to the WSA.

There are no valid rights-of-way in the WSA. Two applications have been received from the UDOT for lands adjacent to the WSA. One is for a material site right-of-way and the second is for the UDOT maintenance shed. The right-of-way for I-70 makes up the southern boundary of the WSA for approximately 2 miles.

Physical and legal access to the WSA is provided by Emery County roads along the northern, western, and southwestern boundaries of the WSA, I-70 on the south, and BLM-maintained roads in the north, west, and south portions of the WSA.

There are no contiguous lands under consideration by other agencies for wilderness.

The area of the WSA is managed in accordance with the San Rafael MFP (USDI, BLM, 1979a). Wilderness designation is not addressed in the MFP. However, wilderness designation is part of the BLM multiple-use concept. The BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

In the Emery County Zoning Plan (Emery County Board of Commissioners, 1984) the WSA area was zoned for mining and grazing uses. Wilderness designation or nondesignation is not specifically addressed in this plan. The Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is located in the south-central portion of Emery County. Socioeconomic effects related to the

WSA are of concern to Emery County, with some interest in Carbon County.

Table 10 shows the baseline and projected total population data for Emery County.

Table 10
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980 the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000, for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

- Employment

Table 10 shows the baseline and projected total employment for Emery County to the year 2010.

Coal mining and operation of Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's most important sources of employment. The local economy is most affected by changes in the coal market and had periods of boom and bust. Green River has not grown in the past 30 years. Major employment for Green River includes mining, government, agriculture, and tourism.

Emery County is part of the Southeast MCD. Table 11 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent, services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total; while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

Table 11
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Past activities in the WSA that could be of local economic consequence include mineral activity, livestock production, hunting, and dispersed recreation. Table 12 summarizes the local sales and Federal revenues related to the WSA. Appendix 9 in Volume I identifies multipliers used to estimate sales and revenues.

Table 12
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	0[b]	$1,040
Mining Claim Assessment	$29,100	0
Livestock Grazing	$48,500	$3,735
Recreational Use	$10,250	0[b]
Total	$87,850	$4,775

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

[b]Intermittent commercial use is low and Federal revenues are not significant.

Production from mines and prospects within and adjacent to the WSA has brought some temporary employment to residents of the area (approximately one work year). The WSA has 291 mining claims that appear current in their assessment work. Regulations require a $100 annual expenditure per claim for labor and improvements. Some of these expenditures are made within the local economy.

Sixty-eight livestock operators have grazing privileges in the WSA. Based on the consumption of 2,425 AUMs of forage by cattle, it is estimated that the WSA accounts for $48,500 of livestock sales, including $12,125 of ranchers' returns to labor and investment.

The WSA supports significant private (both motorized and nonmotorized) and intermittent commercial recreation use. Recreation-related expenditures are well distributed among most businesses in the area and could only be significant to those commercial outfitters using the area. The actual amount of income generated locally from recreational use in the WSA is unknown.

However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that the Statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Sids Mountain/Sids Cabin WSA is estimated as about 2,500 visitor days per year resulting in total estimated expenditures of $10,250 annually.

The WSA generates Federal revenues from three sources: grazing, mineral leasing, and commercial recreation permitting. Within the WSA, about 520 acres are currently leased for oil and gas. At $2 per acre, this generates about $1,040 annually. Half of this, or about $520, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 2,425 AUMs of forage consumed by livestock in the WSA and a grazing fee average of $1.54, the WSA annually accounts for $3,735 of grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM district for the construction of range improvement projects. About $30 of Federal revenues are generated annually from commercial recreation permits.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives section for Sids Mountain/Sids Cabin WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on all 80,084 acres, management under oil and gas leasing Category 4 (closed to leasing) on 56,650 acres and oil and gas leasing Category 3 (no surface occupancy) on 18,560 acres, and ORV closure on 79,450 acres.

In the foreseeable future, disturbance of approximately 83 acres from uranium exploration and development in the eastern and northeastern portions of the WSA, and from development of access to State inholdings, would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Most special features, including geologic features, perennial streams, archaeological and historical values, endangered and sensitive species, and wilderness-associated wildlife, would not be significantly affected because the disturbance would be minor (involving 0.1 percent of the WSA). In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Refer to the Cultural Resources and Vegetation and Wildlife Including Special Status Species sections for more information. Some Class A scenery would be reduced in quality in the disturbed and surrounding areas.

During the period of activity, the visual and audible disturbance from mineral exploration and development, and development of access to State in-holdings, would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of

the WSA. As much as 10 percent (8,097 acres) of the WSA could be so affected in the foreseeable future.

Vehicular use of existing ways, trails, washes, future State access roads, and uranium exploration and development roads would detract from the quality of opportunities for solitude and primitive recreation. Cultural values and wildlife assoeiated with wilderness could be disturbed. As much as 10 percent (8,097 acres) of the WSA could be affected.

The 2 to 7 percent annual increase in visitor use that would occur would be expected to reduce wilderness values because although the additional use would be largely primitive in nature, a sizable amount would be vehicular. In areas where both types of recreation occur, the quality of the opportunities for primitive recreation would be reduced.

The extent that disturbance would occur over the long term and, therefore, the long term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase. Possible upstream development over the long-term future could affect water flows in the San Rafael River and related wilderness values in the WSA.

Conclusion: Wilderness values would not be protected by wilderness designation, and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 83 acres. Additionally, the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to 16,194 acres of the WSA. Class A scenery would be reduced in quality in disturbed and surrounding areas. Cultural values and wildlife associated with wilderness could be disturbed from increased ORV use on about 27 miles (1,520 acres) of ways, wash bottoms, and trails.

• Impacts on Vegetation Including Special Status Species

Implementation of the No Action/No Wilderness Alternative would result in surface disturbance on 0.1 percent (83 acres) of the WSA . This would not adversely affect any vegetation type. However, there is some potential that the two threatened, three endangered, and four Category 1 and 2 candidate plant species which may occur in the WSA could be impacted by continued ORV use of 1,520 acres (mainly washes and canyon bottoms) open for vehicle access and that individual plants may be lost. However, the habitats of these species are widespread and extend beyond WSA boundaries. Intensive monitoring efforts would be initiated in the foreseeable future. BLM would initiate a public awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation. There is also a slight potential that individual plants of the threatened, endangered, or other special status species could be disturbed by locatable mineral exploration and development. This situation would only exist where such mineral operations would occur on sites of 5 acres or less, where a plan of operations and approval are not required under 43 CFR 3809 regulations. The Endangered Species Act and subsequent regulations apply to these operations and any loss would be inadvertent. It is not anticipated that any of the projected actions in the WSA would threaten the continued existence of any of the special status plant species. Before authorizing any surface-disturbing activities (mineral activities subject to 43 CFR 3809 regulations and access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened, endangered, or candidate species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because only a small portion of the WSA (o.1 percent) would be disturbed and nec-essary measures would be taken to protect these spe-cies, special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected. Impacts from ORV use on 1,520 acres would be monitored and corrective measures taken should populations of special status plant species are threatened.

• Impacts on Water Resources

Mineral exploration and development in the northeastern and eastern portions of the WSA would generally be shallow and would not significantly change ground water quantity or quality.

Due to restrictions on development imposed by oil and gas categories, guidelines for protection of riparian habitat and public water resources, potential surface

disturbance of 83 acres would not decrease water quality in the streams of the WSA.

Existing and future water uses within or upstream of the WSA would not be affected because there would be no restrictions on uses imposed by wilderness management.

Conclusion: The No Action/No Wilderness Alternative would not significantly alter present or future water quality or uses.

• Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife species, particularly those sensitive to surface disturbance or human interference, could be adversely affected by possible surface disturbance associated with locatable minerals exploration and development (73 acres), development of access to in-held State lands (10 acres), and ORV use on 1,520 acres.

About 80,970 acres of the WSA are considered big horn sheep range and about 23,360 acres are potential peregrine falcon habitat. Approximately 10,405 acres are considered potential habitat for bald eagles.

Existing oil and gas category restrictions and ORV closures would protect most of these habitats from surface disturbance, including the riparian areas along the San Rafael River. However, there is a slight potential that individual animals of the three endangered and eight other special status species that may occur in the WSA could be disturbed by locatable minerals exploration and development. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under 43 CFR 3809. The Endangered Species Act and subsequent regulations apply to these operations and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would result in an overall population reduction or threaten the continued existence of any of the endangered or special status species.

Prior to authorizing any surface-disturbing activities (locatable mineral operations larger than 5 acres and development of access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status animal species would be preserved with the level of mineral and access development that is projected. However, continued ORV use on 1,520 acres, mainly in canyon bottoms, could adversely affect big horn sheep and raptor nesting along cliffs adjacent to vehicle use areas. Intensive monitoring efforts would be initiated to determine if populations of these species, as well as others including threatened, endangered, or other special status species, which may occur in the WSA would be lost with continued ORV use. BLM would also prepare a management plan which would consider various management options for habitat preservation.

Conclusion: About 0.1 percent (83 acres) of the wildlife habitat in the WSA would be disturbed and ORV use would continue on 1,520 acres of ways and washes. Populations of bighorn sheep, raptors, and special status species could be affected. Monitoring and enforcement of protective measures may be necessary.

• Impacts on Livestock Management

Domestic livestock grazing would continue as authorized in the San Rafael MFP. The 2,425 AUMs currently allocated in the WSA are assigned to 68 livestock permittees. Existing range facilities (2 miles of fence, two reservoirs, one water tank, one trough and pipeline, one trail, and three bar fences) could be maintained by mechanical methods. Motorized vehicles are currently being used within the North and South Forks of Coal Wash, Saddle Horse Canyon, Secret Mesa, Bullock Draw, and Eagle Canyon to manage livestock in the WSA. With this alternative,

motorized vehicle use along these routes could continue for livestock-related activities.

Conclusion: Livestock management and grazing levels would not be affected.

- Impacts on Cultural Resources

In the foreseeable future, 83 acres of surface disturbance is expected due to locatable mineral exploration and development and construction of access to in-held State lands. The entire WSA would remain open to mineral location and leasing, and oil- and gas-related development would continue unchanged (5,760 acres Category 1; 18,560 acres Category 3; and 56,650 acres Category 4). Archaeological inventory and mitigation would precede any ground disturbing activities. All sites in the unit would continue to receive protection under existing Federal and State antiquities laws. Any surface disturbance would be preceded by standard inventory and mitigation procedures. However, some sites, especially those that cannot be identified by surface inspection, may be inadvertently damaged or lost. In addition, increased human presence in developed areas may provide opportunities for illegal artifact collection (Nickens et al., 1981).

About 1,520 acres of the WSA would remain open to ORV use and vehicular access under this alternative. ORV activity currently constitutes a major recreational use of the unit and may increase in the future. Some archaeological sites may receive unintentional damage as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of vehicular traffic. Artifacts may be broken or shallowly buried deposits may be disturbed and exposed to erosional processes. In addition, general vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens et al., 1981).

Archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without the restrictions for protection of other wilderness values.

Conclusion: Impacts due to surface disturbance are expected to be minimal because only 0.1 percent (83 acres) of the WSA would be disturbed and mitigation would be required. Intentional or unintentional damage to archaeological sites including the four known sites may occur due to continued vehicular access and ORV use on 1,520 acres of ways and wash bottoms. Cultural resource management would continue without regard for protection of other wilderness values.

- Impacts on Recreation

Approximately 79,450 acres would remain closed to ORV use and 1,520 acres would be open to such use in accordance with the San Rafael MFP. About 27 miles (1,520 acres) of existing ways, wash bottoms, and trails would be available for use. Vehicular use would occasionally reduce the quality of the primitive recreation experience on as much as 10 percent (8,097 acres) of the WSA.

Primitive recreation values would be foregone within the 83 acres where potential mineral and energy related surface-disturbing activities and access to State in-held lands could take place.Reduction in quality of the primitive recreation opportunity would also occur on an additional 10 percent (8,097 acres) of the WSA due to the indirect affects of these surface-disturbing activities.

The future trends in recreational use of the Sids Mountain/Sids Cabin WSA are unknown. However, based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year over the next 30 years. At this rate, overall recreational use is expected to increase from 2,500 current visitor days per year to be between 4,700 to 21,800 visitor days at the end of 30 years. Assuming that the 2 to 7 percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 2,000 visitor days per year to be between 3,760 to 17,400 visitor days per year. Likewise, recreational activities utilizing vehicular access would increase from the current 500 visitor days per year to be between 940 to 4,400 visitor days. However, both primitive and mechanized visitor use may have to be controlled to protect recreational and other resource values before protection levels are reached. Commercial recreation use would continue at about the same ratio to the overall use.

The estimated 83 acres of surface disturbance that could occur in the future would degrade primitive recreation values in localized areas. Surface disturbance along the San Rafael River, a Nationwide Rivers Inventory listed segment, is not anticipated as exploration and development activities are not likely to occur

there because specific interagency consultation would occur to avoid or mitigate adverse effects on this Nationwide Rivers Inventory segment. The wild and scenic values of the river would not receive the added protection that would result from wilderness designation, however possible upstream development over the long-term future could affect water flows in the San Rafael River and related recreational use.

Conclusion: The quality of primitive recreation would be directly reduced on 83 acres and indirectly reduced on as much as 16,194 acres. Both primitive and motorized recreational use would increase, but vehicles would be restricted to 27 miles of ways, wash bottoms, and trails (1,520 acres). Eighteen miles of the San Rafael River, a wild and scenic river inventory segment, would not receive the additional protection that wilderness designation would provide.

- Impacts on Local Economic Conditions

There would not be changes in existing patterns and trends of population, employment, and personal income. The existing economic potential in the WSA would not be affected. Local income related to existing mining claim assessment (refer to Table 12) could continue and increases in income could occur if new mining claims are located in the WSA. The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, with the exception of uranium, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained. In the long term, up to 160 jobs could be provided by uranium mining operations in the WSA. This would add abou 2.4 percent to the Emery County workforce by the year 2010.

The $1,040 per year in Federal oil and gas lease revenues generated within the WSA could continue and could be increased by as much as $47,600 with additional leasing of 23,800 acres.

Domestic livestock grazing (2,425 AUMs) would continue as authorized in the San Rafael MFP with related income and revenues as shown on Table 12.

Local expenditures related to recreation would continue and could increase from $10,250 to between $19,270 to $89,380, for a net increase of up to $79,130. Federal revenues related to commercial recreation would increase.

Conclusion: Present economic trends would not be affected. Locatable mineral activity could increase employment in Emery County by 2.4 percent (160 jobs) by theyear 2010. Local recreational-related expenditures would contribute up to $89,380 annually to the local economy by the year 2020. Livestock grazing would contribute $48,500 annually in livestock sales and $3,735 in Federal revenues. Present and future oil and gas leases could contribute up to $48,640 annually in Federal and State lease revenues. Federal revenues related to commercial recreation would increase.

All Wilderness Alternative (80,970 Acres)

- Impacts on Wilderness Values

Designation and management of all 80,970 acres as wilderness would contribute to the preservation of wilderness values in the Sids Mountain/Sids Cabin WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I, which allows for only natural ecological change. Naturalness and outstanding opportunities for primitive and unconfined recreation would be protected on all 80,970 acres. Solitude would be protected on approximately 76,970 acres that meet and 4,000 acres that do not meet the standards for outstanding opportunities. Resources that could be considered special features in the WSA, including Class A scenery, perennial streams including the wild and scenic values of the San Rafael River, archaeological and historical sites, endangered and sensitive species, wildlife associated with wilderness, and geologic features, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 32 acres is anticipated from exploration and development of valid uranium mining claims in the eastern and northeastern portions of the WSA, and from providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas (0.04 percent of the WSA).

Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 4 percent (3,240 acres) of the WSA would be affected. Most special features would not be significantly affected

because the disturbance would be minor. In addition, appropriate mesures would be taken to protect endangered and other special status species and cultural values prior to any surface disturbing activities. Class A scenery which would be reduced in quality in the disturbed areas.

Mitigation to protect wilderness values would be applied, but loss of wilderness values would occur if development of existing rights could not be otherwise achieved. All in all, the disturbance would probably not be substantially noticeable in the area as a whole.

Vehicular use of existing ways and other ORV activity would cease with ORV closure, improving opportunities for solitude and primitive recreation. It would be administratively difficult to totally eliminate ORV use from the area, even with signing and patrol, due to the high amount of ORV use occurring in and adjacent to the WSA and because the washes and ways have historically been heavily used access routes.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for other long-term developments is not accurately known, but would be much less with this alternative than with No Action/No Wilderness due to application of mitigation that would protect wilderness values subject to valid existing rights.

The 2 to 7 percent annual increase in visitor use that would occur would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 32 acres, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 3,240 acres. Special features would be preserved overall although some Class A scenery would be disturbed and reduced in quality.

- Impacts on Vegetation Including Special Status Species

Access and disturbance in the WSA due to exploration and development of mining claims would be only 22 acres, compared to 73 acres with the No Action/No Wilderness Alternative. About 10 acres would be disturbed with construction of access to in-held State lands. Any surface disturbance would be preceded by site-specific clearances of the potentially disturbed areas. If any threatened, endangered, or other special status species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). As discussed with the No Action/No Wilderness Alternative, appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, no impacts are projected to occur to threatened, endangered, or other special status plant species with the All Wilderness Alternative. ORV use along traditional routes would be precluded with this alternative and this would have a positive impact on habitat for the special status plant species noted in the Vegetation Including Special Status Species section.

Conclusion: Vegetation types and populations of threatened, endangered, or other special status plant species that may occur in the WSA would be protected.

- Impacts on Water Resources

Since precipitation is low and the estimated soil disturbance is only 32 acres, no significant sedimentation or change in total dissolved solids, including salt production, is expected to occur.

Approximately 24 miles of perennial streams, including 18 miles of the San Rafael River flow through the WSA. The San Rafael River provides opportunities for diversified recreational use such as kayaking and float boating during portions of the year.

Even though existing water uses would not be affected, wilderness designation could hamper future proposals or projects that would consumptively use water upstream of the WSA, or significantly alter flow through the WSA. Projects could be hampered because changes in use, changes in points of diversion, or transfer of water rights could be protested by the Federal government to maintain flow through the WSA. Potential upstream water uses include irrigation, steam power generation, mining, and municipal uses in Emery County.

Conclusion: In the short term, wilderness designation would not significantly alter water quality or uses. In the long term, future water diversions and new consumptive uses in the San Rafael River system upstream of the WSA may be restricted or precluded.

• Impacts on Mineral and Energy Exploration and Production

• Leasable Minerals

No production of oil and gas is presently taking place within the WSA, because the probability of development and production is low in the foreseeable future even without wilderness designation. This alternative would not result in the loss of oil and gas recovery from the Sids Mountain/Sids Cabin WSA.

The potential for the occurrence of tar sand within the Sids Mountain/Sids Cabin WSA is high for small deposits. Present information, however, does not suggest production is likely; therefore, wilderness designation would not significantly affect tar sand development potential in the WSA in the foreseeable future.

The potash-bearing rocks in the WSA are expected to be low-grade, thin, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere. With this alternative, the WSA would not be leased for potash. Loss of access for potash development would not be significant due to the extensive potash resources elsewhere in the region.

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

• Locatable Minerals

There are 291 mining claims covering 5,820 acres (7 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void.

With the exception of uranium, it is unlikely that exploration or development of locatable minerals would occur in the foreseeable future, even without wilderness designation. Because only valid claims could be developed following designation and only a portion of the uranium in the WSA would be in valid claims, recovery of an unknown portion of the uranium in the WSA would be foregone. Therefore, this alternative would probably not result in any significant loss of recoverable gypsum, manganese, and associated minerals but in the long term, loss of uranium recovery would be important.

• Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these materials within the WSA is predicted.

Conclusion: Wilderness designation would limit potential exploration and development opportunities for uranium in the WSA to areas under valid mining claims at the time of designation. An unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be foregone.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat and opportunities to find solitude. Bighorn sheep populations would be expected to expand due to habitat protection afforded over the 80,970 acres of range.

Raptor nesting along cliffs adjacent to vehicle routes in the major canyons of the Sids Mountain/Sids Cabin WSA would be protected by closure to ORV use. The 23,360 acres of potential peregrine falcon (endangered) habitat and 10,405 acres of raptor nesting habitat in the WSA, including habitat for golden eagle (sensitive species), ferruginous hawk (candidate species), and bald eagle (endangered), would be protected. This would avoid abandonment of nests and encourage future nesting.

There are no proposed wildlife management facilities or vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 32 acres (0.04 percent of the WSA) projected to be disturbed from locatable mineral exploration and development and construction of access routes to in-held State lands. Prior to any surface disturbance, site-specific clearances, and necessary consultations with FWS would be made and appropriate mitigation measures would be enforced.

Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife, although visitor/wildlife encounters would be infrequent due to low wildlife populations. Mining claim and access development projected for 32 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife habitats or populations in the WSA.

Conclusion: Approximately 0.04 percent (32 acres)of the habitat in the WSA would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized in the San Rafael MFP. The estimated 2,425 AUMs of forage currently allocated in the WSA and assigned to 68 livestock permittees would remain available for livestock use. Existing developments (2 miles of fence, two reservoirs, one water tank, one trough and pipe unit, one trail, and three gap fences) to access routes would be used and maintained in the same manner as the past, based on practical necessity and reasonableness. Access for motorized vehicle use in the North and South Forks of Coal Wash, Saddle Horse Canyon, Secret Mesa, Bullock Draw, and Eagle Canyon for managing livestock would be restricted. Restrictions on access would be an inconvenience and would increase management costs.

Conclusion: Levels of livestock use would not be affected. The closure of 27 miles of roads, trails, and ways would result in changes in livestock management and supervision as they are currently practiced in the WSA. Restrictions on vehicle use would increase costs and cause inconvenience to 68 permittees.

- Impacts on Cultural Resources

Little surface disturbance (32 acres) is expected under this alternative and vehicular access would be completely eliminated within the boundaries of the WSA. Very few intentional or unintentional impacts to cultural resources would occur under this alternative.

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility of wilderness designation may encourage large scale commercial looting. The Fremont sites and rock shelters in the WSA may meet these requirements (Wylie, 1988). The benefits of protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any negative effects from increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restrictions of wilderness designation (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied.

Conclusion: Cultural resources would be protected by reducing potential disturbance eliminating ORV use. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.

- Impacts on Recreation

The entire 80,970 acres would be closed to recreational ORV use. Motorcycling and ORV use are two popular activities in the area surrounding the WSA, and recreationists ride in portions of the WSA. Similar areas found in other parts of the San Rafael Resource Area are not proposed for closure to ORVs; however, use in the WSA has been traditionally established and, due to terrain and access characteristics, this use may be difficult to fully eliminate. Barriers could be installed to restrict most four-wheel vehicles, but there would probably be occasional unauthorized motorcycle use. Areas where ORV use would be difficult to eliminate are the North and South Forks of Coal Wash, Saddle Horse Canyon, Bullock Draw, Eagle Canyon, and Buckhorn Canyon. These use areas contain specific qualities possibly not found in other substitute ORV areas. The existing 500 annual motorized visitor days and the future motorized use of up to 4,400 visitor days per year by the year 2020 would be foregone.

The floatboating opportunity on the San Rafael River would be enhanced by specific wilderness management goals formulated to protect this special recreation experience. The wild and scenic values of the river would receive additional protection. Hiking, backpacking, sightseeing, and other nonmechanized

recreation activities already occurring in the WSA would be protected and enhanced.

Primitive recreational use could increase from the existing 2,000 annual visitor days up to a total of 17,400 visitor days per year by the year 2020. The opportunity for commercial recreation use would increase as the area receives publicity from designation.

The exploration and development of valid mining claims and construction of new access roads to State lands would reduce the quality of primitive recreational opportunities directly on 32 acres (0.04 percent) of the WSA and indirectly on as much as 3,240 acres (4 percent) of the WSA.

Conclusion: Primitive recreational values would be preserved over most of the WSA. The quality of the primitive recreational opportunity would be directly reduced on 0.04 percent (32 acres) of the WSA and indirectly reduced on up to 4 percent of the WSA (3,240 acres). The existing and up to 4,400 visitor days of motorized recreational use per year would be precluded by the year 2020.

- Impacts on Local Economic Conditions

Current trends of population, employment, and local income distribution would not be affected. Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative.

Except for uranium, the potential for mineral development is low in the foreseeable future and it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. Over the long term, exploration and development of the uranium resource could proceed on valid claims filed at the time of designation. It is assumed that such claims would exist and exploration and development would occur under more restrictive conditions than the No Action/No Wilderness Alternative. It is anticipated that up to 80 jobs could be provided by protected operations. This would be one-half of those available with the No Action/No Wilderness Alternative. In addition, any local income related to assessment of future mining claims would be lost.

Present grazing levels would be allowed and added restrictions would not be such as to prevent the maintenance and replacement of rangeland improvements. Livestock use and ranchers' income would continue as at present with $48,500 annually of livestock sales and $12,125 of ranchers' returns to labor and investment. Federal grazing fee revenues of about $3,735 would continue (at $1.54 per AUM).

Nonmotorized recreational use will increase (refer to the Recreation section). Related local expenditures would be small (average of $4.10 per visitor day Statewide), but could increase from $10,250 to between $15,416 to $71,340 for a net increase of up to $62,000 per year. The elimination of recreational ORV travel in the WSA would reduce related local expenditures which would have been up to $17,000 per year by the year 2020 if use continued. However, these changes in expenditures would be well distributed among businesses in the affected area, and would be locally insignificant. Federal revenues received from commercial recreation use would likely increase.

The loss of leasable acreage (24,320 acres) would cause a loss of Federal revenues of up to $48,640 per year. Half of these revenues would have been distributed to the State of Utah.Depending on the degree of impacts on use of water from the San Rafael River wilderness designation could impede or interfere with major economic developments in Emery County. The magnitude of the potential impact is unknown.

Conclusion: Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Up to 80 fewer jobs would be provided by locatable mineral activities with this alternative. Recreation-related expenditures could contribute up to $71,340 annually to the local economy at the end of 30 years. Livestock grazing would continue to contribute $48,500 annually in livestock sales and $3,735 in Federal revenues. Up to $48,640 in Federal and State oil and gas lease revenues would be foregone each year. Federal revenues related to commercial recreation would increase.

Partial Wilderness Alternative (Proposed Action) (80,084 Acres)

- Impacts on Wilderness Values

Wilderness designation of 80,084 acres would contribute to preservation of the area's wilderness values. Impacts from surface disturbance in the foreseeable future would be about the same as identified for the All Wilderness Alternative. Wilderness values

would be protected in the designated area. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure including closure of 14 miles of ways, and closure to future mineral leasing and location. Naturalness and outstanding opportunities for primi-tive recreation would be protected on all 80,084 acres (all acres meet the standards), and solitude would be protected on 76,970 acres that meet and 3,114 acres that do not meet the standards of out-standing. Special Features would be protected.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from mineral exploration and development and from development of access to State in-holdings would occur on up to 24 acres within the designated portion and on up to 8 acres within the nondesignated portion. Special features would be largely preserved because direct disturbance would involve much less than 1 percent (32 acres) of the WSA, and except for Class A scenery, development is not expected in areas where special features are located. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. The San Rafael River would be within the wilderness and its wild and scenic values would receive additional protection.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas including up to about 4 percent (3,040 acres) of the WSA. Most of this type of impact would be in the designated area.

The difficulty of preventing vehicle use in traditional ORV use areas would be avoided. However, the continuation of ORV use would adversely affect wilderness values in the vicinity of those travel routes. Naturalness, solitude, and primitive recreation would be impacted during the time that vehicles were present. Vehicle tracks in wash bottoms would affect naturalness, except immediately after runoff periods when they would be erased.

The ORV routes would not affect wilderness values in the WSA as a whole, even though the North Fork Coal Wash route would be cherry-stemmed across the WSA and the other routes would provide vehicle access well into the WSA. The rough terrain and confines of the wash bottoms limit ORV influence to the immediate vicinity of the travel corridors. During the period of activity, sights and sounds from vehicular use of the travel corridors would indirectly reduce opportunities for solitude and primitive recreation on up to 8 percent (6,478 acres) of the WSA. Overall, this alternative would not provide as much protection to wilderness values as would the All Wilderness Alternative. This is primarily due to the differing levels of ORV use that would occur. The travel corridors would be fully open to all types of ORV use with this alternative as compared to occasional unauthorized motorcycle use that would occur with the All Wilderness Alternative.

Effects of ORV use on special features would be similar to the affects discussed for the No Action/No Wilderness Alternative. There would be increased potential for vandalism to cultural resources and for disturbance to wildlife associated with wilderness due to greater ease of access.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known, but would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights.

Conclusion: Wilderness values would be preserved overall in the designated area which is approximately 99 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 32 acres, and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to 9,718 acres. Special features including archaeological and scenic values, special status species, and wildlife associated with wilderness would be disturbed in the nondesignated area but would be preserved in the designated area. The wild and scenic values of the San Rafael River would receive additional protection.

- Impacts on Vegetation Including Special Status Species

Implementation of the Partial Wilderness Alternative would not significantly alter any vegetation type in the WSA. However, there is some potential that the two threatened, three endangered, and four Category 1 and 2 plant species which may occur in the WSA could be impacted by continued ORV use of 886 acres remaining open for vehicle access in the nondesignated portion of the WSA. This acreage is 634 acres less

than that which would be open to ORV use with the No Action/No Wilderness Alternative. Nevertheless, this continued use in washes and canyon bottoms would be a continuing management concern. Intensive monitoring efforts would be initiated in the foreseeable future. BLM would initiate a public awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation.

It is anticipated that 32 acres of the WSA would be disturbed with this alternative. Prior to any surface-disturbing activity in these areas, BLM would conduct site-specific clearances of the potentially disturbed areas as discussed for the No Action/No Wilderness Alternative. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of special status plant species would be preserved with the Partial Wilderness Alternative.

Conclusion: Vegetation types and populations of special status plant species would not be significantly affected. Impacts from ORV use on 886 acres would be monitored and corrective measures taken should populations of special status species be threatened.

- Impacts on Water Resources

Impacts and conclusions for Water Resources would be the same as for the All Wilderness Alternative because 99 percent of the WSA would be designated wilderness, disturbance estimates are the same, and the San Rafael River would flow through the designated area.

Conclusion: Water quality would receive additional protection because the potential for surface disturbance would be reduced. In the long term, future water diversions and new consumptive uses in the San Rafael River system upstream of the WSA may be restricted or precluded. Potential upstream uses include irrigation, cooling water for coal-fired generation of electicity, coal mining, and municipal use in Emery County.

- Impacts on Mineral and Energy Exploration and Production

Because 99 percent of the WSA would be designated wilderness, impacts on mineral and energy exploration and development would essentially be the same as discussed for the All Wilderness Alternative.

> Conclusion: Partial wilderness designation would limit potential exploration and development opportunities for uranium known to occur in the WSA to areas under valid mining claims at the time of designation. Although some production would occur, opportunities for production of an unknown amount of uranium would be foregone. No other significant locatable or leasable mineral production would be foregone.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife species, including the threatened, endangered, or sensitive species which may occur in the designated portion of the WSA, would be provided additional solitude and protected from disturbance. This would be a benefit through continued population stability.

Prior to any surface disturbance, BLM would conduct site-specific clearances, conduct informal consultations with the FWS if necessary, and develop protective stipulations where required to protect populations of threatened, endangered or sensitive species which may occur in the WSA. However, continued ORV use on 886 acres, mainly in canyon bottoms in the nondesignated area, could adversely affect bighorn sheep and raptor nesting along cliffs adjacent to vehicle use areas. Intensive monitoring efforts would be initiated to determine if populations of these species as well as others including threatened, endangered or sensitive species which may occur in the WSA would be lost with continued ORV use. Impacts would probably be slight because only two access roads would be open to ORV use. BLM would prepare a management plan which would consider various management options for habitat preservation.

Conclusion: There would be no significant impacts to wildlife habitat or populations including threatened, endangered, or sensitive animal species due to locatable mineral or development of new access. The potential for significant impacts could occur to bighorn sheep and raptor habitat would be reduced by closure of 14 of the 27 miles of access routes.

• Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized in the San Rafael MFP. The estimated 2,384 AUMs in the designated portion and the estimated 41 AUMs in the nondesignated portion would remain available for livestock use. Existing developments would be used and maintained in the same manner in the past as discussed in the All Wilderness Alternative. Motorized vehicle use would be precluded along access routes (13 miles) into Saddle Horse Canyon, Secret Mesa, the upper ends of Bullock Draw, and the South Fork of Coal Wash. About 14 miles of access routes in the North Fork of Coal Wash, Eagle Canyon, the lower portion of Bullock Draw, and the South Fork of Coal Wash would be available for motorized vehicle use.

Conclusion: Levels of livestock use would not be affected. The closure of 13 miles of roads, trails and ways would result in changes in livestock management and supervision as they are currently practicing in the WSA. Restrictions on vehicle use would increase costs and cause inconvenience to the 68 permittees who graze livestock in the WSA.

• Impacts on Cultural Resources

All four recorded sites would receive protection from wilderness designation under this alternative. Only 24 acres of surface disturbance is expected in the foreseeable future and the entire designated portion would be closed to mineral location and leasing. The 80,084 acres composing the wilderness area would be closed to all vehicular access, thus, recorded and unrecorded sites would be protected from any potential damage due to vehicular traffic.

All sites in the nondesignated portion would be protected by existing Federal and State antiquities laws. The nondesignated area would remain open to mineral location, and 200 acres would be available for leasing under Category 1. The degree and potential impacts to cultural resources are unknown. However, they are expected to be light because mineral exploration and development is not expected in the nondesignated area. Only 8 of the 886 nondesignated acres would be disturbed in the foreseeable future. Disturbance would be preceded by appropriate inventory and mitigation procedures.

The nondesignated portion which is coincident with several major washes of the WSA would remain open to ORV use. Archaeological sites are known to be located in these washes and may be unintentionally disturbed by ORV activity. In addition, general vehicular access in the washes would provide opportunities for illegal artifact collection or vandalism to sites located on the canyon sides (Nickens, et al., 1981). The potential for these impacts would be less than with the No Action/No Wilderness Alternative because 14 of the 27 miles of access roads and 99 percent of the WSA would be closed to vehicle use.

Conclusion: All of the recorded sites would receive protection from wilderness designation under this alternative. Sites in the undesignated portion would continue to receive protection under existing laws.

• Impacts on Recreation

The 80,084 acres designated as wilderness would be closed to ORV use, including about 14 miles of existing ORV ways, wash bottoms, and trails. Within this area, primitive recreation values for hiking, backpacking, sightseeing, and floatboating would be protected. The wild and scenic values of the San Rafael River would receive additional protection. Areas presently used most frequently by primitive recreation visitors would be included and preserved.

However, primitive recreation values would be directly reduced on 32 acres due to construction of access to in-held State lands and locatable mineral exploration and development in the northeastern and eastern portion of the WSA.

The 886 acres not designated as wilderness would provide ORV access corridors on about 13 miles of traditional wash bottom travel routes. With the exception of Saddle Horse Canyon, the principal ORV use concentration areas would remain open.

Both primitive and ORV types of recreation would benefit from this alternative; however, there would be some conflict in types of use in the 13 miles of wash bottom areas. This conflict would be of greater concern to primitive recreationists than to ORV users.

Reduction in the quality of the recreation opportunity that would result from indirect sights and sounds could at times occur on as much as 3,040 acres due to affects from uranium development and as much as 6,478 acres due to affects of ORV activity.

With this alternative, it is projected that primitive recreation use in the WSA would increase by 2 to 7 percent over the next 30 years. Primitive recreation

use could increase up to 17,400 visitor days a year by 2020. Also, it is predicted that ORV use would increase up to about 2,200 visitor days per year as a result of normal growth in traditional wash bottom use. ORV use would constitute about 11 percent of the total use, as compared to 20 percent at the present time. Total recreation use could be as high as 19,600 visitor days per year by 2020. However, the projected levels may not be reached because motorized and/or primitive recreation use may have to be curtailed to protect wilderness and other resource values. The opportunity for commercial recreation use would increase from the publicity that would come with designation.

To some extent, the availability of ORV access would tend to disperse primitive recreation use within the WSA by providing extra trailhead opportunities.

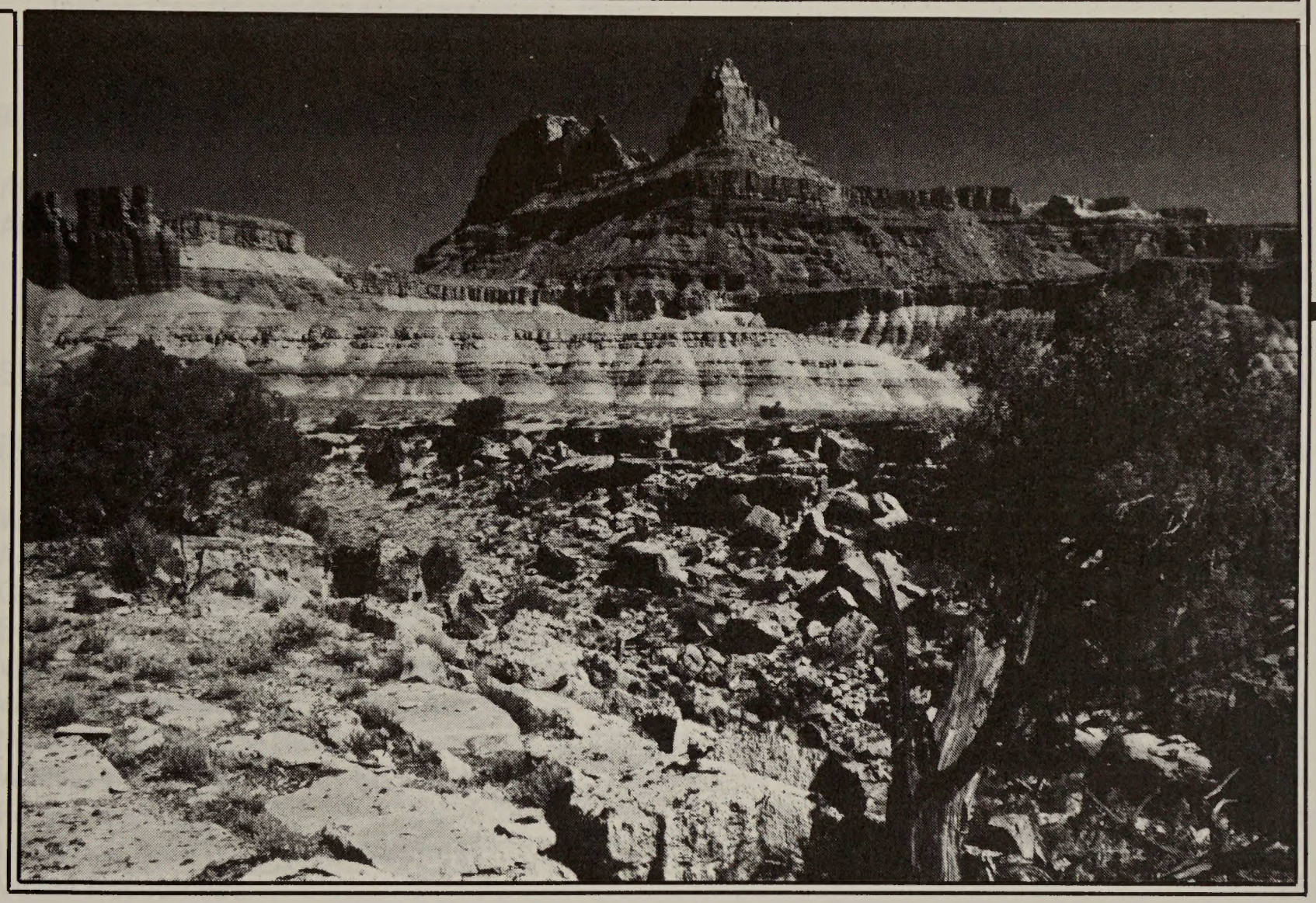
Conclusion: Primitive recreational values would be reduced in quality directly on up to 32 acres and indirectly on up to an additional 9,518 acres. Both primitive and motorized recreation use would increase, but motorized recreation use would increase to about one-half of that expected with the No Action/No Wilderness Alternative.

- Impacts on Local Economic Conditions

Impacts and conclusions for local economic conditions would be approximately the same as for the All Wilderness Alternative because uranium exploration and development would be affected the same as with that alternative. There would be slight increases in potential motorized recreational use and associated revenues as compared to the All Wilderness Alternative. There would also be potential for $1,350 more in annual Federal lease revenues, half of which would go the the State of Utah. Federal revenues from commercial recreation use would probably increase.

Conclusion: Over the long term, partial wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Approximately 80 fewer jobs would be provided by locatable mineral activities with this alternative. This is equivalent to about 1.2 percent of the projected Emery County employment in the year 2010. Recreation-related expenditures could contribute up to $80,360 annually to the local economy at the end of 30 years. Livestock grazing would ocntinue to contribute $14,540 annually in livestock sales and $1,120 in Federal revenues. Up to $47,290 in Federal and State oil and gas lease revenues would be foregone each year. Federal revenues related to commercial recreation would increase.

Mexican Mountain WSA



MEXICAN MOUNTAIN WSA

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the feasibility of development, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 1,760 acres reported in the Draft EIS to 80 acres of surface disturbance for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Mexican Mountain WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the disturbance estimate for the WSA has been reduced from 1,760 to 80 acres in the Final EIS, only 0.1 percent of the WSA would be disturbed and reclamation would be required. Therefore, impacts on soils are not significant issues for the Final EIS for the Mexican Mountain WSA.

2. Forest Resources: The only forest resources in the WSA are 19,920 acres of scattered pinyon pine and juniper trees. Wood production is low (less than two cords per acre) and there is limited access. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

3. Visual Resources: As discussed above for soils, the estimates of surface disturbance have been reduced for the Final EIS. Therefore, the impacts on visual resources would be less than described in the Draft EIS. In the Final EIS, impacts on visual resources are not addressed under the heading of "Visual Resources", but are addressed as part of the discussion of naturalness and special features in the Wilderness Values sections.

4. Wild Burros: The 10 to 15 wild burros which use the southeastern portion of the WSA would be protected by the Wild Free-Roaming Horse and Burrow Act (as amended) with or without wilderness designation. The removal of the excess wild burros, generally by the use of saddle horses, will take place inside and outside the WSA. It requires the construction of temporary corrals for holding the captured animals. Because of the rough topography in the WSA, almost all of the temporary facilities would be outside the WSA boundary. Occasionally, the removal requires the use of a helicopter to assist in the roundup. When this is the case, the helicopter would not be landing inside the WSA. Wild horse and burro numbers are also inventoried by the use of helicopter over the WSA but landing is not required. Therefore, impacts on wild horses are not significant issues for analysis for the Final EIS.

5. Hydroelectric Power: The potential exists for a small-scale hydroelectric dam on the San Rafael River within the WSA. Two potential sites have been identified, one near the Black Box and the other near the San Rafael Reef. There is no known interest in the development of hydroelectric power in this area and none is projected in the foreseeable future. In addition, the San Rafael River is a Wild and Scenic River Inventory segment. Therefore, hydroelectric developments would not be constructed in the foreseeable future on the San Rafael River with or without wilderness.

- Issues Analyzed in Detail

The significant issues for the Mexican Mountain are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on water resources.

4. Impacts on mineral exploration and production.

5. Impacts on wildlife habitat and populations including special status species.

6. Impacts on livestock management.

7. Impacts on the preservation of cultural resources.

8. Impacts on recreational use of the WSA.

9. Impacts on local economic conditions.

MEXICAN MOUNTAIN WSA

Comments made during the public comment period for the Draft EIS centered mainly on the following issues:

1. The need for and adequacy of BLM's rationale for the proposed action.

2. BLM's assessment of wilderness values.

3. The need for further inventories of resource values.

4. The position of and responsibilities of local government in the area.

5. The need to restrict or encourage ORV use in the WSA.

6. Effects or impacts of the proposed action on threatened and endangered plant and animal species.

7. Ability to develop minerals in the WSA or region.

8. Effects of wilderness designation on water rights in the San Rafael River.

9. BLM's assessment of mineral values and development potentials.

10. BLM's assessment of existing recreational use.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 64, for responses to specific comments about the Mexican Mountain WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Alternatives that would add up to 14,400 acres of Federal and 4,620 acres of State lands mainly on the south and southwestern borders of the WSA were suggested in the public comments. These alternatives were not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1).

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (59,600 acres); and (3) Partial Wilderness (Proposed Action) (46,750 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections for each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 59,600-acre Mexican Mountain WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, and the San Rafael RMP will eventually replace the San Rafael MFP, it is assumed that the WSA would continue to be managed in accordance with the San Rafael and Price River MFPs (USDI, BLM, 1979a and 1983b). The five sections (2,608 acres) of State land within the WSA (refer to Map 1) have not been identified in the MFPs for special Federal acquisition through exchange or purchase. Refer to Volume I for further information on State inholdings.

There are no split-estate or private lands in the WSA. The acreages and figures given with this alternative are for Federal lands only.

- Management Conditions and Constraints

All 59,600 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on 111 existing mining claims (2,220 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), without concern for wilderness values. It is projected that exploration and development of uranium would occur in the foreseeable future. Two existing post-FLPMA oil and gas leases (1,120 acres) and future leases could be developed under leasing Category 1 (standard stipulations) on 22,510 acres; Category 2 (special stipulations) on 7,280 acres; and Category 3 (no surface occupancy) on 9,010 acres. Some 20,800 acres would remain in Category 4 (no leasing) and continue to be unavailable for leasing. It is projected that additional oil and gas

R. 11 E.

R. 12 E.

R. 13 E.

Map 1
LAND STATUS
Mexican Mountain WSA
UT-060-054

T. 20 S.

T. 20½ S.

T. 21 S.

SAN RAFAEL SWELL

MEXICAN MOUNTAIN WSA

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

N

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

R. 13 E.

R. 14 E.

4

exploration would occur in the foreseeable future. About 28,664 acres of the San Rafael Swell STSA overlaps the Mexican Mountain WSA. None of the acreage in the WSA is involved in a lease conversion process that would provide for tar sand development. Should future tar sand development (competitive leasing) occur under this alternative, it would be guided by the leasing categories established by the two MFPs.

Although mineral resources would be managed as described above, with the exception of uranium and oil and gas, no locatable or leasable mineral exploration or developments are projected in the WSA because the level of known resources and/or the probability of their development are too low to support those assumptions. Appendix 6 in Volume I explains the mineral exploration and development projections.

The present domestic livestock grazing use in the WSA would continue as authorized in the MFPs (currently estimated to be 1,809 AUMs). Existing developments including two reservoirs and two short (1.25 total miles) allotment boundary fences, could be used and maintained. New rangeland developments could be implemented without wilderness consideration. No developments are proposed for use by livestock. The small herd of 10 to 15 wild burros would continue to use the area.

Developments for wildlife, water resources, etc., could be allowed if in conformance with the MFPs. The development of up to five springs and one catchment for bighorn sheep is proposed. Additional transplants of bighorn sheep would be allowed.

Public water reserve withdrawals on 693 acres would continue. These withdrawals segregate the lands from all public land laws and nonmetalliferous mineral location.

ORV use in the 30,600 acres of the WSA in the Price River MFP area would be limited to existing roads and trails, but new access routes for development could be allowed. ORV use in the 29,000 acres of the WSA in the San Rafael MFP area would remain open to ORV use. Vehicle use of 20 miles of existing ways and trails would continue.

The entire 59,600-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any expected because of the availability of move productive and accessible areas outside the WSA.

The area would continue to be managed under VRM Class II on 55,000 acres and Class III on 4,600 acres.

- Action Scenario

Given the management plans described above and the resources described in the affected environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in approximately 80 acres of surface disturbance.

Up to 68 acres would be disturbed by mineral exploration and development within the WSA. Some 40 acres would be disturbed by oil and gas exploration activities. Geophysical exploration would ultimately determine the location of the wells to be drilled. Each drill location and up to 3 miles of access road will disturb 10 acres.

An additional 28 acres would be disturbed by uranium exploration and development in the central portion of the WSA. Exploration and development will require the construction of up to 5 miles of access roads, some of which would become permanent. Exploratory drilling would start out on widely-spaced centers and would become more closely spaced and concentrated as ore bodies are delineated. Surface facilities necessary to support underground mines would be located in the WSA, but the ore would be processed off-site.

Oil and gas exploration could provide up to 10 temporary jobs per exploratory well lasting from 3 to 6 months. Exploration and development of uranium could provide up to 40 permanent jobs for each of the two operations projected for the WSA.

In addition, 2 acres would be temporarily disturbed with the development of five springs and one water catchment for bighorn sheep and up to 10 acres would be disturbed with development of new access to in-held State lands.

Dispersed disturbance from ORV use could occur on up to 20 percent (11,920 acres) of the WSA.

Recreational use is expected to increase over the current estimated use of 4,000 visitor days per

year at a rate of 2 to 7 percent annually. As much as 63 percent of the recreational use in the WSA would continue to be motorized.

- All Wilderness Alternative

With this alternative, all 59,600 acres of the Mexican Mountain WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve it position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There are five State sections (2,608 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). There are no private or split-estate lands within the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 59,600 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 2,220 acres of 111 existing mining claims that may be determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. It is assumed that such claims for uranium would exist in the WSA at the time of designation and they would be explored and developed in the long term under more restrictive conditions than the No Action/No Wilderness Alternative. Two existing post-FLPMA oil and gas leases involving 1,120 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown prior to wilderness designation. No leasing of the tar sand resource in the WSA would be allowed; therefore, tar sand exploration or development would not occur.

Present domestic livestock grazing would continue as authorized in the Price River and San Rafael MFPs. The estimated 1,809 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland improvements (two short [1.25 miles] allotment boundary fences and two reservoirs) existing at the time of designation would continue in the same manner as in the past based on practical necessity and reasonableness.

The 10 to 15 wild burros would continue to use the area.

No water resource facilities or watershed treatments are located in the Mexican Mountain WSA and, although two dam sites have been identified on the San Rafael River, no projects are expected. It is assumed that future projects on the river within the WSA would not be allowed. Public water reserve withdrawals on 693 acres would continue. These withdrawals segregate the lands from all public land laws and nonmetalliferous mineral location.

Supplemental releases of native species to augment present populations probably would be allowed if proposed by the UDWR. It is assumed that the development of up to five springs and one catchment for bighorn sheep would be allowed to support bighorn sheep.

The entire 59,600-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved rangeland developments. About 20 miles of existing ways and four-wheel drive trails would not be available for vehicular use except as indicated above. The approximately 1 mile of dirt road that borders the WSA and approximately 9 miles of cherry-stemmed county road to the Black Box would remain open to vehicular use.

Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood for use in the wilderness, if accomplished by other than mechanical means.

Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

Map 2

ALL WILDERNESS ALTERNATIVE
Mexican Mountain WSA
UT-060-054

MEXICAN MOUNTAIN WSA

T. 20 S.

T. 20½ S.

T. 21 S.

R. 13 E.

R. 14 E.

Legend

All Wilderness Alternative
(59,600 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

- Action Scenario

BLM projects that up to 20 acres would be disturbed with implementation of the All Wilderness Alternative. About 8 acres would be disturbed due to exploration and development of uranium in the central portion of the WSA as described in the No Action/No Wilderness Alternative. Such activities would include up to 2 miles of new access roads, drill sites, and surface facilities to support an underground mine. The ore would be processed off-site. Up to 20 permanent jobs could be provided by each of the two operations projected for the WSA.

In addition, 2 acres would be temporarily disturbed with development of five springs and one water catchment for bighorn sheep, and 10 acres would be disturbed with construction of new access to in-held State lands.

No disturbance from ORV use is projected because of wilderness management restrictions.

Primitive recreational use is expected to increase over the current estimated use of 1,500 visitor days per year at a rate of 2 to 7 percent annually. Motorized recreational use, including potential increases, would not be allowed.

- Partial Wilderness Alternative (Proposed Action)

With this alternative, 46,750 acres of the Mexican Mountain WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to avoid conflicts of wilderness designation with popular off-road and campsite-use areas while analyzing as wilderness those portions of this WSA that have the best wilderness values. BLM believes that wilderness values are of a higher quality in areas where outstanding opportunities for solitude and/or primitive recreation exist, preferably in combination with special features. In forming this alternative, the portions of the WSA with outstanding opportunities for solitude and primitive recreation and special features were included where possible within a manageable boundary. About 12,850 acres in the WSA not considered for wilderness designation with this alternative would be managed in accordance with the Price River and San Rafael MFPs, as described for the No Action/No Wilderness Alternative. The 46,750-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative.

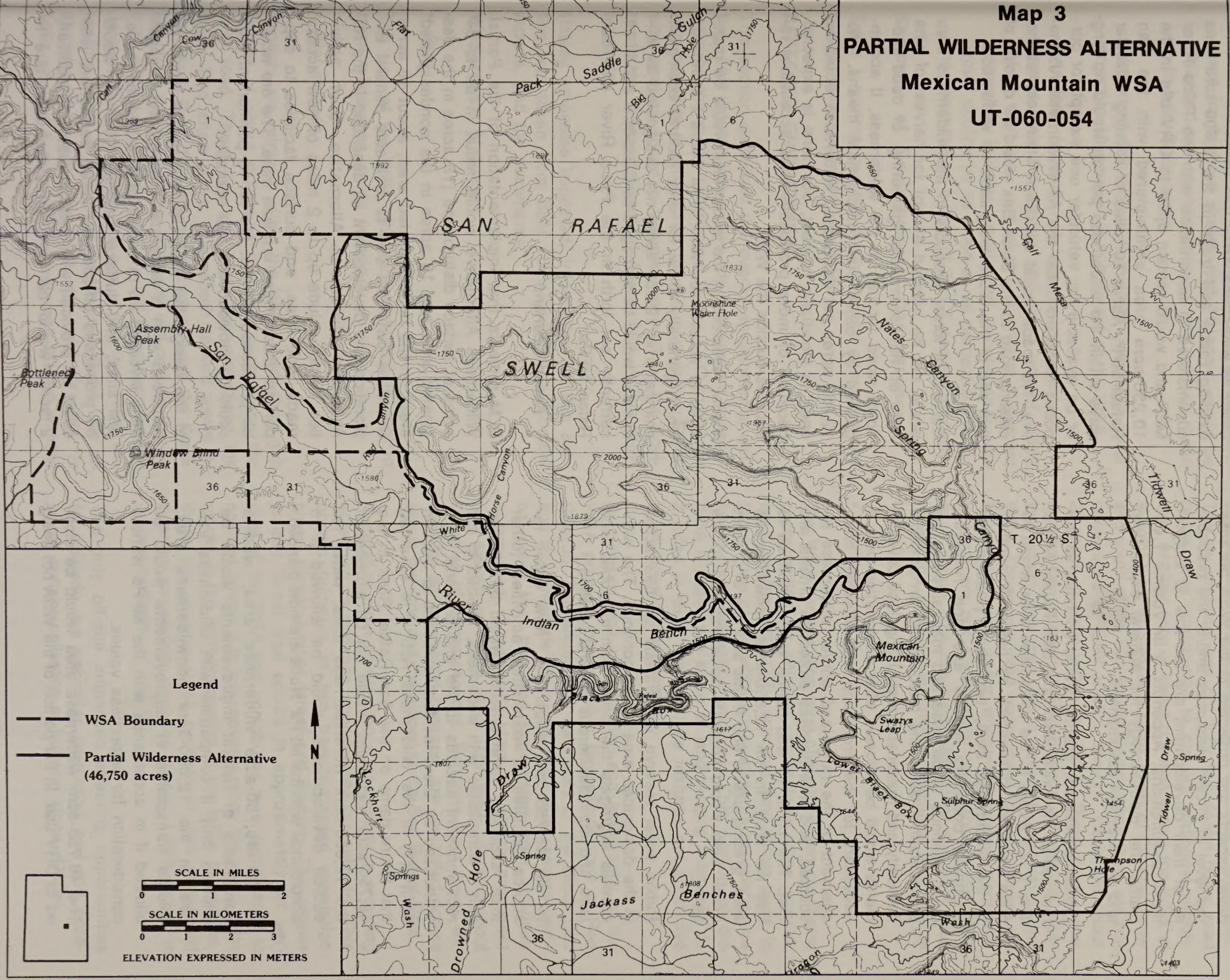
Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is assumed that State lands would remain under existing ownership. There are four State sections (2,241 acres) in the portion of the WSA that would be designated wilderness (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

The 46,750-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and mineral sale. However, development work, extraction, and patenting would be allowed to continue on 1,400 acres in 70 existing mining claims, provided that they are valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. It is assumed that such claims for uranium would exist in the designated portion of the WSA and they would be explored and developed in the foreseeable future under more restrictive conditions than the No Action/No Wilderness Alternative. Existing oil and gas leases covering 480 acres would be phased out upon expiration unless a find in commercial quantities is shown. The 12,850-acre area not designated wilderness would be open to mineral location, leasing, and sale without concern for wilderness values and in accordance with the MFPs. Development work, extraction, and patenting of existing mining claims (820 acres) and future mining claims could occur. Development of existing oil and gas leases (640 acres) and future leases could also occur. The area not designated wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on 9,770 acres; Category 2 (special stipulations) on 1,110 acres, and Category 3 (no surface occupancy) on 900 acres. Some 1,070 acres would be in Category 4 (no leasing) and would continue to be unavailable for leasing. Tar sand development would not be allowed in the wilderness area. In the nonwilderness area, tar sand could be developed through a competitive leasing program.

Although mineral resources would be managed as described above, with the exception of uranium, no locatable or leasable mineral exploration or

Map 3
PARTIAL WILDERNESS ALTERNATIVE
Mexican Mountain WSA
UT-060-054



MEXICAN MOUNTAIN WSA

developments are projected in the WSA because the level of known resources and/or the probability of their development are too low to support those assumptions. Appendix 6 in Volume I explains the methodology for mineral exploration and development assumptions.

Domestic livestock grazing would continue as authorized in the Price River and San Rafael MFPs. The 1,123 AUMs in the wilderness area would remain available to livestock as presently allotted. In the wilderness area, two short (1.25 miles) allotment boundary fences and one reservoir could continue to be used and maintained in the same manner as in the past, based on practical necessity and reasonableness. Rangeland developments would be allowed after designation only if necessary for the protection and effective management of the rangeland and/or wilderness resources, and if wilderness protection criteria are met. The 10 to 15 wild burros would continue to use the area. In the 12,850-acre nonwilderness area, grazing use of 686 AUMs and use of one reservoir also would continue as authorized in the MFPs.

Public water reserve withdrawals on 693 acres in the designated area would continue. The withdrawals segregate the lands from all public land laws and nonmetalliferous mineral location.

In the 46,750-acre wilderness, new water resource facilities or watershed activities (other than rangeland developments) would be allowed only if compatible with wilderness, needed to correct imminent hazards to life and property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the Wilderness Act. It is assumed that future dams on the San Rafael River in the 46,750-acre wilderness would not be allowed. In the 12,850-acre nonwilderness area, water resource developments would be allowed if in accordance with the MFPs. None are now planned.

In the 46,750-acre wilderness area, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the 12,850-acre nonwilderness area, wildlife transplants or improvements would be allowed if in accordance with the MFPs without consideration for wilderness values.

The 46,750-acre wilderness area would be closed to ORV use. In the portion of the WSA not designated as wilderness, ORV use would be limited to existing roads and trails in the 2,600-acre area administered in accordance with the Price River MFP and would remain open to ORV use in the 10,250-acre area administered with the San Rafael MFP. About 10 miles of existing vehicular ways within the wilderness portion would no longer be available for vehicular use except for purposes identified under the All Wilderness Alternative. No roads would be cherry-stemmed, as the existing road to the Black Box would be outside of that part of the WSA designated as wilderness.

Harvest of forest products in the wilderness area would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood for use in the wilderness, if accomplished by other than mechanical means. The 12,850 acres not designated wilderness would be open to woodland harvest, but none is expected because of more productive and accessible resources outside the WSA.

Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The 12,850 acres not designated as wilderness would be managed as Classes II and III as currently set forth in the Price River and San Rafael MFPs.

- Action Scenario

BLM projects that implementation of the Partial Wilderness Alternative would result in up to 34 acres of surface disturbance (18 acres in the designated area and 16 acres in the nondesignated area). In the nondesignated area, about 16 acres would be disturbed due to locatable mineral exploration and development as described in the No Action/No Wilderness Alternative. Such activities would include up to 2 miles of new access roads, drill sites, and surface facilities to support an underground uranium mine. The ore would be processed off-site. Up to 40 permanent jobs could be provided with the operation.

In the designated area, up to 6 acres would be disturbed with a separate underground uranium mine involving up to 1 mile of new access roads, drill sites, and surface facilities. The ore would be processed off-site. Up to 20 permanent jobs could be provided with this operation. In addition, 2 acres would be temporarily disturbed due to

development of five springs and one water catchment for bighorn sheep, and 10 acres would be disturbed with construction of new access roads to in-held State lands.

Dispersed disturbance from ORV use could occur on up to 10 percent (5,960 acres) of the WSA.

Primitive recreational use is expected to increase over the current estimated use of 1,500 visitor days per year at a rate of 2 to 7 percent annually. Initially, motorized recreational use would decline by as much as 25 percent but would then increase at a rate of 2 to 7 percent annually.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The size of the WSA (59,600 acres) is sufficient to meet wilderness study criteria.

- Naturalness

Imprints are minimal within the WSA. Two short gap fences of about 0.75 and 0.5 mile each cross the river road. There are also two reservoirs along the road. Two short ways, lead south toward views of the Black Box. Two short ways also reach the Black Box from the south. The one west of Lockhart Box is 0.25 miles long. The other is a 0.5-mile loop north of Jackass Benches. From the end of the river road, extending about 4 miles around Mexican Bend, are an abandoned access way, drill site, and air strip. In 1984 about 2.5 miles of the way was bladed without authorization. The road bed was scarified and seeded. The reclamation was not fully successful but a road barrier was constructed to prevent additional vehicle use. Another way of about 0.5 mile enters the WSA at a point west of Swasey's Leap. West of Oil Well Draw and south of the San Rafael Campground there are concentrations of ORV tracks. Overall, there are about 20 miles of ways within the WSA. There is also one small mine prospect in Red Canyon. All imprints together affect less than 3,000 acres (5 percent) of the WSA. These imprinted areas meet the naturalness criterion for areas under wilderness review since the imprints are not substantially noticeable in the WSA as a whole. The other 95 percent of the WSA also meets the naturalness criterion because it is free of imprints.

- Solitude

The WSA configuration west of Red Canyon constrains opportunities for solitude, particularly when considered together with ORV activities now taking place in this portion of the WSA and outside its boundaries (refer to the Recreation section). This portion of the WSA includes two strips of land ranging from 0.25 to 3 miles in width with surface features not conducive to wilderness management.

By contrast, the configuration and topography of the WSA promote opportunities for solitude east of Red Canyon. The entrenched meanders of the Black Box and its immediate drainages have such severe vertical relief that they are segregated from activities above them. Topography plays a similarly prominent role elsewhere in the WSA. The WSA contains about 60 miles of major canyons. Separate from these, except for an occasional passage, are the rolled domes above the rims and the slopes of the San Rafael Reef.

Vegetation often complements topography in providing screening to enhance opportunities for solitude. This occurs primarily in two tree-dominated vegetation types, pinyon-juniper forest and riparian. The pinyon-juniper forest type occurs in approximately 34 percent of the WSA and contributes most significantly to solitude where it is interwoven among the rocky hummocks in the northern portion of the WSA. In addition, there are several small pockets of tree dominated riparian vegetation covering about 1,320 acres in canyon bottoms.

The only off-site influences affecting opportunities for solitude are vehicular recreation and the occasional surface collection of building stone. These

MEXICAN MOUNTAIN WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (59,600 Acres)	Partial Wilderness (46,750 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 80 acres because of mineral exploration and development, construction of access roads to in-held State lands, and rangeland projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 5,960 acres. Direct and indirect loss of wilderness values due to ORV activity could occur on up to 11,920 acres of the WSA. In total, opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 17,880 acres. Vehicular activity, including continued use of 20 miles of ways, would have a negative affect on wilderness -dependent and special status wildlife species and on cultural values. Monitoring would be necessary. Class A scenery would be reduced in quality in the disturbed and surrounding areas. The wild and scenic river values of the 34 miles of the San Rafael River in the WSA would not receive additional protection.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 20 acres of the WSA because of uranium exploration and development on valid claims, construction of access roads to in-held State lands, and water developments. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,192 acres. Special features would be preserved overall except that some Class A scenery would be reduced in quality in disturbed and surrounding areas. The wild and scenic river values of 34 miles of the San Rafael River in the WSA would receive additional protection.	Wilderness values would be preserved overall in the designated area which is approximately 78 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 34 acres because of mineral exploration and development, construction of access roads to in-held State lands, and rangeland projects. Opportunities for solitude and primitive and unconfined recreation would be indirectly reduced in quality on up to 2,980 acres. Direct and indirect loss of naturalness due to ORV activity could also occur on up to 5,960 acres of the WSA. Overall, the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to a total of 8,940 acres. Some Class A scenery would be reduced in quality in disturbed and surrounding areas. Vehicular activity in the nondesignated portion including use of 10 of the 20 miles of ways in the WSA would have a negative affect on wilderness-dependent and special status species such as peregrine falcon and bighorn sheep, and on cultural values. Monitoring and enforcement of protective measures would be necessary. Wild and scenic river values would receive additional protection on 26 of the 34 miles of the San Rafael River in the WSA.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives No Action/No Wilderness	All Wilderness (59,600 Acres)	Partial Wilderness (46,750 Acres) (Proposed Action)
Impacts on Vegetation	Vegetation types and populations of special status plant species would not be significantly affected because the 80 acres of projected disturbance would affect 0.1 percent of the vegetation in the WSA. Impacts from ORV use on 29,000 acres would be monitored and corrective measures taken should populations of threatened, endangered, or sensitive species be jeopardized.	Vegetation types and populations of threatened, endangered. or other special status plant species would be protected by this alternative because projected disturbance would be reduced from 80 acres to 20 acres and ORV use would be eliminated. Appropriate inventories, clearances, and consultation with FWS would be completed prior to surface disturbance.	Vegetation types and populations of special status plant species would be protected because projected disturbance would be reduced from 80 acres to 40 acres and ORV use would be eliminated on 83 percent of the area. Impacts from ORV use on 10,250 acres would be monitored and corrective measures taken should populations of threat-ned, endangered, or sensitive species be threatened.
Impacts on Water Resources	This alternative would not alter present or future water quality or uses. Only 0.1 percent (80 acres) of the WSa would be disturbed and there would be no restrictions on water use imposed by wilderness management.	In the short term, wilderness designation would not alter water quality or uses. In the long term, future water diversions and new consumptive uses in the San Rafael River system upstream of the WSA may be restricted or precluded.	Impacts and conclusions for water resources would be essentially the same as for the All Wilderness Alternative because only 34 acres of the WSA would be disturbed and 26 of the 34 miles of the San Rafael river in the WSA would be in the designated area.
Impacts on Mineral and Energy Exploration and Development	Implementation of this alternative would not adversely affect mineral and energy resource exploration and production in the Mexican Mountain WSA because mineral leasing, lcoation of mining claims, and mineral developments would not be restricted for protection of wilderness values.	Oil and gas exploration opportunities would be foregone. Wilderness designation would limit exploration and development opportunities for locatable minerals known to occur in the WSA to those under valid mining claims at the time of designation. An unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be lost.	Impacts would be slightly less than with the All Wilderness Alternative because 22 percent of the WSA would not be designated wilderness. Oil and gas exploration and an unknown amount of uranium production would be foregone.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (59,600 Acres)	Partial Wilderness (46,750 Acres) (Proposed Action)
Impacts on Wildlife Habitat and Populations	Only about 0.1 percent (80 acres) of the wildlife habitat in the WSA would be disturbed. This would not significantly affect wildlife habitat or populations. ORV use would significantly impact bighorn sheep and raptor habitat. The monitoring and enforcement of ORV use and enforcement of protective measures would be necessary.	Approximately 0.03 percent (20 acres) of the wildlife habitat in the WSA would be disturbed. Wilderness designation would protect all wildlife species and provide additional solitude over the short and long term. This would be especially beneficial to peregrine falcons on 31,700 acres of peregring falcon nesting habitat and to desert bighorn sheep.	Approximately 0.6 percent (34 acres) of the habitat in the WSA would be disturbed. Wildlife habitat or populations, including special status animal species would not be significantly affected by locatable mineral and new access development. ORV use would impact bighorn sheep and raptor habitat in the nondesignated area without necessary monitoring and enforcement. Approximately 1,000 acres of peregrine and other raptor nesting habitat and 1,000 acres of bighorn sheep habitat could be affected.
Impacts on Livestock Management	Existing levels of grazing use and current management practices would not be affected because access, grazing levels, and management techniques would remain as at present.	Restrictions on access to 20 miles of ways would necessitate changes in livestock management and supervision and cause inconvenience and increased management costs for 15 livestock permittees.	This alternative would not result in a change in the level of livestock use but would cause a change in the method of livestock management and supervision with restrictions on access to about 10 miles of way. This would cause inconvenience and increase management costs for 13 livestock permittees.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (59,600 Acres)	Partial Wilderness (46,750 Acres) (Proposed Action)
Impacts on Cultural Resources	Impacts due to surface disturbance are expected to be minimal because only 0.1 percent (80 acres) of the WSA would be disturbed and mitigation would be required. Intentional or unintentional damage to archaeological sites including two recorded sites, may occur due to continued vehicular access and ORV use. Up to 25 percent (11,920 acres) would be affected. Cultural resource management would continue without regard for protection of other wilderness values.	Very few impacts to cultural resources are expected with this alternative because potential disturbance would be reduced from 80 acres to 20 acres and ORV use would not be allowed. Overall, cultural resources would be protected but cultural resource management may be limited in scope and execution in order to preserve other wilderness values.	Archaeological sites including all of the recorded sites would be protected by wilderness designation with this alterna-tive. Sites in the nondesignated portion would continue to be protected under existing laws, but some inadvertent damage to sites from ORV use would occur.
Impacts on Recreation	The quality of primitive recreation would be reduced on and near ORV use areas and areas where other surface-disturbing activities occur. This could occur directly on 80 acres and indirectly on up to 30 percent (17,880 acres) of the WSA due to sights and sounds of ORV use and mineral exploration and development. Both primitive and mechanical recreational use would increase by 2 to 7 percent annually over the next 30 years, but vehicles would be restricted to existing roads and trails on 30,600 acres. Thirty-four miles of the San Rafael River, a wild and scenic river inventory segment, would not receive additional protection.	Primitive recreational values would be preserved over most of the WSA. The quality of the primitive recreational opportunity would be directly reduced on 0.03 percent (20 acres) of the WSA and indirectly reduced on 2 percent (1,192 acrs). Primitive recreational use would increase from the present 1,500 visitor days per year to up to 13,060 visitor days while up to 21,800 motorized visitor days per year would be foregone by the year 2020. Thirty-four miles of the San Rafael River, a wild and scenic river inventory segment, would receive additional protection.	Primitive recreational values would be preserved overall in the designated portio of the WSA. The quality of the primitive recrational opportunity would be directly reduced on 15 percent (8,490 acres). Both primitive and motorized recreational use would increase to reach a total of as much as 34,860 visitor days per year by the year 2020. Twenty-six of the 34 miles of the San Rafael River, a wild and scenic river inventory segment on the WSA would receive additional protection.

MEXICAN MOUNTAIN WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (59,600 Acres)	Partial Wilderness (46,750 Acres) (Proposed Action)
Impacts on Economic Conditions	Present economic conditions would not be affected. Locatable mineral activity could increase employment by 1.2 percent (80 jobs) by the year 2010. Recreation-related expenditures would contribute up to $142,926 annually to the local economy by the year 2020. Livestock grazing would contribute $36,180 annually in livestock sales and $2,786 in Federal revenues. Present and future oil and gas leases could contribute up to $77,600 annually in Federal and State lease revenues.	Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Up to 40 fewer jobs would be provided by locatable mineral activities with this alternative. Recreation-related expenditures could contribute up to $53,546 annually at the end of 30 years. Livestock grazing would continue to contribute $36,180 annually in livestock sales and $2,786 in Federal revenues. Up to $77,600 in Federal and State lease revenues would be foregone each year.	Over the long term, partial wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/ No Wilderness Alternative. Approximately 20 fewer jobs would be provided by locatable mineral activities with this alternative. Ths is equivalent to about 0.3 percent of the projected Emery County employment in the year 2010. Recration-related expenditures could contribute up to $142,900 annually at the end of 30 years. Livestock grazing would continue to contribute $36,180 annually in livestock sales and $2,786 in Federal revenues. Up to $54,040 in Federal and State lease revenues would be foregone each year.

activities occur along the boundaries of the WSA and are concentrated around the San Rafael Campground and along the San Rafael River road. There is limited ability to find a secluded spot in the immediate vicinity of these areas.

Overall, about 90 percent of the WSA (53,600 acres) provides outstanding opportunities for solitude, based on configuration, topographic relief, vegetation screening, and the ability to find a secluded spot. Approximately 6,000 acres, including the area west of Red Canyon and along segments of the river road, provide opportunities for solitude that are less than outstanding due to configuration and sights and sounds associated with vehicle use.

- Primitive and Unconfined Recreation

Primitive recreation opportunities for which the WSA is best suited include hiking, camping, floatboating/tubing, and sightseeing activities related to the WSA's scenic, cultural, and nongame wildlife features. Based on these activities, the entire WSA (59,600 acres) provides outstanding opportunities for primitive recreation.

Opportunities for fishing and hunting, while present, are very limited due to very small game populations and poor productivity. Horseback activities could potentially occur in the WSA, but would be limited by terrain.

- Special Features

The natural features of the WSA primarily result from its geology. The ruggedness of the terrain contributes to its suitability as nesting habitat for raptors, habitat for desert bighorn sheep, and scenic interest. The San Rafael River runs through the WSA, cutting deep canyons in the geologic formations and providing an important perennial water source with its riparian vegetation.

The combination of geologic surface features present are not found to the same extent anywhere else in the San Rafael Swell. There are only a few canyons in Utah that can be compared to the entrenched, very narrow gorges of the Black Boxes of the San Rafael River.

The WSA contains the greatest diversity of surface geology of any area its size in the San Rafael Swell. The oldest rock exposed in the San Rafael Swell is the White Rim or Coconino Sandstone exposed in the Black Boxes. It is exposed elsewhere in Utah, although not in a similar gorge. The hummocks in the Navajo Sandstone north of the San Rafael River are also unusual. The reef, found in two other WSAs to the south (San Rafael Reef and Crack Canyon WSAs), is a unique formation due to the violent pitches in the rock. In Mexican Mountain WSA it begins at its base with steep-sloped Carmel and Entrada sandstones cut by narrow clefts and rises to pitched Navajo Sandstone points or sandstone hummocks.

Historical and archaeological features are not fully documented. Evidence at this time does not indicate unusual sites or concentrations of sites relative to the surrounding area. A potential for unusual historical evidence exists, given the known combination of sites and activities in the immediate vicinity of the WSA, including the Old Spanish Trail, the Old Railroad Grade, historical agriculture, and use by outlaws.

There are three animal species (black-footed ferret, bald eagle and peregrine falcon) and two plant species (Maguire Daisy, Erigeron maguirei var. maguirei, and Wright fishhook cactus Sclerocactus wrightiae) listed as endangered that occur, or may occur, in the WSA. Also, two threatened species, the Jones Cycladenia (Cycladenia humilis var. jonesii) and the Last Chance Townsendia (Townsendia aprica), may occur in or near the WSA. There are nine animal species and five plant species that are considered sensitive that may occur in the WSA. Special wildlife habitat features present in the WSA include springs, the San Rafael River, riparian associations, a cliff line suitable for raptor nesting, and at least one bighorn sheep cave. The WSA has small populations of cougar and desert bighorn sheep, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

Approximately 92 percent (54,740 acres) of the WSA is rated Class A for scenic quality. Cuestas, buttes, pinnacles, alcoves, and at least one prominent arch are found in the WSA. The WSA has approximately 34 miles of the San Rafael River or perennial stream. The river is on the Nationwide Rivers Inventory List to be considered for possible inclusion in the National Wild and Scenic Rivers system. Refer to the Recreation section for more information.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon

woodland and saltbush-greasewood. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is in a PSD Class II air quality retention area designation (1977 Clean Air Act, as amended). The nearest Class I areas are Canyonlands and Arches National Parks, about 40 miles to the southeast of the WSA.

Potential pollution sources include industrial and vehicular emissions from Castle Valley and the Green River areas. A large point source includes two powerplants in Castle Valley. Fugitive dust from vehicle use is the most significant pollutant to the WSA at this time. Fugitive dust is intermittent depending mainly on localized activities and wind patterns. Visibility from promontories in the WSA is usually good, ranging from 30 to 100 miles, although hazy conditions on occasion affect views to the north and west (Aerocomp, Inc. 1984).

Geology and Topography

The Mexican Mountain WSA is located on a large anticline (uplift) called the San Rafael Swell. Due to the uplift and subsequent erosion, the swell has been breached with resulting exposure of sedimentary rock (strata) ranging in age from the Pennsylvanian to the Tertiary period. The WSA itself includes strata exposures ranging from the Pennsylvanian to early Cretaceous period. The exposures represent approximately 5,200 feet of sedimentary strata exposed on the east flanks of the swell. The WSA includes less than 2 percent of the whole uplift, but it includes some of the most scenic and remote areas of the uplift.

The northeastern and eastern portions of the WSA are characterized by surface exposures of the Navajo Sandstone that have been eroded into massive tan, white, and orange petrified sand dunes or buttes. Exposures of the Navajo Sandstone cover approximately 25 percent (14,900 acres) of the WSA. Near the eastern boundary of the WSA, the Navajo Sandstone plunges into the subsurface. Toward the southeastern end of the WSA, the strata plunges at near vertical angles. The steeply dipping Navajo Sandstone and associated strata are referred to as the San Rafael Reef.

Stratigraphically above and to the east of the Navajo Sandstone is the red-brown to gray Carmel Formation composed of less resistant siltstones, sandstones, limestones, and gypsum beds. In the San Rafael Reef south of the WSA, the Carmel Formation occurs as flatirons (triangular-shaped outcrops against the dip slope). These flatirons become more extensive and intricately eroded to the north to the degree that the typical triangular shape disappears. These flatiron-type Carmel deposits cover about 7 percent of the WSA. The Carmel Formation contains invertebrate fossils. The Carmel Formation grades into the overlying massive red-brown sandstones of the Entrada Formation.

A 1,000-foot cliff parallels the San Rafael River to its north for about 20 miles, separating the river from the dip slopes of the reef to the north and northeast. The cliff is composed of Moenkopi, Chinle, Wingate, Kayenta, and Navajo sandstones in ascending order. The Moenkopi Formation is composed in descending order of (1) alternating red-brown shales and mudstones; (2) a red-brown limestone and sandstone bed (Sinbad Member); (3) thick yellow to gray shales; and (4) brown to gray, fine-grained sandstone in thin beds alternating with shale. The Moss Back and Church Rock members of the Chinle Formation are above the Moenkopi. At its base, the Chinle consists of yellowish-gray to greenish-gray interbedded conglomerate, sandstone, and siltstone of the Moss Back Member. The overlying Church Rock Member is characterized mainly by red siltstones and sandstones, gray conglomerate, buff sandstones, and red, purple, and green claystone. The Chinle Formation contains both vertebrate and invertebrate fossils. The Wingate Sandstone is a massive, light-orange to tan sandstone with large-scale cross-bedding marked by vertical joints. The sandstone is medium-grained and, in places, interbeds of shale or shale conglomerate or lenses of cherty limestone are present. The Kayenta Formation above the Wingate is composed primarily of red sandstone with some green siltstone and limestone-siltstone-pebble conglomerate. The cliff is capped by the Navajo Sandstone which also makes up most of the dip slopes of the San Rafael Reef. All drainages in the WSA are directly or indirectly tributary to the San Rafael River. The river flows from

the northwest to the southeast diagonally across the structure of the swell without apparent regard to the presence of dipping strata resistant to erosion. This has occurred because the slow rate at which the swell was uplifted allowed the pre-existing drainage pattern to become etched across the structure.

Variation in resistance to erosion and dipping of strata has caused a wide variety of topographic features to form, including cliffs, gorges, canyons, large erosional remnants, cuestas, and plateaus. These topographic features divided the WSA into six major topographic areas; namely, (1) the San Rafael Reef and dip slopes of the Navajo Sandstone; (2) the cliff line north of the San Rafael River and canyons extending into the cliff; (3) large erosional remnants present as mountains and peaks along and south of the river; (4) the gorges of the San Rafael River known as the Black Box and the Lower Black Box; (5) the canyon cut by the river through the San Rafael Reef; and (6) low relief country south of the river which includes pediments, plateaus, and cuestas.

Soils

As shown on Table 2, about 60 percent (35,760 acres) of the WSA is rock outcrop or rubble land. About 35 percent (20,860 acres) of the WSA consists of shallow, loamy soils which, for the most part, are intermixed with rock outcrops. The remainder, about 5 percent (2,980 acres), are deep soils along river channels and washes, where wind-blown sand and silt have accumulated at the base of alluvial fans. Soil losses from erosion are very low and average less than 0.35 cubic yards per acre per year, except (1) during severe thunderstorms when the San Rafael drainage is naturally supplied with sediments from exposed rock and soil; and (2) in areas where vegetation is removed and wind erosion becomes more significant.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop and rubble land	60	35,760	0.0	0
Shallow and loamy soils on sloping structural benches and ledges	35	20,860	1.0	5
Very deep loamy and sandy soils along stream channels and gently sloping canyon bottoms	5	2,980	0.1	1
Totals	100	59,600		

Source: Hansen, 1985.

Most erosion is naturally caused except in the most highly used ORV areas around the San Rafael Campground. Erosion rates due to surface disturbance would be expected to be low, largely due to the coarse character of the soils. Soils more sus-ceptible to erosion cover about 4 percent (2,384 acres) of the WSA. An average soil erosion rate for disturbed soils in the WSA would be about 1.8 cubic yards per acre per year. Although erosion potential is low, it is noted that, due to the steep terrain and rocky characteristics, expected success for revegetation would be poor to very poor, except in the more productive deep soils covering about 5 percent (2,980 acres) of the WSA. Table 3 indicates soil erosion for the WSA.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	-	-	-
Medium	5.0	-	-	-	35	20,860	104,300
Low	1.0	35	20,860	20,860	5	2,980	2,980
Very Low	0.1	5	2,980	298	-	-	-
None	0.0	60	35,760	-	60	35,760	-
Totals		100	59,600	21,158[a]	100	59,600	107,280[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.36 under present conditions; 1.8 if disturbed).

About 25 percent (14,900 acres) of the soils in the WSA are strongly saline, 25 percent (14,900 acres) moderately saline, 45 percent (26,820 acres) slightly saline and 5 percent nonsaline. It is estimated that the soils within the WSA produce 49 lb of salt per acre on an annual basis.

About 95 percent (53,789 acres) of the WSA is unsuitable for seeding because of rock, rock outcrops, and shallow soils. The remaining 5 percent (5,811 acres) would support fair to good seedings. These areas are primarily along drainage channels where soil depths and slopes are conducive to seeding establishment.

Vegetation Including Special Status Species

Nearly half of the WSA is barren. The remainder is divided into five vegetation types which are summarized in Table 4. The predominant vegetation types in the Mexican Mountain WSA are low producing desert and semidesert plant communities, with the exception of the riparian areas.

The barren type contains only scattered vegetation. Common plants include Utah juniper, pinyon pine, and little leaf mountain mahogany. Sparse understory plants include green rabbitbrush, pepperweed, western wheatgrass, galleta, bullgrass, and Indian ricegrass.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Barren	28,050	47
Pinyon-juniper woodland	19,920	34
Shadscale	6,820	11
Desert Shrub	2,310	4
Grassland	1,180	2
Riparian	1,320	2
Total	59,600	100

Source: USDI, BLM, 1989

The pinyon-juniper woodland type is found in relatively flat locations with shallow soil. Utah juniper and pinyon pine dominate, with an understory of shadscale, Mormon tea, squawbush, black sagebrush, snakeweed, prickly pear cactus, globemallow, slender gilia, and eriogonum.

The shadscale type is low growing and occurs at lower elevations with low rainfall. Dominant plants are shadscale, Mormon tea, and galleta. Associated species are snakeweed, desert trumpet, slender gilia, desert plantain, globemallow, and Indian ricegrass.

The desert shrub and grassland types are fairly productive and occur in deeper soils. Dominant species in the desert shrub type are black sagebrush, Mormon tea, rabbitbrush, shadscale, snakeweed, and galleta. Other common plants are Indian ricegrass, needle-and-thread, blue grama, globemallow, aster, and cryptantha. The dominant species in the grassland type is blue grama or Indian ricegrass. Russian thistle dominates when conditions are poor. Other associated species are needle-and-thread, sand dropseed, ragweed, phacelia, white stem blazing star, four-wing saltbush, and winterfat.

The riparian type occurs only in canyons where water is available. Dominant vegetation includes tamarisk, smotherweed, common reed, and scratch-grass. Cottonwood, willow, and rush are common where conditions are good. Less moist riparian areas are dominated by rubber rabbitbrush, squawbush, and saltgrass. Other common species include greasewood, alkali sakaton, Douglas rabbitbrush, seepweed, and big sagebrush.

The San Rafael Swell, of which the WSA is a part, provides habitat for a large number of rare plant species. Nine threatened, endangered, Category 1 and 2 candidate species may occur in the WSA (refer to Table 5).

Table 5
Endangered, Proposed Endangered, and Candidate Plant Species

Species	Status	Date
Erigeron maguirei var. maguirei	Endangered	As of 1/88
Pediocactus despainii	Endangered	As of 1/88
Sclerocactus wrightiae	Endangered	As of 1/88
Cycladenis humilis var. jonesii	Threatened	As of 1/88
Townsendia aprica	Threatened	As of 1/88
Schoencrambe barneybi	Category 1 Candidate	As of 1/88
Hymenoxys depressa	Category 2 Candidate	As of 1/88
Psorathamus polyadenius var. jonesii	Category 2 Candidate	As of 1/88
Sphaeralcea psoraloides	Category 2 Candidate	As of 1/88

Source: USDI, FWS, 1989; Appendix 4 in Volume I.

Sclerocactus wrightiae may be found anywhere in the WSA, with eight other sites known outside the WSA. Erigeron maguirei var. maguirei grows in dry rocky canyon bottoms in desert shrub communities. The surface formation is generally Navajo Sandstone, and this plant is only known to occur in the vicinity of Buckhorn Draw and one other location in Utah. The WSA includes 400 acres of habitat for this plant.

MEXICAN MOUNTAIN WSA

The Mexican Mountain WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types in the WSA are listed on Table 6.

Table 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	35,760	60
Saltbush-greasewood	23,840	40
Total	59,600	100

Source: USDI, USGS, 1978.

Water Resources

The Mexican Mountain WSA is within the San Rafael river drainage which is a tributary to the Green River and is in the Upper Colorado River hydrologic subregion.

The San Rafael River is the primary perennial water source, flowing about 34 miles through the WSA. Drainages of the WSA are all tributary to the San Rafael River, either directly or by way of Tidwell Draw. Consumptive water use in the WSA, at this time, is primarily by livestock and wildlife. Nonconsumptive uses include seasonal floatboating, tubing, and a limited fish habitat.

The San Rafael River originates approximately 16 straight-line miles upstream of the WSA at the confluence of Cottonwood and Huntington Creeks. The tributaries to the San Rafael River originate on the Manti-LaSal National Forest over 40 miles upstream of the WSa. The San Rafael River, including its tributaries, crosses National Forest, private, BLM-administered and scattered sections of State land before entering the WSA. Present and potential upstream uses include irrigation, cooling water for coal-fired generation of electricity, coal mining, and municipal use sin Emery County.

The WSA is within Water Right Adjudication Area 93. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in certain areas. There are no areas of significant groundwater development in this drainage area.

The water quality standards for San Rafael River and tributaries, from confluence with Green River to confluence with Ferron Creek are as follows: Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3C (protected for nongame fish and other aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Salinity in the river is high due to upstream irrigation and surface geology of the drainage. Dissolved solids may reach as high as 2,500 milligrams per liter (mg/l). The water could be safe for human consumption if it is settled and treated. There are two developed reservoirs for livestock in the WSA adjacent to the San Rafael River road.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Mexican Mountain WSA is given in Table 7. Appendix 5 in Volume I explains the mineral and energy rating system.

Table 7
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 2	c1[c]	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f 3	c4	10 to 500 million barrels in-place
Geothermal	f 2	c2	Low temperature
Potash	f 2	c2	Less than 1 million metric tons
Hydropower	f 3	c4	Small scale (less than 15 megawatts)
Uranium/Vanadium	f 3	c4	500 to 1,000 metric tons of oxide
Copper	f 2	c2	Less than 50,000 metric tons
Manganese	f 2	c1	100,000 metric tons of 40-percent manganese

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

[c]Information available to BLM suggests that the certainty rating for the WSA should be c2.

The WSA contains deposits of vanadium and could contain copper and manganese, currently listed as strategic and critical materials (USDoD, 1988). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

- Leasable Minerals

Currently, there are no active drilling, mining, or exploration activities for leasable minerals.

- Oil and Gas

Producible oil and gas are found only where a number of essential conditions exist, namely a petroleum source, porous and permeable rock, and a trap. Within the WSA, petroleum in the Moenkopi Formation is evidenced by the outcrop of tar sand. The Moenkopi is below the surface in about 40 percent of the WSA, northeast of the major cliff line. The northern and eastern boundaries of the WSA are from 0 to 5 miles distance from the outcrop. The Grassy Trail field, a small field 25 miles north of the WSA, has produced over 130,000 barrels of oil from this formation. Limiting factors to production from the Moenkopi are poor porosity and small reservoir size. Evidence of possible combined structural/stratigraphic traps similar to those of the Grassy Trail field exists in the vicinity of the Mexican Mountain WSA. Potential depends on the relative permeability of the Moenkopi below the surface in and around the WSA. Where petroleum has migrated to the surface tar sand was formed. It is uncertain how much petroleum remains below the surface of the WSA, trapped as oil. Petroleum potential would increase with distance from he outcrop. Overall potential for the Moenkopi in the WSA is considered low due to shallow overburden and proximity to the outcrop. Potential for the Moenkopi Formation would improve to the north of the WSA as distance from the outcrop increases. Any potential for areas near the outcrop is probably associated with tar sand rather than with conventional oil and gas.

The only other formation having any significant potential for oil and gas is the Paradox Formation, as much as 9,000 feet below the surface. Complex stratification and later uplift provides for potential traps. Potential for this formation is not well defined. Additional drilling and seismic exploration are necessary to prove or disprove any potential. Gas production is occurring from Ferron field which is located approximately 20 miles west of the WSA.

The low rating of f2/c1 for oil and gas indicates a low potential for accumulations of less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas (SAI, 1982). It would probably occur as small scattered deposits. While the potential of some rock units around the San Rafael Swell may be high, widespread fracturing and rupturing of potential reservoirs is thought to have reduced potential. Fracturing is believed to have allowed petroleum to move vertically into the Moenkopi Formation producing tar sand.

Lease categories for much of the southeast portion of the WSA are presently either no lease or no surface occupancy, based upon natural, scenic, and primitive recreation values. Leasing categories are shown in Table 8. These apply to oil, gas, and, in some parts of the WSA, to tar sand. Currently, there are two post-FLPMA leases occupying 1,120 acres.

Table 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	22,510	38
2. Open with special stipulations	7,280	12
3. Open with no surface occupancy	9,010	15
4. No leasing	20,800	35
Total	59,600	100

Source: USDI, BLM, 1975a.

- Tar Sand

Tar sand is present where the Moenkopi Formation (primarily the Black Dragon Member) is at or near the surface. The San Rafael Swell STSA overlaps 28,664 acres or 48 percent of the WSA. Total estimated potential reserves for the entire 115,705 acres of the San Rafael Swell STSA are 445 to 545 million barrels of oil (USDI, BLM, 1984c). The WSA is estimated to have in-place resources of between 10 and 500 million barrels of oil as tar sand (SAI, 1982). Resources are probably toward the lower end of that range, perhaps on the order of 100 million barrels. If the tar sand were to be effectively mined, up to an estimated 80 to 90 percent would be recoverable after processing; however, the most likely extraction process in the San Rafael Swell STSA would appear to be by in-situ methods, which would result in about 30-percent recovery. Outcrops range from 3 to 60 feet thick and the petroleum content of most deposits is less than 10 percent. Localized occurrences of 5.0- to 16.8-percent petroleum content are known to occur in

the STSA. The richer, better-exposed deposits occur mainly to the south of the WSA on Jackass Benches above Black Dragon Canyon and in Cottonwood Draw (near I-70). Measurements at Red Canyon and Lockhart Box showed deposits of 27 feet thick with 4-percent tar content.

Estimates of tar sand potential in the WSA are based on limited data and potential is considered moderate. However, preliminary indications are that the deposits are considerably smaller in extent and more limited in depth than the Sunnyside tar sand deposits east of Price. For comparison, based on the average estimated reserves of the four largest tracts, 28,664 acres in the Sunnyside STSA would have in-place reserves of about 2.3 billion barrels or nearly 20 times more oil in-place as that estimated for the Mexican Mountain WSA.

Some or most of the tar sand in the WSA may have been removed by erosion where the Moenkopi Formation is exposed at the surface.

While tar sand is present, production within the WSA is unlikely due to low tar content and limited areas of favorable outcrop. There has been little or no industry interest in tar sand leasing or development for the WSA. There are currently no combined hydrocarbon lease conversion applications for lease located within the WSA.

A moderate favorability rating of f3 has been assigned, indicating the possibility of deposits ranging between 10 and 500 million barrels of in-place oil. The certainty rating is high (c4) (SAI, 1982).

- Geothermal

The low favorability rating of f2 for geothermal resources in the WSA is associated with low temperature thermal waters (20 to 90 degrees Centigrade). The rating is assigned based upon sulphur springs along the San Rafael River discharging at 15 to 23 degrees and geologic (Paleozoic) characteristics of the area. The low certainty of (c2) was assigned due to the likelihood that an economic geothermal resource does not exist (SAI, 1982).

- Potash

Because the WSA lies over the northeastern end of the Paradox Basin and potash-bearing rocks, deposits would tend to be deep, thin, and discontinuous if they occur. Thus, the low rating of f2/c2 implies a potential for small deposits of less than 1 million metric tons to occur.

- Hydropower

The San Rafael River runs through nearly vertical-walled incised canyons creating the moderate potential for hydropower dam sites. The sites are located near the San Rafael Reef and Black Box. Assuming that all water would run through the turbines and that operating efficiency would be 85 percent, the dams would be about 20 to 30 feet and 50 to 75 feet in height, respectively. Interest in the identified sites has not been expressed.

The WSA was rated with a moderate favorability of f3 to produce up to about 15 megawatts of hydroelectric capacity. The potential was assigned on the basis of two sites identified by the Federal Energy Regulatory Commission. The high certainty rating of c4 is given due to the presence of a perennial stream, the San Rafael River (SAI, 1982).

- Locatable Minerals

There are 111 mining claims which cover 2,220 acres.

- Uranium and Associated Minerals

Most significant uranium deposits in the San Rafael Swell occur in the Chinle Formation where mineralized solutions have migrated to a favorable host sandstone. The formation outcrops in the WSA in the cliff faces north of the San Rafael River, on the faces of the WSA's mountains, and in the cliffs south of the San Rafael River where it cuts the San Rafael Reef. Most large deposits found in the San Rafael Swell are in the southern belt favorable to uranium occurrence, roughly paralleling the Muddy and Dirty Devil rivers. The Mexican Mountain WSA is in the northern belt, roughly paralleling the San Rafael River through the San Rafael Swell and extending southeast into Labyrinth Canyon.

Most uranium occurrences are within about 30 feet of the contact between the Moenkopi and the Chinle formations, and there are a few small-scale prospects in the vicinity of the WSA. Workings in Red Canyon on the boundary of the WSA are abandoned. All deposits at or near the surface in the WSA have probably been located, while subsurface deposits of unknown size are certain to be present. BLM estimates that up to 1,000 met-ric tons of uranium oxide could be produced from the WSA in the long-term future. Numerous mines outside the WSA in the north belt have generally produced less than 500 metric tons of uranium oxide. Potential is mainly limited to subsurface deposits that would require considerable drilling to locate and would be expensive to mine.

Vanadium exists in the San Rafael Swell and production is related to uranium, as discussed above.

The moderate favorability rating of f3 for uranium/vanadium indicates an estimated deposit of 500 to 1,000 tons of uranium oxide. The high certainty rating of c4 reflects the WSA's position along a belt of known uranium deposits from which production has occurred (SAI, 1982).

- Copper, Lead, Zinc, and Silver

Also associated with uranium are copper, lead, zinc, and silver. The potential for commercial quantities of zinc or silver is very low. They are generally only found in small quantities.

Because copper occurs widely in the Colorado Plateau region, commonly in association with uranium, the Mexican Mountain WSA was rated low (f2/c2). Even though the Chinle and other exposed rocks are not considered particularly favorable for copper, the occurrence of this mineral cannot be completely ruled out. One recorded copper mine (the Copper Globe) located about 30 miles southwest from the WSA produced copper from the San Rafael Swell prior to 1920. Deposits present in the WSA would be expected to be small, or less than 50,000 metric tons of contained copper.

- Manganese

The Chinle Formation, an occasional host rock for manganese, crops out in the WSA giving the area some favorability for manganese. No direct data are available and there are no known surface occurrences, mines, or known deposits in the vicinity. Therefore, the mineral potential rating for manganese is a low f2/c1 and any deposits in the WSA are not expected to be more than 100 thou-sand metric tons of 40 percent manganese (SAI, 1982).

- Gypsum

Gypsum is present in the Carmel Formation. Potential uses would have to be local as the WSA is too far from principal markets to compete economically. Gypsum is relatively common in occurrence in the region. Potential local needs, such as coal mine dusting, could be met by deposits outside the WSA (USDI, BLM, 1987).

- Sulphur

Sulphur is present in and around Sulphur Springs, along the San Rafael River south of the lower Black Box. The deposit is not extensive, has not been developed, and can only be reached by trail. Potential for development is low (USDI, BLM, 1987).

- Salable Minerals

Sand, gravel, and building stone are present along the San Rafael River. Surface collection of building stone has occurred just outside the WSA, west of Red Canyon along the river road. Demand is limited and the present area is adequate. While sand and gravel deposits occur, they are not of economic interest due to their location.

Wildlife Including Special Status Species

A variety of wildlife habitat exists in the Mexican Mountain WSA, but severe environmental constraints limit the number of most species present. Major species of interest include desert bighorn sheep, golden eagle, prairie falcon, peregrine falcon, and potentially black-footed ferret. Angora goats, although not considered wildlife, are present and compete with bighorn sheep.

Twenty-four bighorn sheep were released just south of the WSA in 1978 to re-occupy historical habitat. Within the WSA, 56,150 acres are bighorn sheep range, representing 27 percent of the total range for the North San Rafael herd. No fawning areas have been identified for the herd at this time. A total of six sheep, one ram and five ewes were released in 1986. In February 1988, an additional 10 head of bighorn

sheep were released in Spring Canyon. Present population within the WSA is estimated at 49 sheep while prior stable carrying capacity is considered to be 387 animals. Five spring developments and one catchment along the reef and in Box Flat have been proposed to improve bighorn sheep habitat.

Mule deer also utilize the WSA, although in very small numbers. The entire WSA is included in the range for Deer Herd Unit 29, representing about 2 percent of the total range for the herd. Present population in the WSA is estimated to be at the carrying capacity of 66 deer. This deer range requires about 900 acres to support each deer.

Cougar are also present but in small numbers due to the small size of prey populations. Desert cottontail rabbit are common. Other common furbearers and small mammals include muskrat, beaver, ringtail cat, gray fox, kit fox, bobcat, coyote, and a variety of rodents. One notable small mammal which could inhabit part of the WSA is the white-tail prairie dog, which is prey for the black-footed ferret.

The WSA is used by a large number of bird species. Raptors documented as nesting in the WSA include golden eagle and American kestrel. Various other species also nest in the WSA. Migratory game bird species include ducks and the mourning dove, a common summer resident. Chukar partridge also inhabits about 41,130 acres of the WSA. Large numbers of perching song birds and a few shore birds are also present.

The 34 miles of the San Rafael River within the WSA support six known species of fish, including roundtail chub, speckled dace, flat-head minnow, red shiner, flannel mouth sucker, and bullhead sucker.

Three Federally endangered species are or are potentially found in the WSA. The black-footed ferret was identified by the FWS as potentially inhabiting the WSA. While the WSA is within the range for the black-footed ferret, no habitat is known to exist within the WSA. No sightings have been made within the WSA. No prairie dog towns (principal prey) are known to exist, but about 5 percent (2,980 acres) of the WSA has deep soils which might provide suitable locations for prairie dog towns.

Sightings of peregrine falcon (endangered) in or immediately adjacent to the WSA have been documented between 1952 and 1977. About 31,700 acres of potential nesting habitat are found within the WSA. The vicinity between Calf Canyon and Red Canyon, 11,290 acres, has been proposed as critical peregrine falcon habitat by UDWR. Eleven falcon nests and three golden eagle (a sensitive species) nests were identified within the WSA in a 1982 helicopter survey. Bald eagle, an endangered species, have also been sighted in the WSA during spring and fall migrations, although prey is not abundant. Other sensitive species that could occur in the WSA are eight Category 2 candidate species. These are the Great Basin Silverspot butterfly, white-faced ibis, western yellow-billed cuckoo, ferruginous hawk, western snowy plover, Tanner's black camel cricket, southern spotted owl, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

Forest Resources

The dominant forest resource in the WSA is 19,920 acres of scattered pinyon pine and juniper trees. The scattered stands are neither easily accessible nor especially productive. Fuelwood volumes are estimated to be less than two cords per acre. In addition, present access to almost all of the woodland area is poor to nonexistent. Therefore, forest stands within the WSA are considered nonproductive in terms of forest products. More suitable stands for these uses are available elsewhere in the region. No harvest has occurred in the WSA and none is expected in the foreseeable future because more accessible and productive areas are found outside the WSA.

Livestock and Wild Horses/Burros

The WSA contains portions of seven grazing allotments. Table 9 lists these allotments and contains grazing use data for each.

The only range developments located in the WSA are two reservoirs near the San Rafael River road and two short (1.25 total miles) allotment boundary fences. No additional rangeland facilities for livestock are planned within the WSA. The 9 miles of cherry-stemmed road and about 10 of the 20 miles of way in the WSA are used by 10 grazing permittees for livestock management purpose.

Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the Mexican Mountain WSA (USDA, APHIS, 1988).

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Table 9
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Box Flat	26,285	17,443	410	125	134 Cattle	12/06-05/15	1
Calf Canyon	7,522	2,413	199	69	72 Cattle	12/06-05/15	2
Chimney Rock Flat	53,001	2,058	1,200	100	275 Cattle	05/01-11/30	1
Buckmaster	42,880	7,042	858	3	197 Cattle	12/01-04/30	1
North Sinbad	38,990	11,500	3,200	385	350 Cattle	11/01-05/10	8
Mexican Bend	12,490	12,490	977	977	151 Cattle	11/12-05/25	1
Black Dragon	49,640	5,930	3,223	150	644 Cattle	11/01-04/15	1
Unallotted	0	724	0	0	0		0
Total	230,708	59,600	10,067	1,809			15

Sources: BLM File Data.

The Mexican Mountain herd of wild burros, with a herd size of 10 to 15 animals, uses the WSA. Wild horses are not known to occupy the WSA.

Visual Resources

The geological setting of the WSA is clearly its most striking scenic feature. The variations in color, the unusual shapes and forms, and the sheer masses of rock create a vivid and unusual landscape. The river and the vegetation of the WSA add elements which provide texture and color contrasts.

About 54,740 acres (92 percent) of the Mexican Mountain WSA are rated as Class A scenery due to the vertical relief, massive rock outcrops, unusual surface features, presence of the river, and vivid, rich color combinations (Roy Mann Associates, 1977). About 4,600 acres (8 percent) of Class B scenery and one small piece (260 acres near the Buckhorn Draw road) of Class C scenery occur around the edges of the WSA, mainly toward the southwest in areas with less topographic relief and less color variation. The sensitivity to potential changes in the landscape was rated high for groups using the WSA east of Red Canyon and moderate for those using areas to the west. Class B and C scenery areas in the WSA are in a foreground/middleground view area from most vantage points. Management classes adopted are Class II (55,000 acres), mainly for areas with Class A scenery, and Class III (4,600 acres) for the remainder. Under Class II, changes to the landscape should not be obvious, while under Class III they may be evident but should not attract attention. Refer to Appendix 7 in Volume I for a description of the BLM VRM rating system.

Cultural Resources

One quarter section of this WSA (178 acres or 0.3 percent) has been inventoried for cultural resources. Two sites comprised of small lithic scatters with some identifiable tools were recorded. Three other sites have also been recorded within the WSA. All three are rock art sites and are considered to be eligible for the National Register. One has the possible remains of a structure associated with it and another is reported to have had a split twig figurine collected from it. No other inventory is known for the area. Although very little archaeological inventory has been completed in the WSA, a number of sites are known to exist that have not yet been documented. These sites are also rock art sites. Additional rock art sites of interest near the WSA have been documented, including petroglyphs and pictographs in Buckhorn Draw and Black Dragon Canyon. No National Register sites are in the WSA.

There is one known historical inscription dated 1881 in the WSA. The inscription may either be associated with the Old Spanish Trail or the Old Railroad Grade. A remnant of the Old Spanish Trail just north of the

MEXICAN MOUNTAIN WSA

WSA was considered for nomination to the National Register of Historic Places in May 1975. Another remnant is thought to be within the WSA but has not been documented. The trail was a primary travel route between New Mexico and California in the mid-19th century. The Old Railroad Grade was constructed in the 1880s and then abandoned. Worker camps, bridges, and old ties are found along the grade. It was intended to be part of a cross-country rail route and now forms part of the eastern boundary of the WSA.

Swasey's Leap is a narrow point in the Lower Black Box where Sid Swasey, on a bet with his brothers, reportedly jumped a horse across the canyon. At a later date, someone placed poles and an old wagon box across this point to form a bridge. This bridge is still in place but its timbers are rapidly rotting away, and it will probably fall into the canyon bottom in the near future.

Mexican Bend is a location with western outlaw history. It was a frequent camp of the Wild Bunch and evidence of a corral and camp can still be seen at Mexican Bend.

The abandoned Smith Cabin and corrals are located on the east boundary of the WSA.

Recreation

There is road access around most of the perimeter of the WSA. About 9 miles of County Road 6768, the San Rafael River road, is cherry-stemmed out of the WSA. This road receives use for vehicle sightseeing to the east end of the Upper Black Box, for groups hiking or floating the Black Box, and by livestock operators.

No developed trails are within the WSA. The abandoned road segment east of the county road is suitable for use as a trail for about 4 miles. The terrain and vegetation do not prohibit finding or establishing suitable routes for travel on foot, although they may vary in degrees of challenge. Most negotiable routes in the more rugged canyon terrain are limited to drainage bottoms or rims. The San Rafael Reef and the hummocky rock outcrops near its top are negotiable, although slope and terrain features make the climb challenging. Some routes require short, near vertical rock scrambles or technical ascents.

The San Rafael Campground is located outside of and adjacent to the west side of the WSA. It has eight camping units, water (in the summer), toilets, and a capacity for 50 people.

Interpretive guidebooks for the canyon country often have information which applies to the San Rafael Swell. Commercial outfitting services are not presently offered.

Many features that make the WSA attractive to recreationists are discussed above, including the scenic, historical, archaeological, and wildlife values. In addition to these, riparian sites at springs and along the river provide excellent primitive campsites. Outstanding opportunities for other recreational activities also exist.

Floatboating and tubing occur along the San Rafael River. Floatboating can only occur during spring runoff, generally about 2 to 4 weeks during May or June, when flows are adequate. It is limited to small craft, such as a kayak, and during peak flows requires technical maneuvering to negotiate the Black Boxes (upper and lower). Very few parties have successfully floated through this stretch of river. The 2 to 5 mile flat water stretches above, below, and in between the Black Boxes also are floatable at moderate to high water levels. There are generally adequate flows for tubing from May through mid July and in wetter years throughout the summer. Tubing through the Black Boxes requires some maneuvering to avoid obstacles, and occasionally some walking. Both floatboating and tubing are challenging activities in a very scenic setting. The 110 miles of the San Rafael River are being considered in a Nationwide Rivers Inventory, with potential for study and addition to the National Wild and Scenic Rivers System (USDI, NPS, 1982). About 34 miles of the river are within the Mexican Mountain WSA. Since it is an inventory-listed segment, BLM must, as part of its environmental review process, avoid or mitigate adverse impacts to these rivers and consult with the NPS before taking any action that could foreclose wild, scenic, or recreational river status (CEQ, 1980).

The most frequently hiked portions of the WSA are the Black Boxes, when the water level has dropped. Other potential hiking routes are numerous, with the most obvious being the canyon bottoms. Creative route finding is necessary to locate passages out of the heads of most of the canyons. The hummocky landscape on top (to the north) connects all the canyons providing an infinite number of possible routes among the Navajo Sandstone buttes and domes. The

reef itself can be traversed on foot in many locations. However, most of the short, steep canyons in the reef are dead ends. Horses could be used but routes or trails are limited by terrain. Scenic horse trails exist across the hummocky landscape north of the major cliff, in Nates Canyon and along the San Rafael River.

Fishing, hunting, rockhounding, and snow sport opportunities, while present, are limited due to poor fishery productivity, small game populations, lack of known gem quality stones, and generally inadequate snow. The WSA is well suited to hobby activities, such as photography.

A number of technical climbing routes are possible in the Black Boxes, ranging in difficulty from a scramble to a technical rock climb. Similar climbing opportunities may be found in the harder, more resistant sandstone walls, particularly the Navajo, elsewhere in the WSA. The nearest Navajo Sandstone wall known to have been used for technical rock climbing is in Buckhorn Draw.

ORV use in areas around the San Rafael Campground and Buckhorn Draw is a popular activity, particularly on Easter weekend. Heavy use extends down the San Rafael River as far as about Oil Well Draw on the south and Red Canyon on the north. Areas of interest to ORV users also include Mexican Bend and Swasey's Leap. Well established four-wheel drive trails lead east from the cherry-stemmed county road to Mexican Bend north of the San Rafael River. A similar trail also extends from Jackass Benches to a point near Swasey's Leap. Washes along the county road also show periodic evidence of ORV use. Many routes south of the county road are used to access the river or views of the river in the Black Box. Often, rather than for ORV recreation, the more established routes are used for sightseeing by vehicle. Vehicle camping along the San Rafael River occurs in the spring, winter, and fall.

Prickly Pear Flats is another area that receives some ORV use and vehicle camping around established access, with use primarily occurring on Easter weekend. Vehicle recreation also occurs in Box and Jackass Flats, with most use occurring north of the WSA.

Overall, ORV use occurs on about 20 miles of vehicular ways, and directly affects a total of about 3,000 acres in the WSA.

Comprehensive data on current recreational use levels are not available.

Present recreational use in the WSA primarily occurs along the San Rafael River. It is primarily: (1) vehicle-oriented camping, picnicking, or sightseeing; or (2) hiking and/or floating the river through the Black Boxes. It is estimated that ORV use accounts for about 2,500 visitor days per year, while primitive recreational use accounts for about 1,500 visitor days. These estimates are very general approximations.

Land Use Plans

The WSA is BLM-administered public land except for five State sections (2,608 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. Of the 2,608 acres of in-held State land, 1,920 acres are under lease for oil, gas, and hydrocarbons, and all 2,608 acres are leased for grazing. The only current activity on these lands is livestock grazing (UDNRE, DSLF, 1988).

Eight State sections are adjacent to the WSA. One large block of State land is located 1 to 2 miles north of the WSA. Access to this land is not through the WSA. Present use of this block is for grazing and a utility corridor.

Other than 693 acres in public water reserves, no lands within the WSA are under withdrawal for any special use or purpose. The public water reserve withdrawal segregates those lands from all public land laws and nonmetalliferous mineral location. A 130-foot-wide right-of-way (U-10657) for a power-line forms a portion of the east boundary of the WSA. No rights-of-way are inside the WSA. Current access to the WSA is provided by BLM-and county-maintained roads.

Public lands in the WSA are managed according to the Price River and San Rafael MFPs (USDI, BLM, 1979a and 1983b). Of the lands in the WSA, 30,600 acres (51 percent) are covered by the Price River MFP and 29,000 acres (49 percent) by the San Rafael MFP. The San Rafael MFP will be replaced by the San Rafael Resource Management Plan. Wilderness is not addressed in the Price River or San Rafael MFPs. However,

wilderness designation is part of the BLM multiple-use concept and BLM land use planning is linked to the Statewide Wilderness EIS through analysis of the present plans as the No Action/No Wilderness Alternative. Specific management objectives identified in the MFPs for the WSA and immediate vicinity include: (1) finalizing inventory of remnants of the Old Spanish Trail to determine the quality, quantity, and significance of evidence present for potential National Register of Historic Places nomination; (2) development of five springs and one catchment along the San Rafael Reef and in Box Flat, primarily for use by bighorn sheep; (3) continuation of present grazing management and practices; and (4) maintenance of scenic, natural, and primitive recreation values. Existing oil and gas leasing categories would be maintained.

The UDWR has also been active in land use plans for management of wildlife species, including reintroduction of desert bighorn sheep in the WSA and performing an endangered species inventory which led to the identification of 11,289 acres of critical nesting habitat for the peregrine falcon. The majority of the habitat area is within the WSA.

Potential wilderness land uses in the vicinity of the WSA are being studied in five other WSAs in the San Rafael Swell.

In the Emery County Zoning Plan (Emery County Board of Commissioners, 1984), the WSA area is zoned as M&G-1 (mining and grazing).

The Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is located in the central portion of Emery County. Socioeconomic effects related to the WSA are of concern countywide. Table 10 shows the baseline and projected total population data for Emery County.

From 1970 to 1980, the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

Table 10
Baseline and Projected Population and Employment Growth
Emery County

	1980	1990	2000	2010
Population	11,600	12,000	11,900	14,00
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

Emery County contains 4,449 square miles of land or about 2 million acres. About 81.7 percent (1,634,000 acres) of the county is owned by the Federal government, 10.7 percent (214,000 acres) by the State, and 7.1 percent (152,000 acres) by private residents. The WSA includes about 2.1 percent of the acreage in the county.

- Employment

Table 10 shows the baseline and projected total employment for Emery County to the year 2010.

Coal mining and operation of Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's most important source of employment. The local economy is most affected by changes in the coal market and had periods of boom and bust. Green River has not grown in the past 30 years. Major employment for Green River includes mining, government, agriculture, and tourism.

Emery County is part of the Southeast MCD. Table 11 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by

about 27 percent and that services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

Table 11
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Past activities in the WSA that could be of local economic consequence include mineral assessment, livestock production, and dispersed nonmotorized recreation. Table 12 summarizes sales and revenue related to the Mexican Mountain WSA. Appendix 9 in Volume I identifies the multipliers used to estimate local sales and Federal revenues.

Table 12
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	0	$2,240
Mining Claim Assessment	$11,100	0
Livestock Grazing	$36,180	$2,786
Recreational Use	$16,400	0
Total	$63,680	$5,026

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has 111 mining claims that are current in assessment work. Regulations require a $100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy. Fifteen livestock operators have grazing privileges in the WSA. Based on the consumption of 1,809 AUMs of forage by cattle, it is estimated that the WSA accounts for $36,180 of livestock sales, including $9,045 of ranchers' returns on labor and investment.

The WSA's recreational use is moderate. Local expenditures are neither significant to the region nor to any particular business. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that the Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Mexican Mountain WSA is estimated as about 4,000 visitor days/year resulting in a total estimated expenditure of $16,400 annually.

The WSA generates revenues to the Federal Treasury from two sources: livestock grazing and mineral leasing. Within the WSA, about 1,120 acres are currently leased for oil and gas. At $2 per acre, this generates about $2,240 annually. Half of this, or about $1,120 is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 1,809 AUMs of forage consumed by livestock in the WSA and a grazing fee average of $1.54, the WSA annually accounts for $2,786 of grazing fee revenues to the Treasury. Fifty percent of this is allocated back to the local BLM district for the construction of range improvement projects.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives section for the Mexican Mountain WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on

55,000 acres; management under oil and gas leasing Category 4 (closed to leasing) on 20,800 acres; oil and gas leasing Category 3 (no surface occupancy) on 9,010 acres; and ORV limitations on 30,600 acres).

In the foreseeable future, disturbance of approximately 80 acres from uranium exploration and development, from development of springs and water catchments, and from development of access to State inholdings would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas, mainly in the western and central portions of the WSA. Most special features, including geologic features, special status species, wildlife associated with wilderness, wild burros, cultural values, and perennial streams, would not be significantly affected because the direct disturbance would involve only 0.1 percent of the WSA. Some Class A scenery could be reduced in quality in the disturbed and surrounding areas. Proposed water developments would benefit wildlife special features associated with wilderness because of increased water sources. Appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activities. Refer to the Cultural Resources and Vegetation and Wildlife Including Special Status Species sections for more information.

During the period of activity, the visual and audible disturbance from mineral exploration and development, from water developments, and from providing access to State in-holdings would reduce opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 10 percent (5,960 acres) of the WSA could be so affected in the foreseeable future.

In the foreseeable future, new trails formed by ORV use and sights and sounds during the period of activity could reduce naturalness and opportunities for solitude and primitive recreation in the accessible portions of the unit. As much as 20 percent (11,920 acres) of the WSA could be directly or indirectly affected. Wilderness-dependent wildlife would be disturbed by vehicular activity, as could special status species. Because vehicle access and ORV use would increase, vandalism of special cultural resource values similar to that occurring in adjacent areas (i.e., Buckhorn Draw) could take place. Monitoring of ORV use would be necessary to avoid significant impacts to these values.

The gradual increase in visitor use would be largely motorized in nature and is expected to reduce the quality of wilderness values in heavily used portions of the WSA.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase. Possible upstream development over the long-term future could affect water flows in the San Rafael River and related wilderness values in the WSA.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 80 acres. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 17,880 acres. Special features may be significantly affected by ORV use and monitoring would be necessary.

- Impacts on Vegetation Including Special Status Species

Implementation of the No Action/No Wilderness Alternative would result in surface disturbance on 80 acres (0.1 percent of the WSA). Some Class A scenery would be reduced in quality in disturbed and surrounding areas. This would not significantly alter any vegetation type in the WSA. However, there is some potential that the two threatened, three endangered, and four Category 1 and 2 candidate plant species which may occur in the WSA could be impacted by continued ORV use on the 29,000 acres open for vehicle access. On the remaining 30,600 acres, vehicle use is limited to existing roads and trails. Intensive monitoring efforts would be initiated in the foreseeable future. BLM would initiate a public-awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various man-agement options for habitat preservation. There is also slight potential that individual plants of the threatened, endangered, or other special status species could be disturbed by locatable minerals exploration and development. This situation would only exist where such mineral operations would occur on sites of 5 acres or less, where a plan of operations and approval are not required under 43 CFR 3809. The Endangered Species Act and subsequent regulations apply to these operations and any

loss would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species. Before authorizing any surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, it can be reasonably concluded that the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Vegetation types and populations of threatened, endangered, or other special status plant species would not be significantly affected by mineral-related surface disturbances. Impacts from ORV use on 29,000 acres would be monitored and corrective measures taken to protect populations special status species.

- Impacts on Water Resources

Since precipitation is low and the estimated soil disturbance is only 80 acres, no significant increase in sedimentation or change in total dissolved solids, including salt production, is expected to occur.

Due to restrictions on development imposed by oil and gas categories, guidelines for protection of riparian habitat, and public water resources, potential surface disturbance of 80 acres would not decrease water quality in the WSA.

Existing and future water uses within tor upstream of the WSA would not be affected because there would be no restrictions on water uses imposed by wilderness management.

Conclusion: The No Action/No Wilderness Alternative would not significantly alter present or future water qualtiy or uses.

- Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to surface disturbance or human interference, could be adversely affected by possible surface disturbance (80 acres) associated mainly with energy and mineral exploration and development, especially if this disturbance were to occur in the form of roads and drill pads. Species most likely to be affected would be bighorn sheep and nesting raptors, including golden eagle and peregrine falcon.

Of the 56,150 acres of bighorn sheep habitat within the WSA, up to 320 acres could be rendered unsuitable by development and the encroachment of human activity. Most of this is likely to occur in the eastern two-thirds of the WSA. While bighorn sheep populations would be expected to continue to increase from the present population of 49, carrying capacity would be reduced from 387 to 385 animals.

Raptor nesting adjacent to existing and newly established vehicle use areas could be adversely affected where use is concentrated. Suitable nesting habitat for peregrine falcons (320 acres) would not be significantly reduced over time. Available nesting habitat for other raptors should not diminish significantly within the WSA. Future use of the 11 known falcon nests and three known golden eagle nests could be influenced.

In addition, there is a slight potential that individual animals of the other two endangered and eight sensitive species that may occur in the WSA could be disturbed by locatable minerals exploration and development. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under the 3809 regulations. The Endangered Species Act and subsequent Regulations apply to these operations and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species.

Prior to authorizing any surface-disturbance activities (locatable mineral operations subject to 43 CFR 3809 restrictions, leasable mineral activities, water devel-opments, and new access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status animal species would be preserved with the level of mineral, water, and access development that is projected.

Continued ORV use on 29,000 acres open to ORV use and 30,600 acres available for vehicle use on existing roads and trails could adversely affect bighorn sheep and raptor nesting along cliffs adjacent to vehicle-use areas. Intensive monitoring efforts would be initiated to determine if populations of these species as well as others, including special status species which may occur in the WSA, would be lost with continued ORV use. BLM would also prepare a management plan which would consider various management options for habitat preservation.

Conclusion: Only about 0.1 percent (80 acres) of thee wildlife habitat in the WSA would be disturbed. This would not significantly affect wildlife habitat or populations. Populations of bighorn sheep and raptors would be affected by ORV use and monitoring and enforcement of protective measures would be necessary.

- Impacts on Livestock Management

Domestic livestock grazing would continue as authorized in the San Rafael and Price River MFPs. The estimated 1,809 AUMs currently allocated in the WSA are assigned to 15 livestock permittees. Existing range facilities (two reservoirs and two short [1.25 miles] allotment boundary fences) could be maintained by mechanical methods. Motorized vehicles are currently being used along the cherry-stemmed road and into the WSA along the way to Mexican Bend to manage livestock in the WSA. With this alternative, motorized vehicle use along the way to Mexican Mountain could continue.

The herd of wild burros within the WSA would remain and would be managed as per the Wild and Free Roaming Horse and Burro Act (as amended) (Ninety-Second Congress of the U.S., 1971).

Conclusion: Existing levels of grazing use and current management practices would not be affected.

- Impacts on Cultural Resources

Minimal surface disturbance (80 acres) is expected in the foreseeable future. The entire WSA would remain open to mineral location. Mineral leasing would be allowed on 38,800 acres but 9,010 acres would be closed to surface occupancy. The degree and potential impacts to cultural resources are unknown. All sites in the unit would continue to receive protection under existing Federal and State antiquities laws. Any surface disturbance would be preceded by standard inventory and mitigation procedures; however, some sites, especially those that can not be identified by surface inspection, may be inadvertently damaged or lost. In addition, increased human presence would provide opportunities for illegal artifact collection and vandalization (Nickens, et.al., 1981).

The WSA would remain open to ORV use and vehicular access under this alternative although vehicle use is limited to existing roads and trails on 30,600 acres. ORV activity currently constitutes a major recreational use of the unit and may increase in the future. Some archaeological sites may receive unintentional damage as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of vehicular traffic. Artifacts may be broken or shallowly buried archaeological deposits may be disturbed and exposed to erosional processes. In addition, general vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens, et al., 1981).

Under this alternative, archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without restrictions for protection of other wilderness values maintenance.

Conclusion: Existing levels of grazing use and current management practices would not be abffected because access, grazing levels and management techniques would remain as at present.

• Impacts on Recreation

ORV use would be limited to existing roads and trails on 30,600 acres in accordance with the Price River MFP. Total ORV use and recreational use associated with vehicles in the WSA are estimated at 2,500 visitor days per year. The quality of and opportunities for primitive recreation could be directly and indirectly reduced by sights and sounds on up to 20 percent (11,920 acres) of the WSA where ORV use occurs.

Primitive recreation values would be foregone on and around the 80 acres where potential mineral and energy and other surface-disturbing activities could take place. Direct and indirect sights and sounds from development would reduce primitive-recreation opportunities on up to 10 percent (5,960 acres) of the WSA during the period of activity.

The future increase in recreational use of the Mexican Mountain WSA is unknown. However, based on a review of several projections (UDNRE, DPR, 1985; UDNRE, ORA, 1980; Utah Office of Planning and Budget, 1984; Cordell and Hundee, 1982; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year over the next 30 years. At this rate, overall recreational use is expected to increase from 4,000 current visitor days per year to be between 6,540 to 34,860 visitor days per year at the end of 30 years. Assuming that the 2 to 7 percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 1,500 visitor days per year to between 2,830 to 13,060 visitor days per year over the next 30 years. Likewise, recreational activities utilizing vehicular access would increase from about 2,500 visitor days per year to between 4,700 to 21,800 visitor days. However, use may have to be curtailed to protect primitive and other resource values and maximum use may not occur.

Within the WSA, the segment of the San Rafael River with potential for study and addition to the National Wild and Scenic Rivers System would continue to be managed under the provisions of the August 2, 1979, Presidential Memorandum regarding Wild and Scenic Rivers and National Trails. An August 10, 1980, Council on Environmental Quality Memorandum outlines specific actions for interagency consultation to avoid or mitigate adverse effects on rivers in the Nationwide Rivers Inventory. These procedures are required as part of the environmental analysis process regarding any proposed action that would impact an inventory river. The wild and scenic values of the river would not receive the added protection that would result from wilderness designation. Possible upstream development over the long-term future could affect water flows in the San Rafael River and the related recreational use.

Conclusion: The quality of and opportunities for primitive recreation would be directly lost on 80 acres, and directly and indirectly reduced on up to 17,880 acres of the WSA due to sights and sounds of ORV use and uranium development. Both primitive and mechanical recreational use would increase, but vehicles would be restricted to existing roads and trails on 30,600 acres. Thirty-four miles of the San Rafael River, a wild and scenic river inventory segment, would not receive the addieional protection that wilderness designation would provide.

• Impacts on Local Economic Conditions

There would not be changes in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected. Local income related to existing mining claim assessment (refer to Table 12) could continue and increases in income could occur if new mining claims are located in the WSA. The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, with the exception of uranium, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained. However, oil and gas exploration in the long term could result in up to 10 temporary jobs (3- to 6-month duration) for each of four projected drilling operations. Exploration and development of uranium in the long term could provide up to a total of 80 permanent jobs for projected operations. Eighty jobs would represent 1.2 percent of the total Emery County employment of 6,700 by the year 2010 (Utah Office of Planning and Budget, 1987). The $2,240 per year in Federal oil and gas lease revenues generated within the WSA could continue. As much as $77,600 annually in Federal lease fees could be continued by leasing of the 38,800 acres open to leasing in the WSA.

Domestic livestock grazing (1,809 AUMs) would continue as authorized in the Price River and San Rafael MFPs, with related income and revenues as shown on Table 12.

Local expenditures related to recreation would continue and could increase from $16,400 to be between $26,814 to $142,926 by the year 2020 for a net increase of up to $126,530.

Overall, the local economic impact would not be considered significant, although the future potential for development would remain.

Conclusion: Present economic conditions would not be affected. Locatable mineral activity could increase employment in Emery County by 1.2 percent (80 jobs) by the year 2010. Recreation-related expenditures would contribute up to $142,926 annually to the local economy by the year 2020. Livestock grazing would contribute $36,180 annually in livestock sales and $2,786 in Federal revenues. Present and future oil and gas leases could contribute up to $77,600 annually in Federal and State lease revenues.

All Wilderness Alternative (59,600 Acres)

- Impacts on Wilderness Values

Designation and management of all 59,600 acres as wilderness would contribute to the preservation of the wilderness values in the Mexican Mountain WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for primitive, unconfined recreation would be protected on all 59,600 acres. Solitude would be protected on approximately 53,600 acres that meet and 6,000 acres that do not meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including scenic features, geologic features, cultural values, burros, wildlife associated with wilderness, special status species, and perennial streams including the wild and scenic values of the San Rafael River, would also be protected. Established habitat for species sensitive to development would be protected, increasing the probability of wildlife sightings. Scenic values would be preserved by excluding impairing surface-disturbing activities.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 20 acres is anticipated from exploration and development of valid mining claims, from development of access to State in-holdings, and from development of springs and a water catchment. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas, at least until activities and noise cease and reclamation is complete. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 2 percent (1,192 acres) of the WSA could be so affected. Most special features would not be significanlty affected because the disturbance would be minor (involving only 0.03 percent of the WSA). In addition, appropriate measures would be taken to protect endangered and other special status species and cultural resources prior to any surface-disturbing activity (refer to the Cultural Resources and Wildlife and Vegetation Including Special Status sections for more information). Some Class A scenery could be reduced in quality in disturbed and surrounding areas. Spring developments would benefit wildlife special features associated with wilderness because of increased water sources.

Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights cold not be otherwise achieved. The spring development, on the other hand, would be designed to meet wilderness management criteria and, upon completion, would not be substantially noticeable in the area as a whole. In total, the disturbances would not be substantially noticeable in the area as a whole.

Vehicular use of existing ways and other ORV activity would generally cease with ORV closure, improving opportunities for solitude and primitive recreation. It would, however, be administratively difficult to totally eliminate ORV use from the area, even with signing and patrol. This is due not only to the high amount of ORV use occurring in and adjacent to the WSA, but also because the WSA's configuration makes some boundaries difficult to define, and some of the terrain of the WSA is readily accessible for vehicles. The WSA east of Red Canyon would be particularly difficult to manage as wilderness because of its configuration and the fact that the area receives significant amounts of ORV use. Solitude in parts of the WSA could continue to be affected by off-site influences. Areas along the cherry-stemmed San Rafael River road would continue to be influenced by vehicle use, as would areas near the San Rafael Bridge Campground, Window Blind Peak, Assembly Hall Peak, and along the canyon walls between Buckhorn Draw and Red Canyon.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for long-term development of existing mining claims and State inholdings is not accurately known but would be less with this alternative than with No Action/No Wilderness Alternative due to application of mitigation that would protect wilderness values subject to valid existing rights.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values. Some loss of solitude could occur in the canyon areas adjacent to the WSA on peak-use days. The major visitor uses would be expected to be hiking, tubing, and camping.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 20 acres. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,192 acres. Special features would be preserved overall, although some Class A scenery would be disturbed and reduced in quality. The wild and scenic river values of the San Rafael River would receive additional protection.

- Impacts on Vegetation Including Special Status Species

Access and disturbance in the WSA due to exploration and development of mining claims construction of new access roads to in-held State lands, and spring developments would be only 20 acres as compared to 80 acres with the No Action/No Wilderness Alternative. Twenty acres of surface disturbance would not significantly alter any of the vegetation types in the WSA.

Any surface disturbance would be preceded by site-specific clearances of the disturbed areas as discussed in the No Action/No Wilderness Alternative. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, potential populations of threatened, endangered, or other special status plant species would be preserved with the All Wilderness Alternative.

ORV use would be precluded with this alternative and this would protect the special status plant species in the WSA.

Conclusion: Vegetation types and populations of threatened, endangered, or other special status plant species that may occur in the WSA would be protected.

- Impacts on Water Resources

Since precipitation is low and the estimated soil disturbance is only 20 acres, no significant sedimentation or change in total dissolved solids, including salt production, is expected to occur.

Approximately 34 miles of the San Rafael River flows through the WSA. The San Rafael River provides opportunities for diversified recreational use such as kayaking and floatboating during portions of the year.

Even though existing water uses would not be affected, wilderness designation could hamper future proposals or projects that would consumptively use water upstream of the WSA, or significantly alter flow through the WSA. Projects could be hampered because changes in use, changes in points of diversion, or transfer of water rights could be protected by the Federal government to maintain flow through the WSA.

Potential upstream uses include irrigation, steam power generation, mining, and municipal uses in Emery County.

Conclusion: In the short term, wilderness designation would not significantly alter water quality or uses. In the long term, future water diversions and new consumptive uses in the San Rafael River system upstream of the WSA may be restricted or precluded.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

    Designation of the Mexican Mountain WSA as wilderness would have an impact on the exploration for oil and gas. Post-FLPMA leases (1,120 acres) would be subject to wilderness protection stipulations and likely would not be further explored or developed. As leases expire, they would not be reviewed and any undiscovered oil and gas

reserves would not be identified or placed in production. However, the probability of development following exploration is low even if the area is not designated wilderness.

The potential for the occurrence of tar sand within the WSA is high for small to moderate deposits. Present information, however, does not suggest oil production from tar sand is likely in the WSA even with the No Action/No Wilderness Alternative. Therefore, the All Wilderness Alternative would not affect expected use of the tar sand resource in the foreseeable future.

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

The potash-bearing rocks in the WSA are expected to be low grade, thin, deep, and discontinuous. Any loss of potash would not be significant due to the extensive potash resources elsewhere in the region and a low probability of development within the WSA.

- Locatable Minerals

There are 111 mining claims covering 2,220 acres (4 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void.

Uranium/vanadium-bearing strata are known to occur in the WSA.

With the exception of uranium, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Because only valid claims could be developed following designation and only a portion of the uranium in the WSA would be in valid claims, recovery of an unknown portion of the uranium in the WSA would be foregone. Therefore, this alternative would probably not result in a significant loss of recoverable copper or maganese or associated minerals, but in the long term the loss of uranium recovery could be important.

- Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these materials from the WSA is predicted.

Oil and gas exploration opportunities would be foregone.

Conclusion: Oil and gas exploration opportunity would be foregone. Wilderness designation would also limit exploration and development opportunities for uranium in the WSA to those under valid mining claims at the time of designation. An unknown portion of the uranium in the WSA would be foregone. No other significant locatable or leasable mineral production would be lost.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to surface disturbance and human interference, would benefit through protection of habitat and provision of solitude.

Raptor nesting along cliffs adjacent to heavily used vehicle routes near the west portion of the WSA would continue to be affected by human activities. The 31,700 acres of peregrine falcon nesting habitat and 59,460 acres of raptor nesting habitat in the WSA would be protected from vehicle intrusions. Surface-disturbing activities would be limited to about 20 acres. Limitations on surface disturbance would avoid abandonment of nests and discouragement of future nesting. Eleven known falcon nests and three known golden eagle nests would be within the designated wilderness.

Five small spring developments and one catchment proposed for bighorn sheep would require construction in a manner not impairing to wilderness values. This would improve distribution, and bighorn sheep populations ultimately would be expected to expand from 49 up to about 387 animals due to habitat protection afforded over the 56,150 acres of range within the area designated.

ORV use would be precluded and wildlife habitats, including those of the special status species which may occur in the WSA, would be protected from inadvertent vehicle damage. Sensitive life cycles would be less likely to be disturbed.

There are no proposed vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 20 acres of disturbed areas.

Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife, although visitor/wildlife encounters would be infrequent due to low wildlife populations. Mining-claim development projected for 8 acres, construction of new access to inheld State land for 10 acres, and new spring developments for 2 acres could have a disruptive effect on a few animals, but would not significantly affect overall wildlife populations or conditions in the WSA.

Prior to any surface disturbance, site-specific clearances for special status species would occur. If necessary, consultations with FWS would be made and appropriate mitigation measures would be set as discussed for the No Action/No Wilderness Alternative. No impacts to special status species are projected for the All Wilderness Alternative.

Conclusion: Approximately 0.03 percent (20 acres)of the habitat in the WSA would be disturbed. Wilderness designation would protect all wildlife species with additional opportunities for solitude. Special status species would be protected.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized in the San Rafael and Price River MFPs. The estimated 1,809 AUMs of forage currently allocated in the WSA would remain available. Existing developments (two reservoirs and two short allotment boundary fences) would be used and maintained in the same manner as the past based on practical necessity and reasonableness. Vehicle access for livestock permittees would be regulated by BLM. Restriction on the use of vehicles on the approximately 20 miles of way would be an inconvenience to the 15 permittees using the seven allotments and would increase the cost of livestock management. The cherry-stemmed road to Mexican Bend is critical to good livestock management and any limitations put on the use of this "road" would impact livestock management. However, this road would be cherry-stemmed and could be used without restrictions.

The herd of wild burros would continue to use the area.

Conclusion: Restrictions on access would necessitate changes in livestock management and supervision and cause inconvenience and increased management costs for 15 livestock permittees.

- Impacts on Cultural Resources

The entire 59,600-acre unit would be closed to new mineral location, mineral leasing, and vehicular access. About 20 acres would be disturbed in the foreseeable future. Some 8 acres would be disturbed due to locatable mining activities. About 10 acres would be disturbed due to construction of new access to inheld State lands, and 2 acres would be disturbed with spring development. Any surface disturbance would be preceded by standard inventory and mitigation procedures, and FWS intentional or unintentional impacts to cultural resources would occur under this alternative.

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility of wilderness designation may encourage large scale looting. The rock shelter and rock-art sites in the WSA may meet these requirements (Wylie, 1988). The protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restriction of wilderness designation (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied.

Conclusion: Cultural resources would be protected by reducing potential surface disturbance and eliminating ORV use and vehicular access. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.

- Impacts on Recreation

The entire 59,600 acres would be closed to recreational ORV use. Some unauthorized ORV use, however, could be expected to continue in well established use areas. About 20 miles of ways would be closed. Traditional motorcycle use areas south of the San Rafael

Bridge Campground and along Indian Bench would also be closed. Areas outside of the WSA, west of Red Canyon and south of the WSA, also are proposed for closure as per the San Rafael MFP. The 2,500 visitor days associated with ORV and other vehicle-related recreation would be foregone. In addition, motorized recreational use of between 4,710 to 21,800 visitor days annually that could occur by the year 2020 would be foregone. The cherry-stemmed road along Indian Bench would continue to be available to vehicles.

Primitive recreational values would be preserved over most of the WSA. Recrational use of the 34 miles of the San Rafael River in the WSA would be enhanced by specific wilderness management goals formulated to protect use of the river. The wild and scenic values of the river would receive additional protection.

Based on a 2 to 7 percent annual increase, primitive recreational use would increase from the current 1,500 primitive visitor days per year up to 13,060 annual visitor days by the year 2020. Up to 21,800 motorized visitor days per year of use that could occur by the year 2020 would be foregone, however.

The quality of primitive recreational opportunities would be directly reduced on 0.03 percent (20 acres) of the WSA and indirectly reduced on up to 2 percent (1,192 acres) as a result of uranium exploration and development, construction of access roads to State inholdings, and water developments.

Conclusion: Primitive recreational values would be preserved over most of the WSA. The quality of the primitive recreational opportunity would be directly reduced on 0.03 percent (20 acres) of the WSA and indirectly reduced on 2 percent (1,192 acres). Primitive recreational use would increase from the present 1,500 visitor days per year to up to 13,060 visitor days while up to 21,800 motorized visitor days per year would be foregone by the year 2020. Thirty-four miles of the San Rafael River, a wild and scenic river inventory segment, would receive additional protection.

- Impacts on Local Economic Conditions

Current trends in population, employment, and local income distribution would not be affected. Over the long term, wilderness designation would cause a slight change in local economic conditions from those that would occur with the No Action/No Wilderness Alternative. Valid existing mining claims could be developed, but designation would preclude new leases and claims for being established in the WSA. Except for uranium, the potential for mineral development is low in the foreseeable future and it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. Over the long term, exploration and development of the uranium resource could proceed on valid claims filed at the time of designation. It is assumed that such claims would exist and exploration and development would occur under more restrictive conditions than the No Action/No Wilderness Alternative. It is anticipated that up to 40 jobs could be provided by mining operations. This would be one-half of those available with the No Action/No Wilderness Alternative. In addition, any local income related to assessment of future mining claims or income associated with possible mining in the distant future would be lost.

Present grazing levels would be allowed and added restrictions would not be such as to prevent the maintenance and replacement of rangeland improvements. Livestock use and ranchers' income would continue as at present with $36,180 annually of livestock sales and $9,045 of ranchers' returns to labor and investment. Federal grazing fee revenues of about $2,786 (at $1.54 per AUM) would continue.

Nonmotorized recreational use would increase (refer to the Recreation section). Related local expenditures would be relatively small (average of $4.10 per visitor day Statewide), but could increase from $6,150 presently attributed annually to primitive-type recreation to between $11,603 to $53,546 per year for a net increase of up to $47,396 per year. The elimination of recreational ORV travel in the WSA would reduce related local expenditures as compared to the No Action/No Wilderness Alternative.

Using the $4.10 average expenditure per visitor day, a loss of $10,250 per year from current ORV use would be expected. Since ORV use would be precluded in the future, projected future increases in local expenditures due to motorized recreational use of between $19,300 to $89,380 per year would not occur. However, much of these ORV-related expenditures would not be lost as some use would transfer to other ORV-use areas in the region.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 1,120 acres now leased would cause an eventual loss of $2,240 per year to the Federal Treasury. The closure of an

additional 37,680 acres potentially available for lease would cause a potential loss of $75,360 per year to the Federal Treasury. In each case, without designation, the State would have received half of these revenues.

Conclusion: Over the long term, depending on the degree of impact on use of water from the San Rafael River, wilderness designation could impede or interfere with major economic developments in Emery County. The magnitude of the potential impact is unknown.

Partial Wilderness Alternative (Proposed Action) (46,750 Acres)

- Impacts on Wilderness Values

Wilderness designation of 46,750 acres would contribute to preservation of the area's wilderness values. This Partial Wilderness Alternative would reduce the potential for surface-disturbing activities that could impair wilderness values in the designated area. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure including closure of 10 miles of existing way, and closure to future mineral leasing and location. Naturalness and outstanding opportunities for solitude and primitive, unconfined recreation (all acres in the designated area meet the standards) and special features, including at least 75 percent of most values and 26 of the 34 miles of river, would be protected in the designated area.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from mineral exploration and development, from providing access to State in-holdings, and from development of springs and a water catchment would occur on up to 18 acres within the designated portion and on up to 16 acres within the nondesignated portion. Special features would be largely preserved because disturbance would involve only 0.06 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Refer to the Cultural Resources and Vegetation and Wildlife Including Special Status Species sections. Some Class A scenery would be reduced in quality in disturbed and surrounding areas. Wild and scenic river values would receive additional protection on 26 of the 34 miles of the San Rafael River in the WSA.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas including up to 5 percent (2,980 acres) of the WSA. About 50 percent of this type of impact would be in the designated area.

Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation somewhat in the WSA, although vehicular use of 10 miles of way and other open-use areas in the nondesignated area would continue to detract from these opportunities during the period of activity, and could reduce naturalness as well. As much as 10 percent (5,960 acres) of the WSA would be affected either directly or indirectly. Vehicular activity in the nondesignated area could result in wilderness-dependent species leaving the area, vandalism of cultural resources, and disturbance of special status species. Monitoring ORV use would help in reducing these potentially significant impacts.

The gradual increase in visitor use in the designated area would be primitive in nature and would be managed so as to protect wilderness values. High vehicular use in canyon areas in the nondesignated portion on peak days could largely detract from the wilderness experience.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known, but would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights.

Conclusion: Wilderness values would be preserved overall in the designated area which is 78 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost from development on 34 acres and indirectly reduced in quality on up to 8,940 acres of the WSA by development and ORV use. Overall special features would be although some Class A scenery would be reduced in quality and ORV use could affect special status species and cultural resources Wild and scenic river values would be protected on 26 of the 34 miles of the San Rafael River in the WSA.

• Impacts on Vegetation Including Special Status Species

Implementation of the Partial Wilderness Alternative would not significantly alter any vegetation type in the WSA. However, there is some potential that the two threatened, three endangered, and four Category 1 and 2 plant species which may occur in the WSA could be impacted by continued ORV use of 10,250 acres open for vehicle access in the nondesignated portion of the WSA (vehicle use would be limited to existing road and trails on 2,600 acres). Continued intensive monitoring efforts would be initiated in the foreseeable future. BLM would initiate a public-awareness effort to inform users in the area of the sensitive nature of the species and stress avoidance of critical areas. BLM would also prepare a management plan which would consider various management options for habitat preservation.

There is a slight potential that individual special status plants could be disturbed by the locatable mineral exploration and development. This situation would only exist where such mineral operations would occur on sites of 5 acres or less, where a plan of operations and approval are not required under 43 CFR 3809 regulations. The Endangered Species Act, and subsequent regulations apply to these operations and any loss would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species. Before authorizing or conducting any surface-disturbing activities (mineral activities subject to 43 CFR 3809 regulations, water developments, and access to State lands), BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status plant species would be preserved with the Partial Wilderness Alternative.

Conclusion: Populations of threatened, endangered, or other special status plant species would be protected. Impacts from ORV use on 10,250 acres would be monitored and corrective measures taken should populations of special status species be threatened. The 34 acres of projected surface disturbance would affect only 0.06 percent of the vegetation in the WSA; therefore, vegetation types would not be significantly altered.

• Impacts on Water Resources

Impacts and conclusions for water resources would be essentially the same as for the All Wilderness Alternative because only 34 acres of the WSA would be disturbed and 26 of the 34 miles of the San Rafael River in the WSA would be in the designated area.

Conclusion: In the short term, wilderness designation would not alter water quality or uses. In the long term, future water diversions and new consumptive uses in the San Rafael River upstream of the WSA may be restricted or precluded.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

  Within the designated portion of the WSA, exploration activities for oil and gas would be impacted. Post-FLPMA leases (about 480 acres) would continue to be subject to wilderness stipulations. No new leases would be issued in the designated portion and, as leases expire, opportunities for oil and gas exploration would cease and any undiscovered reserves would not be produced. Potential for production, however, even if the area is not designated wilderness. About 47 percent (27,840 acres) of the designated portion is already in leasing Category 4 (closed to leasing) and could not be occupied for oil and gas production.

Exploration of oil and gas is not anticipated in the nondesignated area.

No tar sand leases exist within the WSA. The portion of the San Rafael Swell STSA within the WSA would be in the designated area and could not be leased; thus, exploration and development would not occur. This would not result in a significant loss of recoverable bitumen because development is not likely even if the area is not designated wilderness.

Due to low potential, no impacts to use of geothermal resources are predicted.

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere.

• Locatable Minerals

Approximately 70 existing mining claims covering 1,400 acres are within the area that would be designated wilderness. Exploration and production could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines, but with consideration given to wilderness values. After designation, lands in the WSA that are not under valid claims would be closed to prospecting and production (USDI, BLM, 1981a).

Because only valid claims could be developed following designation, and only a portion of the uranium in the designated area would be in valid claims, recovery of an unknown portion of the uranium would be foregone. The amount of uranium production foregone would be less than with the All Wilderness Alternative because 22 percent of the WSA would not be designated.

In the nondesignated area, there are about 41 existing mining claims covering 820 acres. These claims and future claims could be explored and developed without consideration for wilderness values. Other known mineral deposits (i.e., copper, manganese, etc.) are not likely to be economically producible regardless of partial wilderness designation.

Conclusion: Oil and gas exploration opportunities would be foregone. Partial wilderness designation would limit potential exploration and development opportunities for uranium to areas under valid claims at the time of designation. Although some production would occur, opportunities for production of an unknown amount of uranium would be foregone. No other significant leasable or locatable mineral production would be foregone.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat and increased opportunities to find solitude. This would be a benefit through continued population stability. The carrying capacity would not be as great as with the All Wilderness Alternative due to an estimated total 34 acres of disturbance in the designated and nondesignated areas and possible human encroachment on the 12,850 nondesignated areas.

Of the 56,150 acres of bighorn sheep habitat within the WSA, up to 1,000 could become unsuitable because of development and ORV use. This is expected to occur mainly in the western portion of the WSA. Bighorn sheep populations would be expected to increase from the present population of 49, although carrying capacity would be reduced from 387 to 380.

Raptor nesting could also be affected. Up to 1,000 acres of peregrine falcon and other raptor nesting habitat could be adversely affected by concentrated vehicle use and/or surface-disturbing activity. Peregrine falcon habitat could be reduced from 31,700 acres to about 30,700 acres, while general raptor habitat could be reduced from 59,600 to 58,360 acres.

There is a slight potential that individual animals of the three endangered and eight sensitive species, that may occur in the WSA, could be disturbed by locatable minerals exploration and development in the nondesignated area. This would only exist where such mineral operations would occur on areas of less than 5 acres, where a plan of operation and approval are not required under the 3809 regulations. The Endangered Species Act and Subsequent Regulations apply to these operations, and any losses would be inadvertent. It is not anticipated that mineral-related actions in the WSA would threaten the continued existence of any of the special status species.

Prior to authorizing any surface-disturbance activities (locatable mineral operations larger than 5 acres, water development, and development of access to State lands), BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, the viability of populations of threatened, endangered, or other special status animal species would be preserved with the level of mineral and access development that is projected. However, continued ORV use on 10,250 acres could adversely affect bighorn sheep and raptor nesting along cliffs adjacent to vehicle-use areas. Intensive monitoring efforts would be initiated to determine if populations of these species, as well as others including special status species, which may occur in the WSA would be lost with continued ORV use. BLM would also prepare a

management plan which would consider various management options for habitat preservation.

Conclusion: Approximately 0.06 percent of the habitat in the WSA would be disturbed. Wildlife habitat or populations, including threatened, endangered, or other special status animal species would not be significantly affected by locatable minerals development. Significant impacts would occur to bighorn sheep and raptor habitat in the nondesignated area. Monitoring and enforcement would be necessary.

- Impacts on Livestock Management

Partial wilderness designation would affect domestic livestock grazing essentially the same as the All Wilderness Alternative. Of the estimated 1,809 AUMs allocated in the WSA, about 1,123 would be within the designated portion and 686 within the nondesignated portion. Access would be restricted on about 10 miles of way. This would cause inconvenience and increase the costs of management for the 13 livestock permittees who graze cattle on allotments which would be in the designated area. The road and way to Mexican Bend would be outside the proposed designated area and access would not be affected.

In the 12,850-acre nonwilderness area, livestock grazing would be allowed without wilderness considerations.

The wild burros within the WSA would continue to be allowed.

Conclusion: The Partial Wilderness Alternative would not result in a change in the level of livestock use, but would cause a change in the method of livestock management and supervision with restrictions on access to 10 miles of way. This would cause inconvenience and increase management costs for 13 livestock permittees.

- Impacts on Cultural Resources

Archaeological sites, including all five recorded sites, would be protected by wilderness designation with this alternative. In the designated area, only 18 acres of surface disturbance is expected in the foreseeable future. The entire designated portion would be closed to future mineral location and leasing. The 46,750 acres comprising the wilderness area would be closed to all vehicular access; thus, recorded and unrecorded sites would be protected from any potential damage due to vehicular traffic.

All sites in the nondesignated portion would be protected by existing Federal and State antiquities laws. The nondesignated area would remain open to mineral location and 11,780 acres would be available for mineral leasing (9,720 acres Category 1; 1,110 acres Category 2; and 900 acres Category 3). The degree and potential impacts to cultural resources are unknown. However, they are expected to be light because mineral exploration and development is expected to disturb only 16 acres in the foreseeable future. Any development would be preceded by appropriate inventory and mitigation procedures.

In the nondesignated portion, 10,250 acres would remain open to ORV use. Some archaeological sites may receive unintentional damage as a result of ORV activity. In addition, general vehicular access in the nondesignated area would provide opportunities for illegal artifact collection or vandalism to sites located on the canyon sides (Nickens, et al., 1981).

Conclusion: Archaeological sites including all of the recorded sites would be protected by wilderness designation with this alternative. Sites in the nondesignated portion would continue to receive protection under existing laws, but some inadvertent damage to sites from ORV use would occur.

- Impacts on Recreation

The 46,750 acres designated as wilderness would be closed to ORV use, including about 10 miles of existing ORV trails. Within this area, primitive recreation values for hiking, backpacking, sightseeing, and float-boating on 26 of the 34 miles of the San Rafael River in the WSA would be protected. Areas presently used most frequently by primitive recreation visitors would be preserved.

The quality of primitive recreational opportunities would be directly reduced on 0.06 percent (34 acres) fo the WSA and indirectly reduced on 15 percent (8,490 acres) as a result of uranium exploration and development, constreuction of access roads to State in-holdings, and water developments.

The 12,850 acres not designated as wilderness would provide ORV access on existing roads and trails (2,600 acres) and open ORV use on 10,250 acres. Vehicle access to Mexican Bend would remain open.

Both primitive and ORV types of recreation would benefit from this alternative; however, there would be some conflict in types of use on the 10 miles of

ways that would remain open for vehicle use. This conflict likely would be of greater concern to primitive recreationists than to ORV users.

With this alternative, it is projected that primitive recreation use in the WSA would increase by 2 to 7 percent over the next 30 years. Primitive recreation use could increase up to 13,060 visitor days a year within 30 years. ORV use may initially decrease by as much as 25 percent, but may eventually increase up to about 21,800 visitor days per year as a result of growth in motorized recreational use. Total recreation use could be as high as 34,860 visitor days per year within 30 years. However, motorized and/or primitive recreation use may have to be curtailed to protect wilderness and other resource values, and projected levels may not be reached.

Conclusion: Primitive recreational values would be preserved overall in the designated portion of the WSA. The quality of the primitive recreational opportunity would be directly reduced on 0.06 percent (34 acres) of the WSa and indirectly reduced on 15 percent (8,490 acres). Both primitive and motorized recreational use would increase to reach a total of as much as 34,860 visitor days per year by the year 2020. Twenty-six of the 34 miles of the San Rafael River, a wild and scenic river inventory segment, in the WSA would receive additional protection.

- Impacts on Local Economic Conditions

With this alternative, there would be a slight change in trends of population, employment, and local income distribution from those that would occur with the No Action/No Wilderness Alternative.

In the 46,750-acre designated area, valid mining claims could be continued but new claims would not be located. In the 12,850-acre nondesignated area, both existing and new claims would occur. This alternative would not cause a reduction in local income from existing claims (as shown in Table 12) and there could be up to about a 20-percent increase if new claims are located in the nondesignated area.

The main difference between this alternative and the other two would be in mineral-related sales and revenues. It is projected that two locatable (uranium) mineral operations would occur within the WSA. One would be located in the designated portion and would be developed under more restrictive conditions than the No Action/No Wilderness Alternative. As a result, the Partial Wilderness Alternative would provide up to 60 jobs as compared to 80 with the No Action/No Wilderness Alternative and 40 with the All Wilderness Alternative.

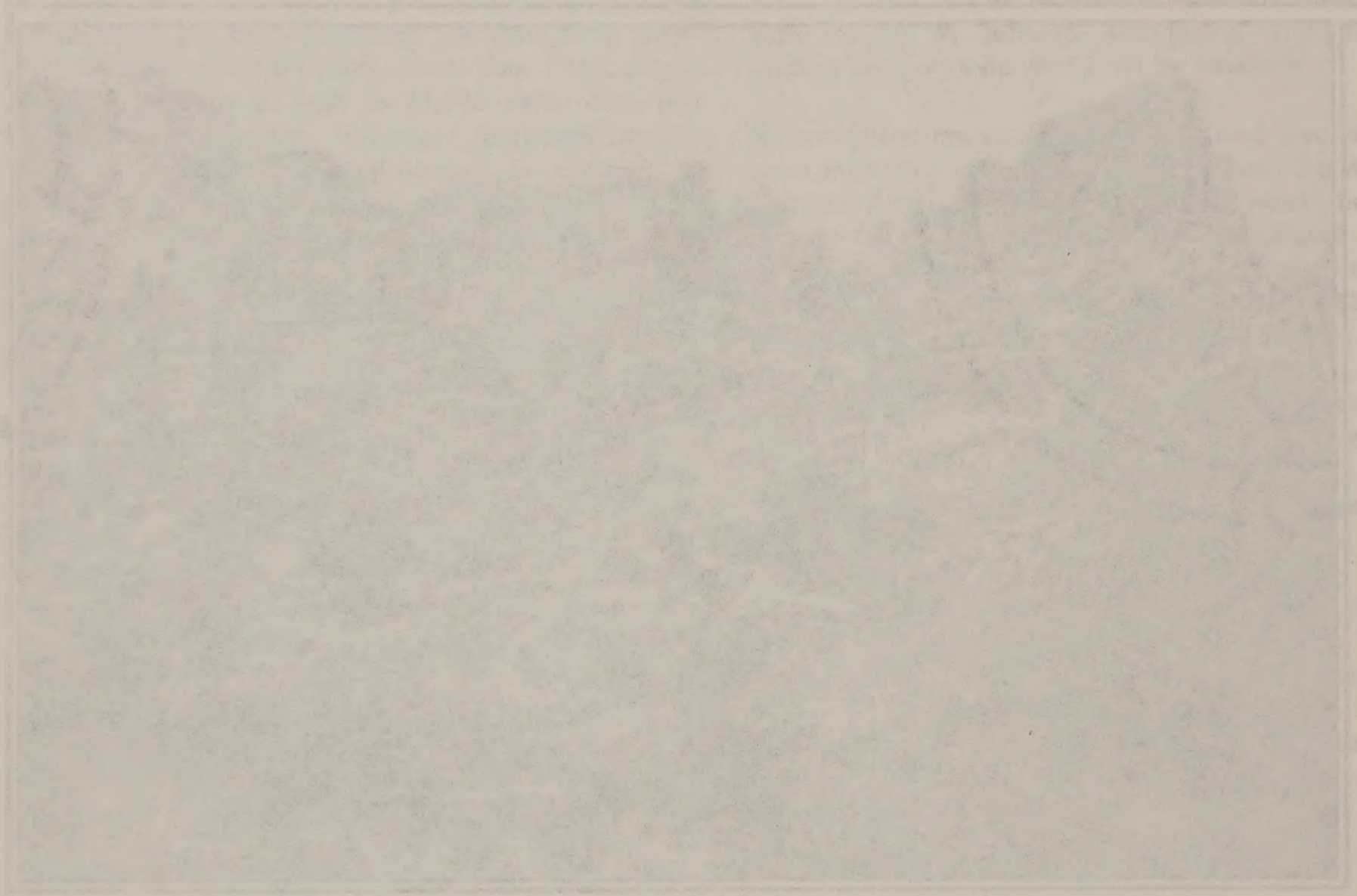
Existing local income of $36,180 resulting from 1,809 AUMs of forage would continue. There would be no future livestock-related impacts in the Calf Canyon and North Sinbad allotments because the ability to maintain, replace and build new range improvements would remain. Other allotments would be affected as with the All Wilderness Alternative. The existing grazing fee revenues would not be foregone.

Nonmotorized recreation use and related local expenditures might not increase as much as with the All Wilderness Alternative; however, there would be little loss in ORV travel-related local expenditures in the long term. All things considered, recreation-related expenditures could increase to be between $26,150 and $142,900 per year by the year 2020.

There would be a potential loss of $54,040 annually in Federal revenues from 27,020 acres that, without designation, could be leased in the future. About 19,730 acres that would be in the designated area are already closed to mineral leasing.

Conclusion: Over the long term, depending on the degree of impact on use of water from the San Rafael River, wilderness designation could impede or interfere with major economic developments in Emery County. The magnitude of the potential impact is unknown.

Jack Canyon WSA



JACK CANYON WSA

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JACK CANYON WSA

(UT-060-068C)

INTRODUCTION

General Description of the Area

Jack Canyon WSA consists of 7,500 acres of BLM-administered land in Carbon County, about 15 miles northeast of East Carbon City and Sunnyside, Utah. The area is in the rugged West Tavaputs plateau of the Book Cliffs/Roan Cliffs region. The WSA is about 6 miles long, northeast to southwest, and about 4 miles wide, northwest to southeast. It includes the multi-forked canyon drainages of Pine Spring Draw and Upper Jack Creek. It is separated from the Desolation Canyon WSA by the Cedar Ridge road and a pipeline route.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Desolation Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

Elevation in the WSA extends from about 5,200 feet in the bottom of the Upper Jack Creek drainage to about 8,900 feet along Cedar Ridge. Climate ranges between semiarid and semihumid. Summer temperatures may reach 100 degrees Fahrenheit (F) in the canyon bottoms, while winter lows may dip to -25 degrees F on the higher rims. Depending on location, the average July high temperature ranges from 75 to 85 degrees F. The average January low temperature can be expected to reach 5 to 20 degrees F. Average annual precipitation ranges from 10 to 16 inches, roughly evenly divided between summer/fall thunder showers (5 to 7 inches) and winter snowfall (20 to 80 inches).

The WSA displays the characteristic highly dissected topography of the Roan Cliffs region of Utah. Surface features include segments of vertical-walled and steep V-shaped canyons in two principal drainages. Narrow, irregular ridges separate steep draws which rise to the north and south of the principal drainages. Vegetation is varied and includes Douglas fir, pinyon-juniper woodland, sagebrush, riparian, and rock outcrop types. Water is present throughout much of the WSA.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 13 S., R. 17 E., secs. 7 and 18) has been redrawn to correct an error in the Draft EIS.

2. The anticipated surface disturbance presented in the Draft EIS (1,500 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 1,500 acres reported in the Draft EIS to 161 acres of surface disturbance for the Final EIS.

3. The Draft EIS identified a 940 acre chaining and seeding proposal within the WSA to increase livestock forage production. However, BLM does not anticipate sufficient funding in the foreseeable future to complete this project. As a result, the land treatment estimates have been eliminated in the Final EIS to reflect more realistic funding projections. Estimates of potential increases in livestock forage have been revised accordingly.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies),

STATEWIDE POCKET MAP
WSA NO. 65
SEE VOL.I

the following issues or impacts specific to the Jack Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below:

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the surface disturbance estimate for the WSA has been reduced from 1,500 acres to 161 acres in the Final EIS, only 2 percent of the WSA would be disturbed and reclamation would be required. Although Jack Creek and Pine Springs Draw have intermittent water, there is no perennial stream located in the WSA. Also, precipitation is only light to moderate, averaging between 10 to 16 inches yearly. Soils are loamy and/or stony with approximately 9 percent as rock outcrop, which is not susceptible to erosion. Therefore, major increases in soil erosion are not likely, and impacts on soils are not significant issues for the Final EIS.

2. Vegetation Including Special Status Species: Estimates of surface disturbance without wilderness designation have been revised downward from the 1,500 acres reported in the Draft EIS to 161 acres of mineral-related surface disturbance in the Final EIS. Given this new scenario, the impacts of direct disturbance of vegetation would be reduced and would not be significant with any of the alternatives (approximately 2 percent of the WSA). There are no special status plant species known to occur within the WSA. In any event, BLM would conduct site-specific clearances of potentially disturbed areas and consult with FWS concerning impacts on special status plant species. Therefore, impacts on vegetation are not analyzed in detail for the Jack Canyon WSA.

3. Water Resources: The public is concerned that wilderness designation would interfere with development and use of water. Future surface disturbance could increase sediment yield and affect water quality. There are no perennial streams in the Jack Canyon WSA. The only potential uses of the 12 undeveloped springs in the WSA are the present uses for recreation, livestock, and wildlife. Springs could be developed following wilderness designation if designed and installed compatibly with wilderness protection guidelines. As explained above, there is little potential for significant increases in erosion and related effects on water quality. Therefore, impacts on water uses and quality are not significant issues for the Jack Canyon WSA.

4. Forest Resources: The only forest resources in the WSA are 6,160 acres of pinyon pine, juniper and Douglas fir trees. The forest resources are considered nonproductive and noncommercial timber or woodland. Only 7,500 cords of harvestable fuelwood are present in the WSA. Demand is low, the location is remote, and there is limited access. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

5. Livestock. The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements, moving of livestock, and by preventing future range improvements. However, under the Wilderness Management Policy (BLM Manual 8560) there shall be no curtailments in grazing simply because an area is wilderness. Restrictions would be placed on predator control and livestock losses could increase in both the wilderness area and on adjacent lands. However, predators have not been a problem and predator control has not been conducted in the allotment that comprises the WSA for several years. The Jack Canyon WSA included a portion of only one grazing allotment (only 6 percent within the WSA), utilized by one rancher. There are no present or proposed range developments within the WSA. Livestock management activities would not be reduced because very little access has been used within the WSA. For these reasons, impacts on livestock management are not significant issues for analysis in the Final EIS.

6. Visual Resources: As discussed above for vegetation, only 161 acres of surface disturbance are projected for the WSA without wilderness designation in the Final EIS. Therefore visual resources would not be significantly affected. Visual resources are not addressed in the Final EIS as a separate topic, but are addressed in relation to naturalness and special features in the Wilderness Values sections.

7. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles or vandalism. However, only two cultural resource sites have been recorded in the Jack Canyon WSA. Terrain and surface features limit vehicle use to the 1.75 miles of ways and 0.75 mile of road inside the WSA. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, impacts on cultural resources are not significant issues for analysis in the Final EIS.

8. Recreation: The public has expressed concern that wilderness designation would change recreational use from motorized to primitive or conversely that without wilderness designation, motorized recreation would eliminate or reduce opportunities for primitive recreation. Recreational use of the Jack Canyon WSA is light (estimated 100 visitor days per year no more than 25 of which are motorized) and would remain light and mostly primitive in nature with or without wilderness designation due to the terrain of the WSA and limited access. Therefore, impacts on recreation use would not be significant and they are not analyzed in detail in the Final EIS. Affects of potential activities on primitive recreation are discussed in the analysis of impacts on wilderness values.

9. Wild Horses: About 1,300 acres of the WSA are used by a herd of 25 wild horses. The horses would be allowed to utilize the WSA with or without wilderness designation. Therefore, impacts on wild horses are not significant issues for analysis in the Final EIS.

- Issues Analyzed in Detail

The significant issues for the Jack Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on leasable mineral exploration and production.

3. Impacts on wildlife habitat and populations including special status species.

4. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, visual resources, mineral values, wildlife values, recreational values, riparian values, and livestock values.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 65, for responses to specific comments about the Jack Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

A partial alternative was suggested during the initial scoping to include that portion of the WSA immediately adjacent to Desolation Canyon. During early studies, BLM endeavored to identify a realistic partial alternative; however, the WSA is not well suited to such an alternative due to limited size, influence of adjacent roads, an adjacent pipeline crossing, and because it is mainly a single major canyon. The Cedar Ridge road and an existing pipeline route separate the Jack Canyon WSA from the Desolation Canyon WSA, thereby preventing a combination of the two areas. A partial alternative within the Jack Canyon WSA would divide the single canyon/ridge system into an arbitrary configuration. Therefore, a partial alternative was not included for detailed study.

During the public comment period for the Draft EIS, it was again suggested that the Jack Canyon WSA be combined with the Desolation Canyon WSA. As noted above, the Cedar Ridge road and a pipeline route (right-of-way) separates the two WSAs. Such a combination would be inconsistent with BLM's wilderness guidelines.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness (Proposed Action); and (2) All Wilderness (7,500 acres). Where management intentions have not been clearly identified, assumptions are made based on management projections for each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative (Proposed Action)

With this alternative, none of the 7,500-acre Jack Canyon WSA would be designated by Congress as part of the NWPS. The area would continue to be managed for multiple uses in accordance with the general provisions of the Price River MFP (USDI, BLM, 1983b). One section of State land (640 acres) and 1/16 section of private land (40 acres) with State-owned minerals (split-estate) within the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase. State and

JACK CANYON WSA

R. 15 E.

R. 16 E.

T. 13 S.

T. 14 S.

Dry Flat Top Canyon
Landing Strip
Sage Brush Flat
TAVAPUTS PLATEAU
Cottonwood
Jack Pine Spring
Draw
Cedar Ridge
Creek
Big Swale
Pine Spr
Cedar Corral
Bishop Canyon
Flat
Ridge
Summerhouse Canyon
Summerhouse
RIDGE
STEER
Rock
Canyon
Creek
Beal

36 31 6 1

2000 2054 2251 2150 2080 2455 2588 2591 2523 2224 2250 2388 2500 2684

Map 1
LAND STATUS
Jack Canyon WSA
UT-060-068A2

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Split Estate-Private Surface and State Minerals
- BLM Administered Land Within or Adjacent to WSA

N

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

private lands are analyzed in this alternative as remaining under current ownership.

- Management Conditions and Constraints

All 7,500 acres would remain closed to mineral location due to an oil shale withdrawal that restricts any mining claim location. The two existing pre-FLPMA oil and gas leases (2,180 acres) and three post-FLPMA leases (1,110 acres) could be developed under stipulations issued at the time of leasing. New leases could be issued under Category 2 (standard and special stipulations) on 7,100 acres and under Category 3 (no surface occupancy) on 400 acres. The special stipulations would restrict use to protect watershed conditions. Future leases for coal, oil shale, and combined hydrocarbons (tar sand) could be considered, although the potential appears low.

Domestic livestock grazing use of the Jack Canyon WSA would continue as authorized (currently about 216 AUMs). There are no existing or proposed range developments.

About 1,300 acres of the WSA could continue to be used by the Range Creek wild horse herd of about 25 animals.

The entire WSA would continue to be open to ORV use, although existing use is rare, except on roads bordering the WSA. About 1.75 miles of existing ways extending into the WSA in several locations could be used. A 0.75-mile road leading to a drill site north of Cedar Ridge road would also remain open to vehicular use.

Pipeline rights-of-way could be issued if needed for oil and gas development.

The entire 7,500-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned, because opportunities are limited due to remoteness, steep terrain, and poor accessibility.

The area would continue to be managed under VRM Class II (change not visually evident) on 6,400 acres, Class III (change evident but usually subordinate) on 400 acres, and Class IV (changes evident but visually integrated) on 700 acres.

- Action Scenario

Given BLM management actions described above and the resources described in the Affected Environment, BLM anticipates that implementation of the No Action/No Wilderness Alternative would result in approximately 161 acres of surface disturbance associated with oil and gas exploration and development within the WSA. Up to 10 miles of access roads could be constructed. Lands most likely to be disturbed are those in the former Greater Jack Canyon Known Geologic Structure (KGS). Although the actual disturbance is estimated at 161 acres, the area indirectly impacted by this development would be much larger.

It is assumed that surface disturbance associated with developed leases would remain over the long term. Employment would average 10 employees for each exploration well drilled. Maximum employment at one time would be about 40 employees. An average of 3 to 6 months would be required to complete drilling operations at each site. Each site would be reclaimed following abandonment. Producing wells would generally require only two employees for periodic maintenance. No livestock, wildlife habitat, or watershed improvement projects are planned.

No disturbance from ORV use is projected because rugged terrain limits access to existing ways. Recreational use is projected to increase over the current use of 100 visitor days per year at a rate of 2 to 7 percent annually. As much as 25 percent of visitor use would continue to be motorized.

- All Wilderness Alternative

With this alternative, all 7,500 acres of the Jack Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands and provisions of BLM Wilderness Management Guidelines regarding private lands, it is assumed that State and private lands would remain under existing ownership. There is one State section (640 acres) and one tract

JACK CANYON WSA

R. 15 E.

R. 16 E.

T. 13 S.

T. 14 S.

Map 2

ALL WILDERNESS ALTERNATIVE

Jack Canyon WSA

UT-060-068A2

Legend

All Wilderness Alternative (7,500 acres)

N

SCALE IN MILES

0 1 2

SCALE IN KILOMETERS

0 1 2 3

ELEVATION EXPRESSED IN METERS

of private land (40 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 7,500 acres would be closed to new mineral leasing and sale. There are no existing mining claims in the WSA and the WSA would continue to be withdrawn from mineral location. Existing oil and gas leases not held by production in the Peters Point Unit would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. Some finds might be expected to occur outside the Peters Point Unit but within the former Greater Jack Canyon KGS which extends into the WSA. Development of leases outside the unit would not be allowed to cause significant adverse impacts to the area's wilderness character. Development and production from leases within the Peters Point Unit is expected to continue and would be allowed (under provisions of prior and existing rights) until oil and gas resources are depleted. At that time, reclamation would be carried out. New oil and gas, coal, oil shale, or combined hydrocarbon (tar sand) leases would not be issued.

The estimated 216 AUMs in the WSA would remain available to livestock as presently allotted. There are no range developments and none are expected following designation.

Use of 1,300 acres in the WSA by about 25 wild horses would be allowed to continue.

The entire 7,500-acre area would be closed to ORV use except for: (1) users with valid existing rights, if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Vehicular ways totaling about 1.75 miles would be closed. A 0.75-mile road north of Cedar Ridge road would remain open to vehicular travel for the life of an associated oil and gas well. Reasonable access to the 40-acre private land inholding would be allowed as required in the future. About 18 miles of road or jeep trail bordering the WSA would remain open to vehicle use.

Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

Given the BLM management actions described above and the resources described in the Affected Environment, BLM anticipates 11 acres of surface disturbance associated with oil and gas exploration and development within the WSA. Up to 3 miles of access roads could be constructed. Lands most likely to be disturbed are those associated with pre-FLPMA leases. Although the actual disturbance is estimated at 11 acres, the area impacted by this development would be much larger. Employment assumptions are the same per well as with the No Action/No Wilderness Alternative. However, maximum employment at one time would be about 10 employees. No livestock, wildlife habitat, or watershed improvement projects are planned for the area.

No disturbance from ORV use is anticipated because of wilderness management restrictions and rugged terrain. Primitive recreational use is projected to increase over the current estimated primitive use of 75 visitor days per year at a rate of 2 to 7 percent annually.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of the alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

JACK CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives No Action/No Wilderness	All Wilderness (2,500 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on up to 161 acres of the WSA because of oil and gas development and construction of access to State in-holdings. The quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to an additional 3,750 acres. Endangered or threatened species would not be significantly affected. Class A scenery and wildlife associated with wilderness would be disturbed. Vehicular use of ways and future oil and gas exploration and development roads would occasionally detract from the quality of opportunities for solitude and primitive recreation in the WSA.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 11 acres of the WSA because of oil and gas development and construction of access to State in-holdings. The quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to an additional 600 acres. Special features would be preserved. Although some Class A scenery would be reduced in quality in the disturbed and surrounding areas.
Impacts on Mineral and Energy Resources	Implementation of this alternative would not adversely affect oil and gas exploration and production in the WSA because leasing and development would not be restricted for protection of wilderness values.	The current production of natural gas from pre-FLPMA leases would not be affected. Production of locally significant but unquantifiable amounts of oil and natural gas would be foregone. There would not be a significant loss of tar sand, oil shale, locatable minerals, or salable minerals within the WSA because the probability of development is low even if the area is not designated wilderness.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	Alternatives: All Wilderness (2,500 Acres) (Proposed Action)
Impacts on Wildlife Habitat and Populations	Surface disturbance caused by potential mineral exploration could displace some wildlife species during the lifetime of the disturbance. Additional impacts could occur to sensitive big game species such as elk and bighorn sheep. Impacts on threatened, endangered, or other special status species would not be significant because only 2 percent of the WSA would be disturbed, activities would be temporary and mitigation would be required.	About 0.02 percent of the habitat in the WSA would be disturbed. Wilderness designation would protect wildlife and provide additional solitude. Threatened, endangered, and other special status species would be protected.
Impacts on Economic Conditions	Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Carbon County by 0.3 percent (40 jobs) as compared to projected employment by the year 2010. There would be only minor changes in local economic conditions. The WSA could contribute up to $3,576 annually in local sales related to recreation by the year 2020. Livestock grazing in the WSA would continue to provide about $4,320 per year in livestock sales and $333 in grazing fees. Oil and gas leasing fees and royalty payments could contribute between $15,000 and over $100,000 per year in Federal and State revenues depending on production levels.	The potential for about 0.2 percent of the projected Carbon County employment in the year 2010 (30 jobs), would be foregone. This would not significantly affect local economic conditions. Annual local sales related to recreation could be up to $2,160 per year by the year 2020. This would be about $886 less than with the No Action/No Wilderness Alternative. Livestock grazing would continue to contribute about $4,320 per year in livestock sales and $333 in Federal revenues. Annual Federal and State revenues from oil and gas leasing fees and royalty payments could be reduced by between $10,640 and over $100,000 as compared to the No Action/No Wilderness Alternative.

JACK CANYON WSA

Wilderness Values

- Size

The Jack Canyon WSA is 7,500 acres in size. It is about 6 miles long (northeast-southwest) and about 4 miles wide (northwest-southeast).

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Desolation Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

- Naturalness

Since the establishment of the WSA, one portion of the WSA has received substantially noticeable imprints. The imprints include a drill site, access road, and pipeline leading into the WSA from Cedar Ridge. The road is about 0.75 mile long and portions are constructed along side slopes. The drill site is in a grassy opening on a bench between Cedar Ridge and Jack Creek. The site was drilled in 1981 on a pre-FLPMA lease and is currently producing gas (refer to Mineral and Energy Resources section). The drill site and road are visible for long distances when viewed from the north, and reclamation is expected in the near future.

There is a drill site in Jack Canyon located about 0.25 mile from the northeast WSA boundary. The site was drilled in 1976 and produced 11.2 million cubic feet of natural gas before being plugged in 1979. The 0.25-miles vehicular way to the site could no longer be considered substantially noticeable; however, the drill site itself still presents a noticeable contrast to the surrounding landscape. Some facilities are still in-place and the pad area remains evident. The area affected by this imprint is localized and the imprint is located very near the WSA boundary. Based on these factors, it does not impair the naturalness of a significant portion of the WSA when viewed in the area as a whole.

There are three old vehicle ways extending into the WSA from the bench road on the northern boundary. The ways total 1.5 miles. There is an abandoned drill site along one of these ways. They have generally revegetated. The sections where the ways cut through pinyon-juniper stands are still evident, as is the drill site. While these imprints may be noticeable in localized areas, they are not substantially noticeable in the area as a whole.

In all, 7,350 acres could be considered to meet the naturalness criterion. About 2 percent of the WSA (150 acres), where the drill site access and pipeline are located, does not meet the naturalness criterion. The remaining imprints affect about another 1 percent of the WSA (75 acres); however, these areas meet the naturalness criterion because the imprints are not substantially noticeable in the WSA as a whole.

- Solitude

The combination of size, configuration, topography, and vegetation provides solitude in the majority of the WSA. Vistas can be viewed from edges of plateaus around the boundary of the WSA.

The drainages of Pine Springs Draw and Jack Creek are narrow, twisting, and steep throughout most of their lengths and are separated by broken and irregular ridge lines. The upper portions of Pine Springs Draw and its forks above 7,000 feet are the most open areas. On the bench areas along the north and south boundaries, the terrain is less severe, but the pinyon-juniper vegetation type provides excellent screening. There are several sagebrush areas along boundary roads to the north and south where neither vegetation nor topography provide significant screening.

Vegetation aids topography in providing opportunities for solitude in most of the WSA. In 80 percent (6,000 acres) of the WSA, tree cover is a dominant feature in the vegetation. Tree cover in the pinyon-juniper woodland/Douglas fir type often has a closed canopy and is moderate to heavy. Tree cover in the pinyon-juniper woodland/sage community is variable. In the majority of these types, trees make a significant contribution to opportunities for solitude.

Off-site influences of significance are related to past and present oil and gas activity. Oil and gas exploration imprints are quite visible from a number of locations along the northern boundary of the WSA. Vehicle use of the Cedar Ridge road and the road in Jack Canyon occurs on a regular basis to access producing gas wells. Off-site influences generally affect about three percent (225 acres) of the WSA, primarily along its boundaries.

In summary, about 97 percent of the WSA (7,275 acres) meets the solitude criterion for areas under wilderness review. In about 3 percent of the WSA (225 acres), along the north and south boundaries, opportunities for solitude are less than outstanding, primarily due to off-site influences.

- Primitive and Unconfined Recreation

Primitive recreation activities for which the WSA is best suited include hiking, climbing, hunting, camping, and sightseeing related to the WSA's scenic, geologic, and wildlife features. Horseback riding could occur, but would be limited due to the steep terrain. Generally, the opportunities for primitive recreation are considered outstanding throughout the entire WSA (7,500 acres).

- Special Features

The Jack Canyon WSA is highly scenic when viewed from the canyon bottoms. Variety throughout the WSA, including variety in vegetation, and the existence of erosional remnants and features, creeks and springs, and wildlife habitat all combine in an interesting and scenic landscape. Approximately 85 percent (6,400 acres) of the WSA is rated Class A for scenic quality. The archaeological potential of the area is largely unknown, but significant sites are known to be present nearby (outside the WSA) in Nine Mile Canyon and Desolation Canyon. High-value wildlife habitat includes the intermittent stream and spring riparian associations in Jack Creek and Pine Springs Draw, and cliff and talus habitats.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are two animal species (peregrine falcon and bald eagle) listed as endangered that may occasionally use the WSA. There are eight animal species that are considered sensitive that may occur in the WSA. The WSA has small populations of Rocky Mountain bighorn sheep, cougar, and black bear, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland and pine-Douglas fir forest. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is in a PSD Class II air quality attainment area under the 1977 Clean Air Act Amendments, and currently meets National Air Quality Standards. The nearest Class I areas are Arches National Monument (about 65 air miles south), Canyonlands National Park (about 80 air miles south), and the Colorado portion of Dinosaur National Monument (about 80 air miles northeast). Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River area, the Uinta Basin, and the Wasatch Front. Point sources in the vicinity include powerplants in Castle Valley and coal, oil, gas, and uranium exploration, production, and processing activities. Fugitive dust is the most significant air pollutant to the WSA and is intermittent depending on localized activities and winds. Visibility from ridge tops in the WSA usually remains good, ranging from 30 to 100 miles (Aerocomp, Inc., 1983).

Geology and Topography

The Jack Canyon WSA is in the Uinta Basin section of the Colorado Plateau Physiographic Province. It is located on the southwest edge of the Uinta Basin and also on the southwest side of the Jack Canyon anticline. The anticline is associated with the area formerly designated the Greater Jack Canyon KGS. Sedimentary rocks (strata) exposed at the surface represent about 2,500 feet of the Douglas, Parachute, and Evacuation Creek members of the Green River Formation of Tertiary age. Important vertebrate fossils may be found within this formation.

The Douglas Creek Member is composed mainly of sandstone, siltstone, shale, and limestone. The sandstone beds are composed mostly of fine to medium grained quartz and weather to gray and brown ledges. They are predominantly even-bedded, although some are cross-bedded. The siltstone is predominantly gray to tan and weathers to tan or reddish-brown ledges and steep slopes. The shale is gray, tan, and green, and weathers to green or gray slopes.

JACK CANYON WSA

Limestones of the Douglas Creek WSA are thin-bedded to massive and are commonly gray. These limestones weather to distinct orange-brown ledges on many outcrops. This member is characterized by a rugged topography, displaying many cliffs and ledges dissected by numerous gullies. Features include buttresses, pinnacles, and windows.

The Parachute Creek Member is composed of interbedded marlstone, siltstone, sandstone, oil shale, and tuff. The Parachute Member is found at the higher elevations of the WSA, above the Douglas Creek Member. The member is composed mostly of gray and brown marlstone, siltstone, and sandstone deposited in a shallow-water environment. Strata are predominantly thin, even-bedded, and continuous. They are mainly less than 1 inch thick, with some oil shales being paper thin.

The Evacuation Creek Member, uppermost member of the Green River Formation, caps the higher elevations of the mesas bordering Jack Creek Canyon. The Horse Bench sandstone bed and associated resistant sandstones at the base of the member form the mesa caps. Sandstone beds are composed chiefly of very fine to medium grained quartz. Bedding is thin to massive and some units are cross-laminated and rippled marked. Grain size and thickness of bedding of the sandstones increase to the southwest. The sandstone beds are gray and brown, and weather to gray and brown ledges and steep slopes. Thickness of the sandstones is about 100 feet.

The highly dissected topography of the WSA is representative of the Roan Cliffs region and results from (1) its position between the San Rafael Swell and the Uinta Basin; (2) the gradual uplift of the Colorado Plateau; and (3) climate and erosion over 40 to 50 million years. The landscape formed consists of incised, steep-walled (50+ percent slope) canyons, separated by elongated mesas or ridges. Elevations range from 5,200 to 8,900 feet. The canyons tend to be near-vertical walled to the east, becoming more V-shaped to the west. Rock crops out through the canyons in massive rock walls and remnants, becoming more ledgy as tree cover and elevation increase to the west.

Soils

About 9 percent (675 acres) of the WSA is primarily rock outcrop with very steep slopes of between 50 and 75 percent. Steep slopes of 20 to 50 percent are also found in another 41 percent (3,075 acres) of the WSA. These steep to very steep slopes consist of moderately deep, stony soils. Another 49 percent (3,675 acres) of the WSA occupies sloping to moderately steep slopes on benches, major ledges, and ridge lines. The loamy and stony soils on these slopes are generally shallow to moderately deep. Soils in the remaining 1 percent (75 acres) of the WSA are deep loams on gently sloping basins on structural benches. Table 2 shows soil characteristics and land types, and Table 3 describes erosion conditions.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	9	675	0.0	0
Shallow to moderately deep loamy and stony soils on sloping ridges and structural benches	49	3,675	1.0	5
Shallow to moderately deep stony soils on steep hillsides	41	3,075	1.0	10
Deep loamy soils on gently sloping basins on structural benches	1	75	0.1	1
Totals	100	7,500		

Source: Hansen, 1985.

It is estimated that 50 percent (3,750 acres) of the WSA is strongly saline and 50 percent is slightly saline. Estimated average salinity production is of 49 lb of salt per acre per year. Seeding potential is unsuitable for seeding on 50 percent of the WSA due to steep slopes, rock outcrops, and shallow, stony soils. Seeding potential will vary from unsuited for seeding to good on the remaining 50 percent of the WSA, depending upon the combination of soil depth, slopes, and rock content.

Vegetation Including Special Status Species

The major vegetation types located in the WSA are pinyon-juniper woodland/sagebrush, pinyon-juniper woodland/Douglas fir, sagebrush, and riparian (refer to Table 4).

The pinyon-juniper woodland/sagebrush type is the largest and most complex vegetation type in the WSA and is generally found on moderate slopes and benches

JACK CANYON WSA

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	41	3,075	30,750
Medium	5.0	-	-	-	49	3,675	18,375
Low	1.0	90	6,750	6,750.0	1	75	75
Very Low	0.1	1	75	7.5	-	-	-
None	0.0	9	675	-	9	675	-
Totals		100	7,500	6,757.5[a]	100	7,500	49,200[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.90 under present conditions; 6.6 if disturbed).

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper/sagebrush	3,480	46
Pinyon-juniper/Douglas fir	2,680	36
Sagebrush	480	6
Riparian	30	1
Barren	830	11
Total	7,500	100

Source: USDI, BLM, 1983b.

on fairly deep loam soils. The general appearance is sagebrush understory with considerable variation in the density of tree cover. Tree cover may vary from fewer than five trees per acre up to 200 per acre. Associated plant species typically include Utah serviceberry, snowberry, Salina wildrye, needlegrass, western wheatgrass, lupine, and penstemon.

The pinyon-juniper woodland/Douglas fir type generally occurs on shallow loamy soils and steep canyon slopes. North-facing slopes have higher percentages of Douglas fir. Common understory plants include Utah serviceberry, Oregon grape, locoweed, Salina wildrye, western wheatgrass, and squirreltail. Rock outcrops are a common inclusion in this type.

The dominant species in the sagebrush type are Wyoming and black sagebrush. Wyoming big sagebrush is found on deep productive soils while black sagebrush indicates a considerably shallower, less productive soil. Sagebrush sites are found at higher elevations in open parks along the ridges around the perimeter of the WSA. Common understory plants are balsam root, lupine, aster, Salina wildrye, western and bluebunch wheatgrass, needlegrass, Thurbers fescue, and bluegrass. Other shrubs are sporadically scattered among the sage, including Utah serviceberry, snowberry, and woods rose.

The riparian type is found along Jack Creek and in Pine Springs Draw. The riparian vegetation type may be underestimated as sites of less than 5 acres were not mapped during the inventory. Riparian vegetation is dominated by tamarisk and willow. Also included in this type is big sagebrush, rabbitbrush, snakeweed, Utah juniper, and prickly pear. Associated species also include eriogonum, Russian thistle, lupine, locoweed, sweet clover, pepperweed, cheatgrass, saltgrass, sand dropseed, needle-and-thread, and Indian ricegrass.

The barren areas are confined to rocky ridges and are scattered through the WSA, often as an intrusion into other vegetation types. Pinyon pine and juniper trees occasionally occur in barren areas. However, due to poor site characteristics, these trees are often dwarf and frequently assume unusual forms. Vegetative cover is generally less than 10 percent. Other species found are curlleaf mountain mahogany, needle grass, Fendler's bluegrass, and penstemon.

No threatened, endangered, or other special status plant species are known to occur in the WSA (see Appendix 4 in Volume I).

The Jack Canyon WSA is in the Colorado Plateau Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA

are juniper-pinyon woodland (3,750 acres) and pine-Douglas fir forest (3,750 acres).

Water Resources

The Jack Canyon WSA is within the Jack Creek watershed which drains into the Green River which is in the Upper Colorado River hydrologic subregion.

Jack Creek, an intermittent stream, is the main water source in the area, although water is also found in Pine Springs Draw. Twelve perennial springs keep segments of stream channels in Jack Creek and Pine Springs Draw wet for up to 1 mile in length. The entire 4.5-mile length of Jack Creek though the WSA runs during wet years and/or seasons of years. There are no developed water sources in the WSA. Present water use is mainly by wildlife and livestock.

The WSA is within Water Right Adjudication area 47. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation but claims may not exceed 0.015 cfs. Temporary and fixed-time applications for more than 0.015 cfs on the Green River could be considered.

The water quality standards for Green River and tributaries, from confluence with Colorado River to State line are as follows: Class 1C (protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health); Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3 (protected for warm water species of game fish and other warm water aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Water quality is relatively good due to geology, drainage area, and lack of upstream disturbance or pollution sources and is suitable for present uses. Water is probably safe for human consumption without treatment. Nevertheless, precautions are desirable as water quality data are lacking. The extent or quality of the groundwater resource in the WSA is unknown.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Jack Canyon WSA is given in Table 5. Appendix 5 in Volume I describes the mineral and energy resource rating system.

Table 5

Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 2	c4	Less than 10 million barrels of oil; less than 60 billion cubic feet of natural gas
Coal	f 1	c4	None
Tar Sand	f 2	c3	37.5 to 50 million barrels of oil
Oil Shale	f 2	c4	90 million barrels of shale oil
Uranium/Vanadium	f 1	c3	None
Copper	f 1	c1	None
Manganese	f 1	c1	None

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

There are no materials currently listed as strategic and critical known to occur within the WSA (USDoD, 1988).

- Leasable Minerals
  - Oil and Gas

A portion of the formerly designated Greater Jack Canyon KGS (70,822.25 total acres) covers 4,750 acres of the Jack Canyon WSA. Production of gas is occurring in the WSA and has occurred since 1976. A well (Peters Point 13) was drilled in 1976 in T. 13 S., R. 16 E., sec. 12. This well produced 11.2 million cubic feet of gas prior to being plugged and abandoned in 1979. Another well (Peters Point 14-9), located in T. 13 S., R. 16 E., sec. 14, was drilled in 1981 and produced a total of 443 million cubic feet of gas as of December 1986. The wells in the WSA produce from zones at the base of the Green River Formation, in the upper Wasatch Formation, and a unit in the lower Wasatch Formation. Production (1952 to December 1986) from the entire Peters Point field, a 4,400-acre portion (1,240 acres in the WSA) of the former Greater Jack Canyon KGS, is about 4.0 billion cubic feet of gas and 142,927 barrels of oil. One other well was drilled in the WSA and was plugged and abandoned. Production pipelines follow over 2 miles of the WSA boundary and production facilities are located at the Peters Point 14-9 well location in the WSA and at Peters Point 4 well adjacent to the WSA. A separator is located along the boundary pipeline in Jack Creek Canyon.

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Rocks exposed at the surface or underlying the WSA have produced moderate amounts of gas and smaller amounts of oil from wells in the WSA and vicinity. Eleven wells have been drilled within 1 mile of the WSA. Six of these are producing oil or gas, while the remainder are plugged and abandoned. In addition, the location of the WSA on the southwest flanks of the Uinta Basin and mostly north of major faulting bordering the Jack Creek anticline (an upward flexing or doming of the rock) reinforces the favorability of known source rocks. About 5,000 acres of the WSA are northeast of this fault. Production is from the same strata in the WSA, lower Green River and upper Wasatch, as those responsible for the majority of production in the Uinta Basin.

Formations deeper than the Green River and Wasatch are largely unexplored in the vicinity. One producing well, 1 mile north of the WSA, was drilled to 17,408 feet in depth through most formations known to be favorable for oil and gas production in eastern Utah and western Colorado, including the Moenkopi, Navajo, Morrison, Entrada, Cedar Mountain, Dakota, Mancos, and Mesa Verde formations. These formations are below the surface of the WSA at about 5,000 to 17,000 feet. This well (Peters Point 101), located in T. 13 S., R. 16 E., sec. 4, has produced 102,130 cubic feet of gas from the Dakota Formation as of December 1986.

Data from this and other recently drilled exploration wells south of the WSA, combined with seismic surveying near the tract, have given indications of very promising potential in both the Cretaceous age Dakota sandstone and in the Permian age White Rim sandstone.

The Dakota potential results from a very thick section of beach sands present on a north-south trend west of the Green River. This north-south trend of thickening underlies the WSA. These beach sands make excellent reservoir rocks and abundant source rocks are found in strata above and below the Dakota. The full potential of the Dakota is as yet undefined, but appears very promising for future, relatively large scale, discoveries.

The White Rim potential results from the depositional pinchout of this formation along the ancient Uncompahgre Uplift present directly south of the WSA. These pinchouts form excellent stratigraphic traps for oil and gas. Migration of oil and gas along the subsurface fault zone associated with the Uncompahgre Uplift could have resulted in the accumulation and trapping of these resources within these pinchouts. However, this stratigraphic potential is largely undefined at this time, and will require further drilling to fully evaluate.

The f2 rating given for oil and gas potential results from the probability of finding relatively small amounts of oil and gas within the WSA, primarily due to the small size of the WSA. The certainty of the resource occurring in the WSA is high (c4). Potential exists in the WSA for up to 10 million barrels of oil and 60 billion cubic feet of natural gas. The high degree of certainty (refer to Table 5) is based on (1) current production from the WSA; (2) structural and stratigraphic conditions that are fairly well identified; and (3) production history around the WSA.

Oil and gas leasing categories were established in the WSA (USDI, BLM, 1975a). These categories were revised in 1983-84. As a result, most of the WSA (7,100 acres) is in leasing Category 2 (open with standard and special stipulations) requiring that activities be mitigated to avoid serious erosion of watershed problems. The remaining 400 acres are in Category 3 (open to leasing with no surface occupancy). There are presently two pre-FLPMA (2,180 acres) and three post-FLPMA (1,110 acres) leases in the WSA, covering 3,290 acres.

Several leases in the area have been unitized to form the Peters Point Unit. A portion of the Peters Point Unit is held by production established and ongoing since 1952. All of the pre-FLPMA leases in the WSA are held in the Peters Point Unit. The total size of the unit is 10,090 acres, of which about 13 percent (1,340 acres) is within the WSA. The Peters Point Unit is also located in the formerly designated Greater Jack Canyon KGS.

- Coal

The WSA is underlain by the Blackhawk Formation which probably contains coal seams of unknown thickness. The coal would be more than 6,000 feet under the surface and is not considered a recoverable resource. Mining limitations typically do not allow recovery of coal deeper than

3,000 feet. For these reasons, the favorability rating of f4 assigned for coal to the Desolation Canyon WSA is reduced to f1 for the Jack Canyon WSA. The WSA is not considered to have potential for coal production and none of the WSA is leased for coal. Data availability on coal-bearing formations in Carbon County is good and has been obtained through coal exploration and mining. Thus, the certainty is high (c4) that the WSA has no potential for coal production (SAI, 1982).

- Tar Sand

A portion of a detached block and a portion of the main block of the 157,445-acre Sunnyside STSA overlap about 2,000 acres of the WSA. Tar sand is present in the lower member of the Green River Formation and upper portions of the Wasatch Formation where petroleum is at or near the surface. Tar sand would be expected to be up to 1,000 feet or more below the surface of the WSA. No exploration of the deposit at or near the WSA has occurred. The WSA is about 9 to 10 miles east of the main outcrop for the Sunnyside STSA. The Sunnyside STSA is considered to have the largest, best exposed, oil-impregnated sand deposits in the southwestern Uinta Basin. However, no outcrops and none of the best reserves (higher quality tar sand near the outcrop) are within the WSA (Ritzma, 1972). Potential for tar sand production in the Jack Canyon WSA is considered low due to the small size of the WSA and the depth of the resource. A low favorability (f2) is assigned for the WSA, indicating a potential for up to 37.5 to 50 million barrels of oil in-place. If the tar sand deposit in the WSA was developed, recovery methods would be expected to be by in-situ methods, yielding about 20 to 30 percent of the in-place resource using present technology. It is estimated that up to about 10 million barrels of oil from tar sand could be recovered in the WSA because it is near the edge of the STSA. This would represent up to 0.3 percent of the total estimated reserves for the entire Sunnyside STSA. The certainty that a deposit in this range is present in the WSA is moderate (c3) due to the nearness of known oil-impregnated rocks and the assumed lateral continuity of oil saturation (SAI, 1982).

No oil and gas leases within the WSA are currently being considered for conversion to combined hydrocarbon leases (which would then include tar sand) under the Combined Hydrocarbon Leasing Act (Ninety-Seventh Congress of the U. S., 1981). No tracts have been identified within the WSA for competitive leasing. The tar sand production in the vicinity has been from the outcrop 9 to 10 miles from the WSA. Intermittent mining of the outcrop for paving material occurred between 1892 and 1945. Surface mining of tar sand for its oil content has been proposed for areas 8 to 9 miles east of the WSA.

- Oil Shale

An estimated 5,000 acres of the WSA are underlain by oil shale and contain an estimated in-place resource of 90 million barrels. Oil shale beds in the Uinta Basin are estimated to contain an in-place reserve of 320 billion barrels occurring in zones of up to 700 feet thick. The oil shale in this part of the region is found in the Mahogany Beds of the Parachute Creek Member in the Green River Formation. The overall depth varies from 2 to 60 feet. Richness in organic matter varies 3 to 90 gallons per ton of rock within the oil shale bearing zone. The generally recognized lower limits of a potentially commercial oil shale deposit are an average richness of 15 gallons per ton and a thickness of at least 15 feet. The deposits in the WSA are estimated at about 15 feet thick, could yield about 15 gallons per ton, and contain an estimated 27 million barrels of recoverable shale oil or about 0.008 percent of the in-place reserves of the Uinta Basin.

A low favorability rating of f2 for shale oil production was assigned to the WSA due to the thin, low grade oil shale beds found in the vicinity of the WSA, particularly relative to richer oil shale deposits in other areas of the Uinta Basin (SAI, 1982). The high certainty rating (c4) is assigned because the WSA is known to contain oil shale.

The entire WSA is under an oil shale withdrawal. This withdrawal, some 2,757,310 acres in total size, has been in-place since the 1920s. It prohibits development of the oil shale resource except under Federal leasing and prevents location of mining claims. Considering the large acreage of oil shale withdrawn and the fact that oil shale in large amounts is of higher quality and more accessible elsewhere in the Uinta Basin, it is believed that the oil shale resource in the WSA would not be extracted in the future.

• Locatable Minerals

Essentially no potential for locatable minerals, including uranium, vanadium, copper, and manganese, is assigned for the WSA. The certainty of this rating is moderate for uranium. It is not certain that copper and manganese are present and direct data are not available.

The Green River Formation, at and near the surface of the WSA, is not considered favorable for locatable minerals. In the Wasatch Formation, about 2,000 to 3,000 feet below the surface, there is a chance for small deposits of uranium. The formations typically considered to be more favorable for locatable minerals are all well over 10,000 feet below the surface of the WSA. Due to their depths, none of these formations are expected to have mining potential. There are also no mining claims in the WSA nor any known or suspected occurrences of locatable minerals. Due to the oil shale withdrawal, the WSA is closed to mining claim location.

• Salable Minerals

Salable minerals in the WSA include sand, gravel, and rock. Mineral material sales in the vicinity have been limited to building stone. In 1979, 120 tons of rock were sold from an area west of the WSA. A common use area (4,234 total acres) for building stone has been established, including about 600 acres in the WSA. Use of this area is not projected in the foreseeable future.

Wildlife Including Special Status Species

A wide variety of wildlife inhabits the WSA. Springs, intermittent streams, riparian vegetation, and rugged terrain, including cliff and talus habitat, contribute to maintaining a diversity of wildlife. Only the more common or distinctive species are discussed here. Major species of interest include Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, sage grouse, golden eagle, and prairie falcon. No facilities for wildlife management exist in the WSA and none are planned in the future.

The WSA is within the historical range for Rocky Mountain bighorn sheep. Twenty-two sheep were reintroduced into the vicinity on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek, about 20 miles south of the WSA in Desolation Canyon. They are reoccupying historical range, including 4,110 acres in the canyons of Jack Creek and Pine Springs Draw which are considered yearlong, high priority habitat. The total range for the bighorn sheep herd is 127,690 acres. One bighorn sheep skull was found in Flat Canyon, about 3 miles south of the WSA, in 1979, indicating historic use or possibly present use near or in the WSA. On the basis of prorating population to total habitat, the present population for the WSA is estimated at one animal, while prior stable carrying capacity is 28.

Mule deer winter and crucial winter ranges (about 120 acres) for Herd Unit 27B are found in the WSA. The crucial winter range is the riparian vegetation type with a large sagebrush inclusion in the bottom of Jack Creek. The WSA contains less than 0.1 percent of the crucial range for Herd Unit 27B (121,440 total acres). Winter forage is not presently considered limiting for the herd unit. The estimated present winter population is two deer, while the carrying capacity is four.

Elk disappeared from the Range Creek herd as they did in the adjacent Avintaquin and Manti herds in the early 1900s. The Avintaquin and Manti herds were reestablished by transplant beginning in 1924. Populations in the Range Creek herd are being re-established by movement from adjacent herds. The present population estimated for the WSA is ten elk, with a prior stable carrying capacity of 23. About 6,720 acres (2 percent) of the 320,025 acres of winter range identified for the Range Creek herd is located in the WSA.

Mountain lion and black bear are both common to the entire WSA and populations are considered healthy, although accurate population counts are not available. The total habitat identified for these species is 601,290 acres, only 0.01 percent of which is in the WSA. The WSA may include crucial habitat for black bear based on the observed consistency of use over several years.

The only upland game bird found in the WSA is sage grouse. It is found in sagebrush communities on flat or shallow slopes. Other nongame birds include a large number of perching species and shore birds, commonly including the canyon wren, blue-grey gnat catcher, western kingbird, pinyon jay, magpie, and junco.

Raptors nesting, wintering, or migrating in or through the WSA include golden eagles, prairie falcons, Cooper's hawks, goshawks, American kestrels, and red-tailed hawks. Although no raptor inventory has been done for the WSA, nesting habitat

is present and/or use has been documented in the vicinity of the WSA.

Two Federally listed endangered raptor species are also believed to use the WSA. The peregrine falcon is believed to use the WSA during spring and fall migration and as a winter resident. Suitable nesting habitat for this species is not known to occur in the WSA. The bald eagle also occurs during migration and possibly during the winter. Bald eagle sightings have occurred in the vicinity. Although the WSA lies within the range of the endangered black-footed ferret, habitat types in the WSA are not suited to this species. The Fish and Wildlife Service (FWS) has identified the following six candidate species that may occur in the WSA: ferruginous hawk, western snowy plover, white-faced ibis, long-billed curlew, southern spotted owl, and western yellow-billed cuckoo, and the Great Basin silverspot butterfly. Refer to Appendix 4 in Volume I for details. Also, the golden eagle is considered a BLM sensitive species.

Forest Resources

Adequate volumes for small-scale noncommercial fuelwood or timber harvest occur in the tree-dominated vegetation types identified in the Vegetation Including Special Status Species section. However, steep slopes would be prohibitive for production in much of the WSA. Remoteness, poor accessibility, low volumes, and distance to a saw mill would also limit potential for timber production. More suitable stands are available elsewhere and there is no known commercial or noncommercial interest for forest tree harvest in the WSA. Some interest in fuelwood cutting could arise in the future along the boundary roads of the WSA in the pinyon-juniper woodland type. At present, 82 percent (6,150 acres) of the WSA is considered nonproductive and noncommercial timber or woodland. The remaining 940 acres are on ridges to the north and south of the WSA along boundary roads. Fuelwood products could be harvested in these areas as an aid to proposed chaining projects. Volumes would average about seven to eight cords per acre. As much as 7,500 cords of harvestable fuelwood may be present in this part of the WSA.

Livestock and Wild Horses/Burros

The WSA is totally within the Green River allotment. The allotment has one operator, and the WSA portion is typically grazed spring through fall by cattle although the season is year long. The WSA occupies 6 percent of the 122,845-acre allotment. Of the 8,584 total AUMs in the allotment, the WSA contains 216 or 2.5 percent (Table 6).

Presently there are no range development projects located within the WSA, and none are proposed. Predator control was not conducted during the 1986 to 1987 period in the grazing allotment that comprises the Jack Canyon WSA (USDA, APHIS, 1988). The Range Creek wild horse herd of approximately 25 animals uses 1,300 acres of the WSA in the Pine Springs Draw and portions of Cedar Ridge vicinity. This represents about 3.6 percent of the total range for the herd.

Visual Resources

About 85 percent of the WSA (6,400 acres) rates as Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water through most of the canyons, and rich and pleasing color combinations (Roy Mann Associates, Inc., 1977). Two areas along Cedar Ridge and the ridge north of Jack Canyon rates as Class B scenery due to less vertical relief, less variation in vegetation, and the absence of water. The sensitivity to modifications in the landscape was rated as moderate.

Table 6
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Green River	122,845	7,500	8,584	216	1,200 Cattle	01/01-12/31	1

Sources: BLM File Data.

JACK CANYON WSA

The area along the ridge north of Jack Canyon is considered in a foreground/ middleground area to most viewers, while Cedar Ridge is rated as seldom seen. The geology, topography, and vegetation combine to create a very scenic landscape in most of the WSA. Vertical-walled to steep V-shaped canyons comprise most of the topography. Rock walls, buttresses, caves, and pinnacles break up slopes of timber and brush. Water is a frequent element in the landscape. VRM classes adopted for the WSA are summarized in Table 7.

Table 7
Visual Resource Quality and Management Class

Element		Acres	Percent of WSA
Scenic Quality Class A		6,400	85
Scenic Quality Class B		1,100	15
Scenic Quality Class C		0	0
	Total	7,500	100
Management Class I		0	0
Management Class II		6,400	85
Management Class III		400	6
Management Class IV		700	9
	Total	7,500	100

Source: USDI, BLM, 1982c

Cultural Resources

Several seismic lines in the WSA have been inventoried for cultural, historical, and archaeological resources. Two Fremont archaeological sites were identified (USDI, BLM, 1986). One site consists of two rock-walled structures and the other is a rock art panel. Additional Fremont archaeological sites are known to be present around the WSA, including structures, rock art, and lithic scatters. No cultural sites are known which qualify for the National Register of Historic Places. The WSA has a moderate potential for the discovery of additional sites.

Historical use of the WSA is principally related to grazing operations in the 1880s; however, historical structures or features related to ranching use are not known to occur in the WSA.

Recreation

Road access to the WSA is located near or around its entire perimeter. All road access connects to a road along Sagebrush Flat. The northernmost road is in a northern tributary drainage and borders the WSA in the bottom of the Jack Canyon drainage. A second road extends along a ridge east of Sagebrush Flat, also forming part of the northern WSA boundary. A third road leaves the second at Sagebrush Flat, crossing the Jack Creek and Pine Springs Draw drainages and forming the western WSA boundary. A fourth road extends along Cedar Ridge south of the WSA to a point on the ridge above the road in the bottom of Jack Creek.

There are intermittent, primitive trails through Jack Canyon and Pine Springs Draw which were probably established by horses, cattle, and wildlife use. The trails are difficult to follow in places and require many creek crossings during spring runoff and wet years. ORV use is infrequent in the WSA, although the Price River MFP designates the area open to ORV use. One passable vehicle way enters the WSA for about 0.25 mile to an abandoned drill site in the bottom of Jack Canyon. The remainder of the WSA, including an additional 1.5 miles of abandoned way, is not known to be used by ORVs. The area generally is not well suited to vehicle use due to terrain limitations. Steep slopes, rock outcrops, and dense vegetation would make travel away from the major canyon bottoms difficult and challenging.

A number of the WSA's features make it attractive for recreation experiences. Specific features of interest include unusual rock features, springs and pools, occasional wildlife sightings, and challenging hiking opportunities. Some possibility for paleontological and archaeological sites also exists.

Hiking and climbing are the activities for which the WSA is best suited. Routes between the canyon bottoms and ridges generally follow natural drainages. Routes and primitive trails through the WSA offer moderate to difficult hiking with creek fords, fallen trees and boulders, steep terrain, and dense vegetation being the principal challenges. Pinnacles and cliffs offer opportunities for technical rock climbing. Use for hiking and climbing is very limited at present.

Fishing opportunities are not available in the WSA. Hunting opportunities in the WSA and surrounding area are good. Terrain has limited most use to the plateau and bench areas along the north, west, and south boundaries. Based on known use patterns, an estimated 15 to 30 deer hunters use the WSA. Potential exists for hunting grouse, dove, rabbit, mountain lion, and black bear. In the future, elk may be hunted if a viable herd becomes re-established.

Horseback riding and horse packing along the primitive trails in Jack Creek and Pine Springs Draw are possible, but would be difficult due to terrain. There is no evidence of regular or current recreational horseback riding use.

Although very little, if any, winter recreation use now occurs, snow cover in the WSA is favorable for winter sports for approximately 3 months of the year. Steep slopes would limit cross-country skiing in about 80 percent (6,000 acres) of the WSA. Opportunities for winter camping and snowshoeing are fair to good along the ridge tops and benches.

The recreational use of the WSA is currently estimated at 100 visitor days annually. No more than 25 percent of the use involves vehicular access on existing ways. No visitor days are related to commercial outfitting.

Land Use Plans

Roads forming the boundaries of the WSA are under BLM administration. No rights-of-way are located within the WSA.

Although land within and adjacent to the WSA is primarily Federally owned, there is one State section in the WSA and one adjacent to the WSA. Also, a 40-acre parcel of land in the WSA is privately owned.

The likelihood that State lands would be developed for oil and gas over the long term is good due to favorable geologic conditions. Further, the management philosophy for all State sections is to maximize economic returns for the State School Fund. There are no activities on the State land in-holdings in the WSA.

The area within the WSA is zoned as Critical Environmental 1 (CE-1) (Carbon County Commission, 1981). Land use objectives for the CE-1 zone are:

1. To protect and conserve the water supply, vegetation, soils, wildlife, and other natural resources within the watershed.

2. To avoid the creation of hazards from floods, fire, and other dangers.

3. To preserve aesthetic appearance of the landscape.

4. To prevent the degradation of the environment and waste of natural and financial resources.

Permitted uses under CE-1 include grazing and pond construction. Major construction requires approval by the county. The WSA represents about 0.8 percent of the acreage in Carbon County.

Public lands in the WSA are managed by BLM under the Price River MFP (USDI, BLM, 1983). Specific management actions in the MFP affecting the Jack Canyon WSA generally allow for multiple use as described in the No Action/No Wilderness Alternative. Specifically, the MFP discusses continuation of present grazing management and practices (Green River North Allotment), establishment of a building stone area overlying 600 acres of the WSA, and placement of high priority on mineral production from the Greater Jack Canyon KGS.

Socioeconomics

- Demographics

The WSA is located in the northeastern portion of Carbon County. From 1970 to 1980, the population of Carbon County grew from 15,647 to 22,400, an overall increase of about 43 percent. Carbon County has less than 2 percent of the State population of about 1.5 million (Utah Office of Planning and Budget, 1984). Table 8 presents baseline and projected population data for Carbon County. It is estimated that between 1980 and 1987, the population increased to about 23,100. Population projections indicate that the number of people living in Carbon County in the year 2010 will be about 28,000 for about a 25 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). The county has one major service center, Price (population 9,086).

Table 8
Baseline and Projected Population and Employment Growth
Carbon County

	1980	1990	2000	2010
Population	22,400	23,400	23,200	28,000
Employment	9,372	9,400	10,700	13,000

Source: Utah Office of Planning and Budget, 1987.

Sunnyside and East Carbon City (total population 1.942), are the nearest communities to the WSA, about 15 miles to the southwest. Most access to the WSA is through Price and Wellington via Nine Mile Canyon or through Sunnyside and East Carbon City via Bruin Point. Carbon County comprises 1,474 square miles or about 940,800 acres. About 49 percent (460,992 acres) of the county is managed by the

Federal government, 9 percent (84,672 acres) by the State, and 42 percent (395,136 acres) is privately owned.

- Employment

Table 8 shows the baseline and projected total employment for Carbon County to the year 2010.

Carbon County is part of the Southeast MCD. Table 9 shows the baseline (1980) and projected employment by source for MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trade (15 percent), and services (8 percent).

Table 9
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

It is projected that by the year 2010, employment in the MCD will increase by 27 percent and that services will increase to 18 percent and trade to 17 percent of the total, while government will decline to 15 percent and mining to 20 percent of the total MCD employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent in the year 2010 (Utah Office of Planning and Budget, 1987).

- Sales and Revenues

Past activities in the WSA that could be of local economic consequence include oil and gas exploration and production, livestock, and recreation. Table 10 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 10
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	Unknown	$6,580[b]
Livestock Grazing	$4,320	$333
Recreational Use	$ 410	0
Total	$4,730	$6,913

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

[b]Does not include royalties from current natural gas production.

The WSA has no mining claims and, therefore, no economic activity related to locatable minerals due to the oil shale withdrawal.

Oil and gas exploration and production from the WSA has accounted for an unknown amount of local employment and income. The drilling of three wells, bringing two of these wells into production (only one is still producing), and operating and maintaining these wells has required approximately 15 man-years of labor in the past 10 years, some of which represents local employment.

One livestock operator has a total grazing privilege of 216 AUMs within the WSA. If all this forage were utilized, it would account for $4,320 of livestock sales including $1,080 of ranchers' returns to labor and investment.

The WSA's motorized and nonmotorized recreational use and related local expenditures are low. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). Study indicates that Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Jack Canyon WSA is estimated as about 100 visitor days per year which accounts for $410 of local expenditures yearly.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 10). Oil and gas leases in the WSA cover approximately 3,290 acres. At $2 per acre, lease rental fees generate up to $6,580 of Federal revenues annually. In addition, the Federal government has received revenues from royalties and bonus bids related to production and leasing in that portion of the KGS located in the

WSA. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development. Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittee in the WSA can use up to 216 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $333 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of range improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Jack Canyon WSA.

No Action/No Wilderness Alternative (Proposed Action)

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on 6,400 acres and management under oil and gas leasing Category 3 [no surface occupancy] on 400 acres).

In the foreseeable future, disturbance of approximately 161 acres from oil and gas exploration and development would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Although the direct disturbance would involve only 2.1 percent of the WSA, some Class A scenery would be reduced in quality in the disturbed and surrounding areas, and some wildlife associated with wilderness would be displaced. Appropriate measures would be taken to protect special status species prior to any surface-disturbing activity. Refer to the Wildlife section for more information.

During the period of activity, the visual and audible disturbance from oil and gas exploration and development would indirectly reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also on adjacent portions of the WSA. As much as 50 percent (3,750 acres) of the WSA could be so affected in the foreseeable future. Some wildlife associated with wilderness would leave the area of direct and indirect disturbance during the period of activity.

Because future vehicular use would generally be limited by terrain to existing vehicular ways, no additional disturbance from ORV activity is anticipated. Vehicular use of existing ways and future oil and gas exploration and development roads would, however, occasionally detract from opportunities for solitude and primitive recreation.

The gradual increase in visitor use would not be expected to significantly reduce the quality of wilderness values because the additional use is expected to be small and mostly primitive in nature.

The extent that disturbance would occur over the long term, and therefore the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on up to 161 acres of the WSA, and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to an additional 3,750 acres. Endangered or threatened species would not be significantly affected. Some Class A scenery and wildlife associated with wilderness would be disturbed.

- Impacts on Mineral and Energy Resources

The WSA would remain open to exploration and development of leasable mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative. The area would continue to be withdrawn from location of mining claims.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect exploration for or production of leasable minerals.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife could be adversely affected by possible surface disturbance associated with oil and gas exploration and production on 161 acres (2 percent) of the WSA. Species sensitive to human encroachment or surface disturbance (i.e., black bear, mountain lion, bighorn sheep, and nesting raptors) may be forced from historic habitat during the construction stage and lifetime of the disturbance. For species that are becoming reestablished, such as bighorn sheep and elk, disturbance may lead to a delay in reestablishment. Delays would be short term because activities associated with exploration would last 3 to 6 months per exploration site. Production would require only occasional maintenance activity.

The extent and use of the WSA by the peregrine falcon, bald eagle, or the seven Category 2 species that may occur in the WSA is unknown.

BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened, endangered, or other special status species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, potential populations of threatened, endangered, or other special status animal species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Surface disturbance caused by potential oil and gas exploration and production would displace some wildlife species during the lifetime of the disturbance. Additional disturbance to sensitive big game species such as elk and bighorn sheep would result in short term delays in reestablishment of populations. Impacts on threatened, endangered, or special status species would not be significant.

• Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop leasable mineral resources would remain as at present. Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one period of time. This would represent about 0.1 percent of the projected employment in the Southeast MCD work force in the year 2010 and only 0.3 percent of the projected Carbon County employment in the year 2010. There would be minor increases in local sales communities such as East Carbon and Price. These increases would not significantly affect local economic conditions. In the foreseeable future, the probability of economic development of minerals, other than oil and gas within the WSA is low. Future tar sand, oil shale, and locatable mineral development are unlikely. (Refer to the Mineral and Energy Resources section for a description of mineral and development potentials.)

There would be no livestock-related economic losses because the existing grazing use (216 AUMs) and ability to maintain, replace, and build new range developments would remain as at present.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 to 7 percent per year over the next 30 years. Because recreational use in the area is estimated to increase from the current 100 visitor days of annual use to be between 190 to 870 visitor days per year by the year 2020 and because overall recreation-related local expenditures average $4.10 per visitor day, annual recreation-related expenditures would contribute between $779 and $3,567 annually to the local economy.

Federal and State revenues would not be reduced by this alternative. Existing lease fees (refer to Table 10) and natural gas royalties would continue. There are 4,210 acres in the WSA open to oil and gas leases that are currently not leased. If leased they would bring up to $8,420 additional Federal lease fee revenues per year in addition to possible new royalties from lease production and bonus bids from new leases in the former Greater Jack Canyon KGS. Royalties per well in this area could average between $20,000 and $100,000 per year based on a price of $2 per MCF of gas and a 12.5 percent royalty. Half of these monies would be allocated to the State, a portion of which could reach the local economy.

Collection of livestock grazing fees ($333 per year) would continue.

Conclusion: Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Carbon County by 0.3 percent (40 jobs) as compared to projected employment by the year 2010. There would be only minor

changes in local economic conditions. The WSA could contribute up to $3,576 annually in local sales related to recreation by the year 2020. Livestock grazing in the WSA would continue to provide about $4,320 per year in livestock sales and $333 in grazing fees. Oil and gas leasing fees and royalty payments could contribute between $15,000 and over $100,000 per year in Federal and State revenues depending on production levels.

All Wilderness Alternative (7,500 Acres)

- Impacts on Wilderness Values

Designation and management of all 7,500 acres as wilderness would contribute to the preservation of the wilderness values in the Jack Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness would be protected on 7,350 acres that meet and 150 acres that do not meet the criteria for naturalness. Solitude would be protected on approximately 7,275 acres that meet and 325 acres that do not meet the standards for outstanding opportunities. Primitive and unconfined recreation would be protected on 7,500 acres that meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA including Class A scenery, special status species, and wildlife associated with wilderness would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of the existence of valid existing rights. In the foreseeable future, disturbance of up to 11 acres is anticipated from oil and gas exploration and development. Naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. The quality of opportunities for solitude and primitive recreation would also be indirectly reduced on adjacent portions of the WSA. As much as 8 percent (600 acres) of the WSA could be so affected. Special features would not be affected because the direct disturbance would be minor (involving 0.2 percent (11 acres of the WSA). However, some Class A scenery could be reduced in quality in disturbed and adjacent areas. Appropriate measures would be taken to protect endangered and sensitive species, and cultural values prior to any surface-disturbing activity. Refer to the Wildlife Including Special Status Species section for more information. Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. The disturbance would probably not be substantially noticeable in the area as a whole.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for solitude and primitive recreation.

Over the long term there would be no potential for loss of wilderness values due to development of new leases and mining claims.

Future increases in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 11 acres of the WSA and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to 600 acres. Special features, including Class A scenery, endangered or sensitive species, and wildlife associated with wilderness, would be preserved overall. However, some Class A scenery would be reduced in quality in the dixturbed and surrounding areas.

- Impacts on Mineral and Energy Resources

  - Leasable Minerals

    Approximately 3,290 acres (2,180 acres pre-FLPMA and 1,110 acres post-FLPMA) are leased for oil and gas in the Jack Canyon WSA. Current average annual production of more than 100 million cubic-feet of natural gas from the WSA would not be affected. Future production from pre-FLPMA leases within that portion of the Peters Point Unit located in the WSA also likely would not be affected. Existing post-FLPMA leases (1,110 acres) would expire without production and would not be reissued. An additional 4,210 acres of the WSA would remain unleased for oil and gas.

    Exploration for and development of that portion of the potential resource of up to 60 billion cubic-feet of natural gas and 10 million barrels of oil not located in the pre-FLPMA lease areas could be foregone. The most likely range for production potentially foregone, based on current informa-

tion, is up to 15 billion cubic feet of gas and up to 2.5 million barrels of oil. These estimates of resource foregone are based on the assumption that the oil and gas would be evenly distributed throughout the WSA and that only the portion on the 1,340 acres in the Peters Point Unit would be recovered. Because of the unit, it is most likely that more recovery would occur than identified on a pro-rated basis and, therefore, the amounts foregone would actually be less than stated; however, data are not available for quantification.

The WSA has not been leased for tar sand or oil shale and, with this alternative, leasing would not occur. Considering the quality and quantity of both tar sand and oil shale in the WSA, in compari-son with the deposits elsewhere and technological and economic considerations, it is not anticipated that these resources would be extracted in the foreseeable future even without wilderness designation. Consequently, the All Wilderness Alternative would not result in a significant loss of oil production from tar sand or oil shale.

- Locatable Minerals

The entire 7,500-acre WSA would remain withdrawn, thus preventing mining claim location. Further, locatable minerals are not considered to exist within the WSA; thus, there would be no known potential locatable mineral development foregone with this alternative.

- Salable Minerals

Sand, gravel, or building stone permits could not be issued. The WSA has a low potential for these resources due to common occurrence of most mineral materials present and the remote location of the WSA.

Conclusion: With the All Wilderness Alternative, locally significant but unquantifiable amounts of natural gas and oil production would be foregone. The current annual production of 100 million cubic feet of natural gas on existing pre-FLPMA leases would continue. Loss of tar sand, oil shale, locatable minerals, or salable mineral production from the WSA would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife species would benefit due to additional opportunities for solitude. It is anticipated that only 11 acres (0.02 percent of the WSA) of surface disturbance would occur from oil and gas exploration/development activities this would not significantly impact wildlife habitat or populations. Game species would continue to expand towards, or be maintained at, near optimum levels.

Threatened, endangered, or sensitive animals (including the seven candidate species, if present) would be protected by implementation of this alternative.

Conclusion: About 0.02 percent (11 acres) of the habitat in the WSA would be disturbed. Wilderness designation would provide wildlife habitat and populations including threatened, endangered, or sensitive species with additional protection from disturbance and would provide solitude.

- Impacts on Local Economic Conditions

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues (primarily due to oil and gas lease expiration) currently provided by resource uses in the WSA (refer to Table 10) as well as loss of potential future increases in local income and Federal revenues that could occur otherwise with the No Action/No Wilderness Alternative.

Oil and gas development in the WSA would continue on 2,180 acres, but would not expand to the entire WSA. Valid existing oil and gas leases could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of potential oil and gas deposits would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action/No Wilderness Alternative. The loss of employment for 30 persons would be equivalent to abou 0.2 percent of the projected Carbon County employment in the year 2010. This would not significantly change local economic conditions. The potential for other mineral development (tar sand and oil shale, etc.; refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character) is low and little, if any, economic potential related to these minerals would be foregone.

Livestock use and ranchers' income would continue as at present with $4,320 of livestock sales, including $1,080 of ranchers' return to labor and investment.

Primitive recreational use could increase to between 141 and 654 annual visitor days by the year 2020. Related expenditures would be small (average of $4.10 per visitor day locally) and would total between $578 and $2,681 per year.

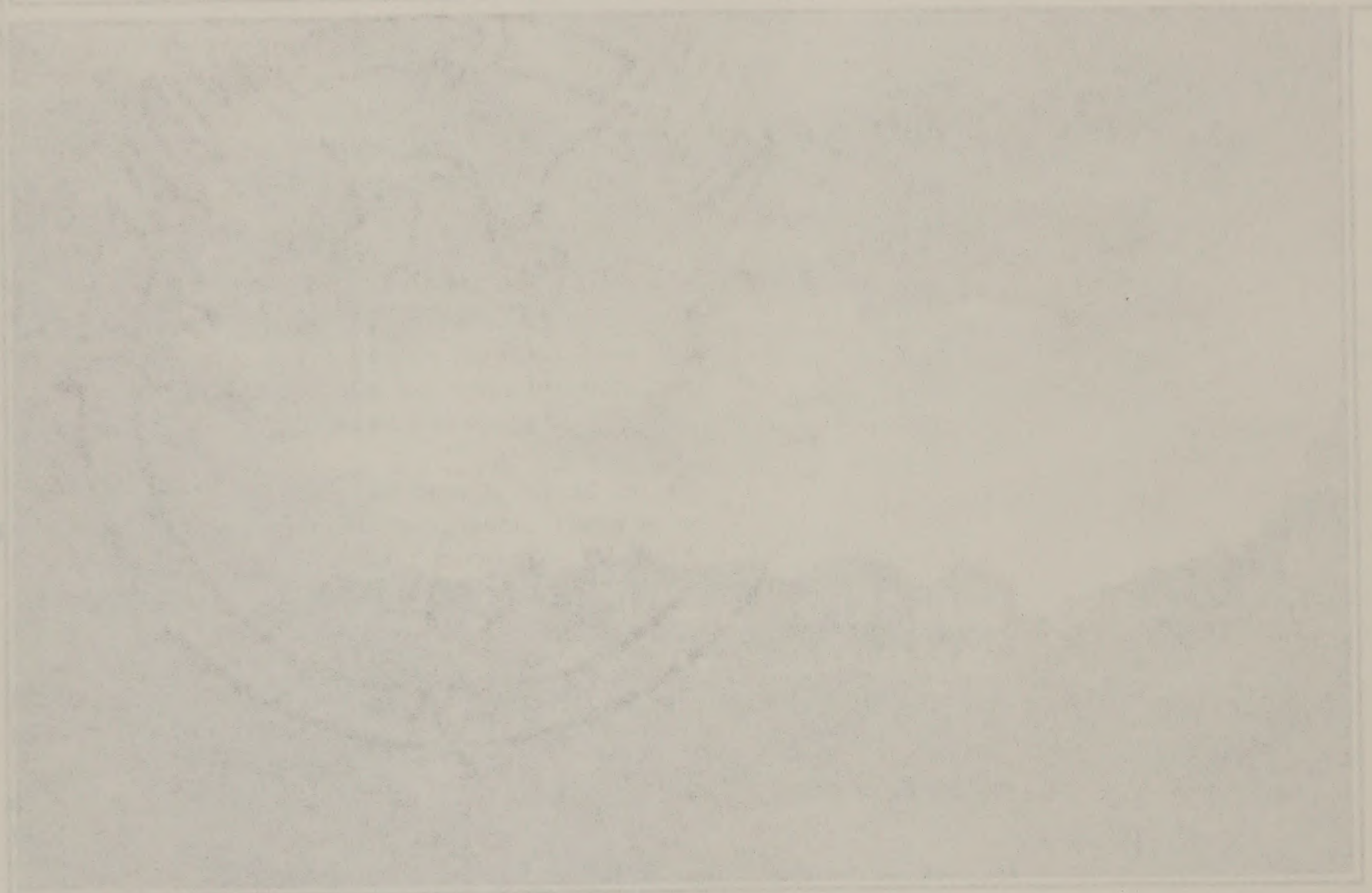
Motorized recreational use of the WSA is light (about 25 visitor days per year). The effects that elimination of motorized recreation would have on local expenditures would be insignificant to both the local economy and individual businesses.

The loss of 5,320 acres of potential leases could cause an eventual loss of up to $10,640 per year of lease fees to the Federal Treasury. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in the area would also be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation. There is no present or projected woodland harvest in the WSA. Therefore, there would not be significant economic loss from conflicts with use of these resources.

Conclusion: The potential for about 0.2 percent of the projected Carbon County employment in the year 2010 (30 jobs), would be foregone. This would not significantly affect local economic conditions. Annual local sales related to recreation could be up to $2,160 per year by the year 2020. This would be about $886 less than with the No Action/No Wilderness Alternative. Livestock grazing would continue to contribute about $4,320 per year in livestock sales and $333 in Federal revenues. Annual Federal and State revenues from oil and gas leasing fees and royalty payments could be reduced by between $10,640 and over $100,000 as compared to the No Action/No Wilderness Alternative.

Desolation Canyon WSA



DESOLATION CANYON WSA

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DESOLATION CANYON WSA

(UT-060-068A)

INTRODUCTION

General Description of the Area

Desolation Canyon WSA includes about 450 square miles (290,845 acres) of land along the Desolation and Gray Canyon portions of the Green River and tributary drainages from the Tavaputs Plateau to the river and from Range Creek north to Rock House Canyon. The Price River and its tributary drainages from the point where the river enters the Book Cliffs to its confluence with the Green River also are included. The Green River forms the eastern boundary of the WSA with the exception of the southernmost portion which also includes Rattlesnake, Flat Nose George, Poverty, and portions of Coal Creek canyons located east of the river and south of the Uintah and Ouray Indian Reservation. The southeastern border of the Desolation Canyon WSA is separated from the Floy Canyon WSA by the dirt road in the right hand fork of Tusher Canyon.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Spruce, Flume, Turtle, and Jack Canyons WSAs) that are either managed as roadless or are under study for wilderness status.

The WSA is located in three counties: Carbon (79,520 acres), Emery (128,255 acres), and Grand (83,070 acres). The nearest community is Green River, Utah, located about 6 miles south of the WSA. The communities of East Carbon City and Sunnyside are about 8 miles west of the WSA.

The configuration of the WSA is irregular, but approximates an L-shape. It is about 50 miles long north to south, and ranges in width from about 1 to 28 miles. It includes approximately 290,845 acres of Federal land managed by the BLM Moab District's Price River and Grand Resource Areas. The WSA was originally reported to have 217,130 acres; the new acreage figure of 290,845 acres is attributable to Master Title Plat checks and addition of acreage in response to an appeal received during the BLM Intensive Wilderness Inventory (USDI, BLM, 1980); addition of 840 acres in the Rock Creek drainage as a variation, and addition of 355 acres of Federal surface, State minerals, split-estate lands to the WSA total. In addition to public lands, there are 77.7 acres of split-estate lands with private surface and State minerals, 40 acres of private and 23,519.7 acres of State in-hled land in the WSA.

The WSA is characterized by a wide range of topographic relief, a variety of vegetation, and (in the north) several water sources. Elevation varies over 5,500 feet ranging from about 4,000 feet at the Green River to over 9,600 feet in the Roan Cliffs-Tavaputs Plateau areas along the west boundary. Ten geologic formations outcrop within the WSA. Surface features in the WSA include rugged, irregular ridges; steep, V-shaped canyons (highlighted by Desolation and Gray canyons); vertical rock walls; peaks; plateaus; pinnacles; balanced rocks; arches; buttresses; alcoves; caves; waterfalls; and rock water pockets.

Twelve separate vegetation types occur in the WSA. Dominant species in these types include cottonwood, willow, tamarisk, greasewood, saltbush, blackbrush, pinyon pine, juniper, big sagebrush, mountain mahogany, Douglas fir, aspen, black sagebrush, and Gambel oak.

Climate of the WSA ranges from arid to semiarid with average annual precipitation ranging from 8 to 20 inches, increasing from south to north with elevation. Half to slightly over half of the precipitation occurs during summer thunderstorms, while snowfall ranges from 15 to 100 inches. Average temperatures vary with elevation. At 9,600 feet, they range from 5 to 80 degrees Fahrenheit (F) and at 4,000 feet 20 to 95 degrees F.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. Portions of the boundary of the WSA (T. 18 S., R. 19 E., secs. 8, 15, 16, 21, 22, and 35) have been redrawn to eliminate private lands that are along the WSA boundary. In addition, approximately 840 acres

STATEWIDE POCKET MAP WSA NO. 66 SEE VOL.I

of BLM land in the head of the Rock Creek drainage (T. 14 S., R. 15 E., secs. 25, 26, and 27) have been included in the WSA total for analysis even though they are not officially inside the WSA.

2. The Draft EIS erroneously reported that there were 1,072.83 acres of split-estate land with Federal surface and State mineral ownership inside the WSA. There were actually 355.2 acres of split-estate lands with Federal surface and State minerals and 717.7 of split-estate lands with private surface and State minerals. All but 77.7 acres of the private surface split-estate lands have been eliminated from the WSA by the boundary changes described above. The 355.2 acres of Federal surface split-estate lands have been added to the WSA for the Final EIS. Because of the inclusion of 840 acres in the Rock Creek drainage and 355.2 acres of split-estate land, the WSA acre-age has changed from the 289,650 acres reported in the Draft EIS to 290,845 acres analyzed in the Final EIS.

3. The BLM Proposed Action in the Draft EIS was the 242,000-acre Large Partial Wilderness Alternative. The BLM Proposed Action for the Final EIS is a new 224,850-acre Large Partial Wilderness Alternative. The large partial alternative was modified for the Final EIS to eliminate additional acreage with oil and gas potential from wilderness designation in Range Creek and in the area between the Price River and the Big Horn Benches. Refer to Appendix 11 (Volume I) for rationale for the proposed action. The new alternative also includes 320 acres of split-estate lands with Federal surface and 430 acres in T. 19 S., R. 20 E., secs. 3 and 10, that were not in the proposed action analyzed in the Draft EIS. The 430 acres are part of a former KGS, but are part of a participating area that could possibly be drained from wells on adjacent lands.

4. The small partial alternative addressed in the Draft EIS was 143,350 acres. This alternative did not include the Rock Creek variation of 840 acres, or 320 acres of Federal surface split-estate lands. With these additions, this alternative has changed to the 144,510-acre Small Partial Wilderness Alternative analyzed in the Final EIS.

5. The anticipated surface disturbance presented in the Draft EIS (2,500 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6). This resulted in a reduction of surface disturbance estimate from the 2,500 acres reported in the Draft EIS to 423 acres of surface disturbance for the Final EIS.

The large reduction in the disturbance estimate is the result of projections that tar sand, uranium, and hydropower development are not likely in the foreseeable future (see Appendix 6 in Volume I for mineral development assumptions). In addition, a 1,620-acre vegetation treatment analyzed in the Draft EIS has been dropped from consideration by BLM. The analysis of Environmental Consequences has been revised to correspond with the reduced surface disturbance projections.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, water rights, and land use plans and policies), the following issues or impacts specific to the Desolation Canyon WSA were considered but are not analyzed in detail in the Final EIS for the following reasons:

1. Forest Resources: The forest resources in the WSA are on steep slopes, are inaccessible, and are considered by BLM to be nonproductive and noncommercial. In addition, the area is closed to woodland harvest by the existing BLM land use plan. For these reasons, BLM does not consider impacts on forest resources as a significant issue for analysis in the Final EIS.

2. Livestock Management: The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements and moving of livestock, and by preventing future range improvements. Restrictions would be placed on predator control and livestock losses could increase in both the wilderness area and on adjacent lands. However, vehicle use in the Desolation Canyon WSA is limited to existing roads and trails by the BLM land use plans and most of the routes used by livestock operators are cherry-stemmed roads that would remain open following wilderness designation. The

forage in four allotments in the WSA have been reserved for bighorn sheep use.

The proposed range developments, including a spring development, maintenance of a pond, and stream diversion structures, would also be compatible with wilderness. Vegetation treatments are not proposed.

Predators have not been controlled in the area for several years. For these reasons, impacts on livestock management are not significant issues for the Desolation Canyon WSA.

- Issues Analyzed in Detail

The significant issues for the Desolation Canyon are:

1. Impacts on geology and topography, including subsidence from underground coal mining in the Little Park Wash area.

2. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

3. Impacts on soil erosion.

4. Impacts on vegetation including special status species.

5. Impacts on water quality in the Green and Colorado River systems and water uses on the Price River.

6. Impacts on mineral exploration and production, including development of oil, gas, and coal resources.

7. Impacts on wildlife habitat and populations, including special status species.

8. Impacts on visual resources, including Class A scenery.

9. Impacts on the preservation of cultural resources.

10. Impacts on recreational use.

11. Impacts on local economic conditions, including employment in Carbon, Emery, and Grand Counties.
Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the wilderness inventory; relationship of Desolation Canyon to other WSAs; failure to inventory the Naval Oil Shale Reserve; includsion of head of Rock Creek in the WSA; assessment of mineral, energy, and hydropower values; effect on salinity of Green and Colorado Rivers; impacts on economic conditions.

See Volume VII-B, for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 66, for responses to specific comments about the Desolation Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

Alternatives suggested during scoping were evaluated and eliminated from detailed study as explained below.

It was suggested that a partial alternative include Little Pearl Wash and Jack Creek.

No known location or drainage within the WSA is named Little Pearl Wash. The name does not appear on any Geological Survey quadrangle maps covering the WSA. It is assumed that the commentor was referring to Little Park Wash.

With the All Wilderness Alternative, all of the Jack Creek drainage to the boundaries of the WSA is included. Part of that drainage is also included in both partial wilderness alternatives. With the partial wilderness alternatives, portions of the Jack Creek drainage (outside the Green River corridor) that overlap the Peters Point oil and gas field and adjacent areas along the Jack Creek anticline are specifically not included because of the conflict with existing oil and gas resources. Exploration and production has occurred in this area. Almost all of the leases there are held by established production dating to the early 1950s. Little Park Wash is underlain by known coal reserves and has not been included in the partial wilderness alternatives because of potential conflicts with future coal production.

As part of the public comment on the Draft EIS, citizen alternatives were proposed that would combine the Desolation, Jack, and Floy Canyon WSAs into a wilderness area of between 400,000 and 420,000 acres. These alternatives would add between 30,000 and 50,000 acres along the boundaries of the BLM WSAs. These additions would include approximately 10,000 to 30,000 acres of Federal and State lands. Approximately 7,000 to 10,000 acres of State land and up to about 25,000 acres of Naval Oil Shale Re-

serve Number 2 (Department of Energy lands) are included in one of the citizen alternatives. These alternatives are not analyzed in detail because the inclusion of State lands or the Naval Oil Shale Reserve is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Vol-ume VII-B, General Comment Response 3.1).

Alternatives Analyzed

Four alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (290,845 acres); (3) Large Partial Wilderness (Proposed Action) (224,850 acres); and (4) Small Partial Wilderness (144,510 acres). The all and partial wilderness alternatives include a variation that adds 840 acres outside the WSA boundaries in the Rock Creek drainage. A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The analysis assumptions presented in the Introduction Volume VI are also applicable.

- No Action/No Wilderness Alternative

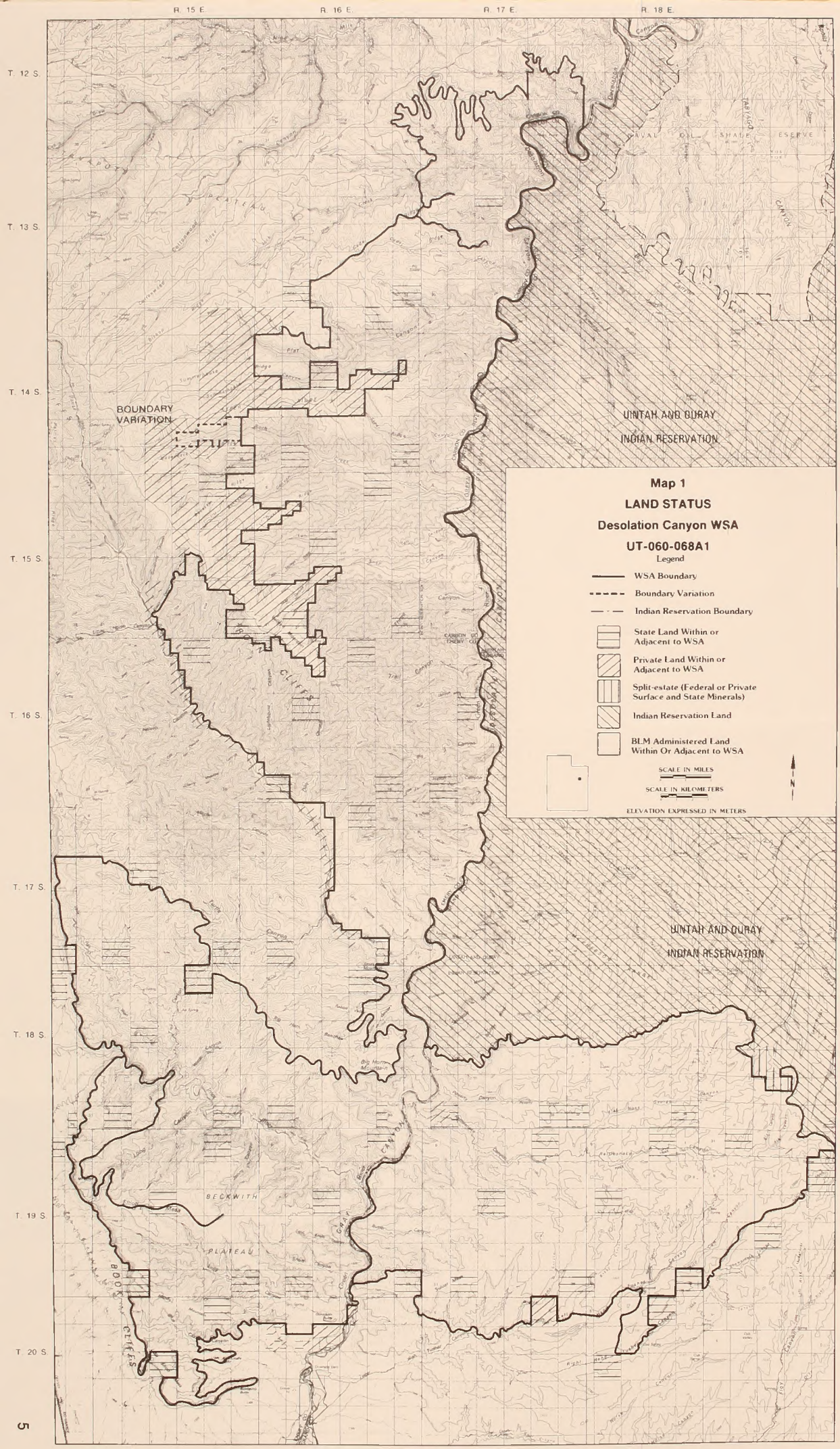
With this alternative, none of the 290,845-acre Desolation Canyon WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, it is projected that the area west of the Green River would continue to be managed in accordance with the Price River MFP (USDI, BLM, 1983b) and the area east of the Green River would be managed in accordance with the Grand RMP (USDI, BLM, 1983a). The Green River corridor would continue to be managed under the Desolation and Gray Canyons of the Green River Management Plan (USDI, BLM, 1979c).

The remaining 23,419.7 acres of State land (surface and mineral) in the WSA have not been proposed for Federal acquisition. Private (40 acres) and subsurface rights to split-estate lands (355.2 acres of Federal surface and State minerals and 77.7 acres of private surface and State minerals) also are expected to remain in non-Federal ownership (refer to Map 1). Refer to Volume I for further information on State inholdings.

- Management Conditions and Constraints

About 161,885 acres of the 290,845-acre area would remain open to mineral location and sale while 128,960 acres would remain withdrawn to mineral location due to the presence of an oil shale withdrawal and public water reserves that withdraw lands from metalliferous mining. Development work, extraction, and patenting would be allowed on three existing claims (60 acres) and any future mining claims, if determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines, without consideration for wilderness values. Fifty-eight existing oil and gas leases could be developed under standard (Category 1) and special stipulations (Category 2) on 48,171 acres. New oil and gas leases could be issued under Category 1 (standard stipulations) on 680 acres, Category 2 (special stipulations) on 241,255 acres, and Category 3 (no surface occupancy) on 120 acres, without concern for wilderness values. About 48,790 acres would remain in Category 4 (closed to leasing). The special stipulations would restrict use to protect watershed and wildlife. Coal resources could occur on up to 8,000 acres in the Little Park drainage. None of the coal in the WSA is currently under lease. The development of tar sand and oil shale also could occur. Even though minerals would be managed as described above, only oil, gas, and coal development are expected in the foreseeable future. Development of locatable minerals, tar sand, or oil shale are not expected because the level of known resource or the likelihood of their development are too low to support a development assumption. Refer to Appendix 6 in Volume I for a description of the mineral development assumptions.

The present domestic livestock grazing use in the area would continue as authorized in the Grand RMP and Price River MFP (6,794 AUMs). Use and maintenance of the existing six segments of fence, two reservoirs, three improved springs, and one trough would continue. One proposed spring development, maintenance and enlargement of one small pond, and reconstruction of a diversion dam would be implemented without wilderness designation. Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue.


R. 15 E.
R. 16 E.
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BOUNDARY VARIATION
UINTAH AND OURAY INDIAN RESERVATION
UINTAH AND OURAY INDIAN RESERVATION
Map 1
LAND STATUS
Desolation Canyon WSA
UT-060-068A1
Legend
WSA Boundary
Boundary Variation
Indian Reservation Boundary
State Land Within or Adjacent to WSA
Private Land Within or Adjacent to WSA
Split-estate (Federal or Private Surface and State Minerals)
Indian Reservation Land
BLM Administered Land Within Or Adjacent to WSA
SCALE IN MILES
SCALE IN KILOMETERS
ELEVATION EXPRESSED IN METERS
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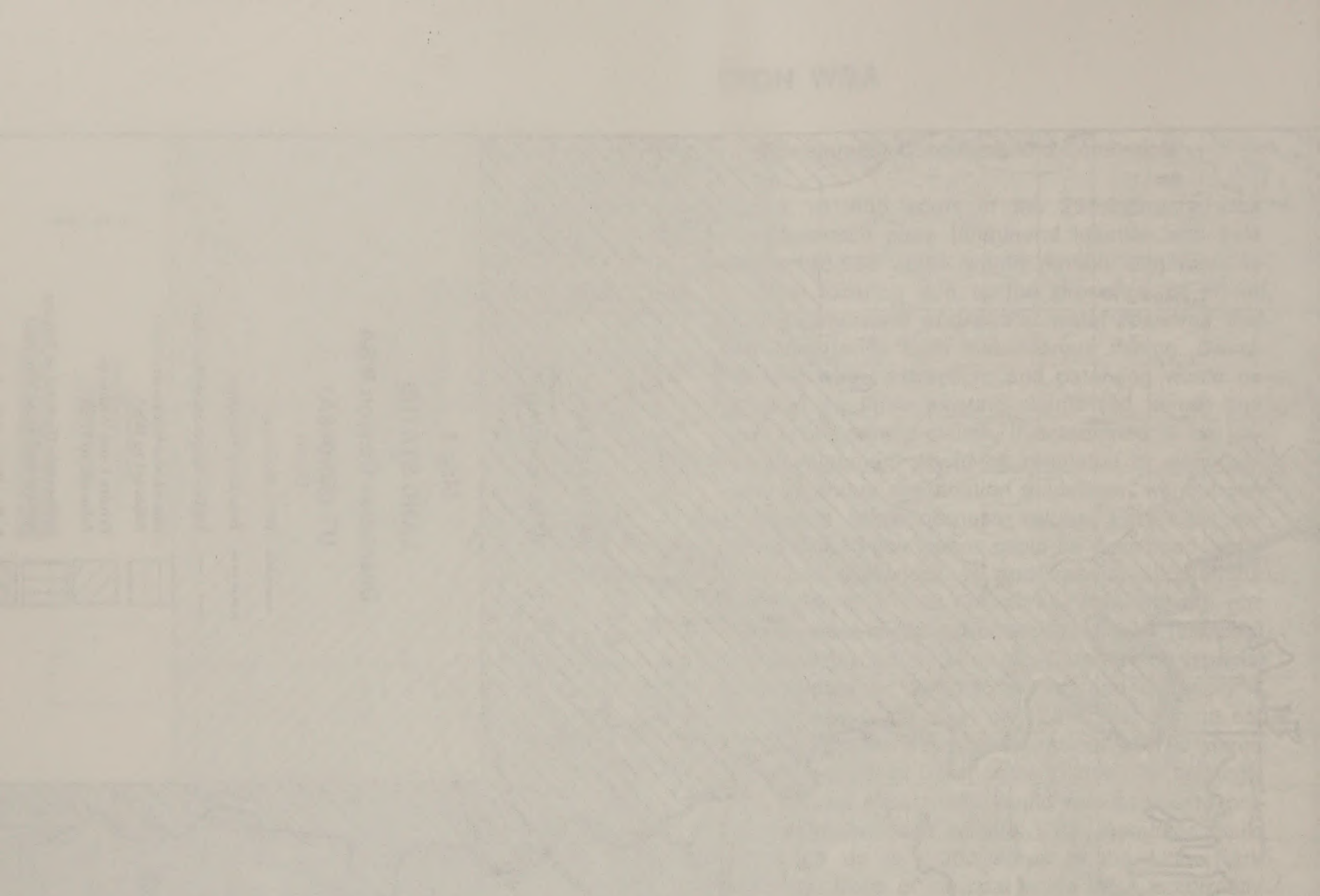
BECKWITH PLATEAU
BOOK CLIFFS
DESOLATION CANYON



A water diversion structure for irrigation water from Rock Creek would be constructed. The existing fenced stream exclosure at the mouth of Rock Creek would be maintained. Construction of a future dam and reservoir on the Green River at a site within the WSA is not likely in the foreseeable future because of conflicts with the wild and scenic river potential of Gray and Desolation Canyon and the presence of threatened and endangered fish in the Colorado River system (see Affected Environment text on hydropower and water resources).

It is projected that 2,786.72 acres of reclamation withdrawal and 13,026.07 acres of power site classifications and Federal power projects would not be developed and would be reviewed and removed from the WSA. It is projected that 752.39 acres of public water reserve would remain in effect.

Proposed transplants of bighorn sheep and elk into the WSA would be allowed.

ORV use in the WSA is categorized as limited to existing roads and trails. Vehicular activity is also limited to the existing 29.5 miles of roads and 5.5 miles of way by terrain constraints.

Low speed, wakeless downstream use of small outboard motors would continue on the Green River.

Historical values within Desolation Canyon National Historical Landmark and cultural values within Flat Canyon Archaeological District would continue to receive management consideration under the National Historical Preservation Act and State Historical Preservation Office procedures.

The entire 290,845-acre area would be open to forest product harvest; however, harvest is not expected due to steep terrain and lack of access.

The area would continue to be managed under VRM Class I on 22,000 acres, Class II on 253,685 acres, Class III on 6,000 acres, and Class IV on 9,160 acres.

A possible future variation under the No Action/ No Wilderness Alternative would be to designate a proposed ONA or National Natural Landmark for a 37,760-acre area identified in 1983 by the NPS as potentially suitable. This action would be independent of the wilderness study process and is not considered further in this document.

- Action Scenario

Implementation of the No Action/No Wilderness Alternative would result in approximately 423 acres of surface disturbance in the foreseeable future. About 310 acres of surface disturbance would result from oil and gas exploration and development activities in the short term. The entire WSA is considered favorable for oil and gas. However, it is projected that the areas most likely to be developed would be the Cedar Ridge and Jack Canyon area in the northwest portion of the WSA; the Last Chance Benches area near Range Creek; the Big Horn Benches and the Water Canyon area in the central portion of the WSA; the Rattlesnake Canyon, Suluar Mesa, and Tusher Canyon areas in the southern and southeastern portions of the WSA; and the Beckwith Plateau, Middle Mountain, and Long Canyon areas in the southwest part of the WSA. The remaining portions of the WSA are extremely rugged and inaccessible. Seismic work would identify specific areas where the initial drilling locations would be located. Subsequent drilling to develop a field would include wells on 640- or 160-acre spacings. Development would include up to 30 drill holes, 5 miles of new access roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. It is projected that surface disturbance associated with developed leases would remain over a long-term period of time. Although the direct surface disturbance is estimated at 310 acres, the overall area impacted by these activities would be much larger.

Employment would average 10 employees for each of approximately 30 exploration wells drilled. An average of 3 to 6 months would be required to complete drilling operations for individual wells, and no more than two wells would be drilled at one time. Each site would be reclaimed following abandonment. Depending on the number of wells, producing wells would generally require only 2 to 10 employees for periodic maintenance over approximately 30 years of well life. A maximum of 200 employees would be required at one time.

In the long term, it is projected that exploration and development of the coal resource in the Little Park Wash portion of the WSA would occur. Mining within the WSA itself likely would be part of a larger operation with surface facilities located outside of the WSA where the coal could be easily accessed. Actual development operations would be by underground methods. Approximately 10 acres of surface disturbance would occur within the WSA over the life of the mine. This would be associated with exploration drilling and possible construction of ventilation facilities along cliff faces. The surface disturbance resulting from exploration activities would be temporary, while the ventilation shafts would remain in place for the life of the mining operation.

The size of individual coal operations, typical of the intermountain area, differ. The surface facilities, including access roads, would be located outside of the WSA and occupy up to 20 acres. Employees, including supervisory personnel, would number from 20 to 300. Operations would last from 30 to 40 years. All disturbed areas would be reclaimed upon abandonment.

About 100 acres of surface disturbance are projected for access to in-held State-of-Utah lands for the purposes of mineral exploration and development. This access could occur anywhere in the WSA, but is most likely in the areas previously identified for oil and gas and coal development. The majority of the anticipated 40 to 50 miles of roads would be located on the Beckwith Plateau and in the Rattlesnake Canyon area. Once constructed, these roads would remain over the long term.

Other projected developments in the foreseeable future include one spring development, reconstruction of an existing diversion structure on Rock Creek, construction of a new diversion structure on Rock Creek, and enlargement of a small pond. These activities would result in about 3 acres of disturbance. No other livestock, wildlife habitat, or watershed improvement projects are projected.

No disturbance from ORV use is projected due to management and terrain constraints.

Recreation use is mostly river use which is set by permit. Overall recreation use is expected to increase from the current estimated use of about 70,000 visitor days per year to 82,845 visitor days per year by the year 2000. Less than 1 percent of the use would involve vehicular access.

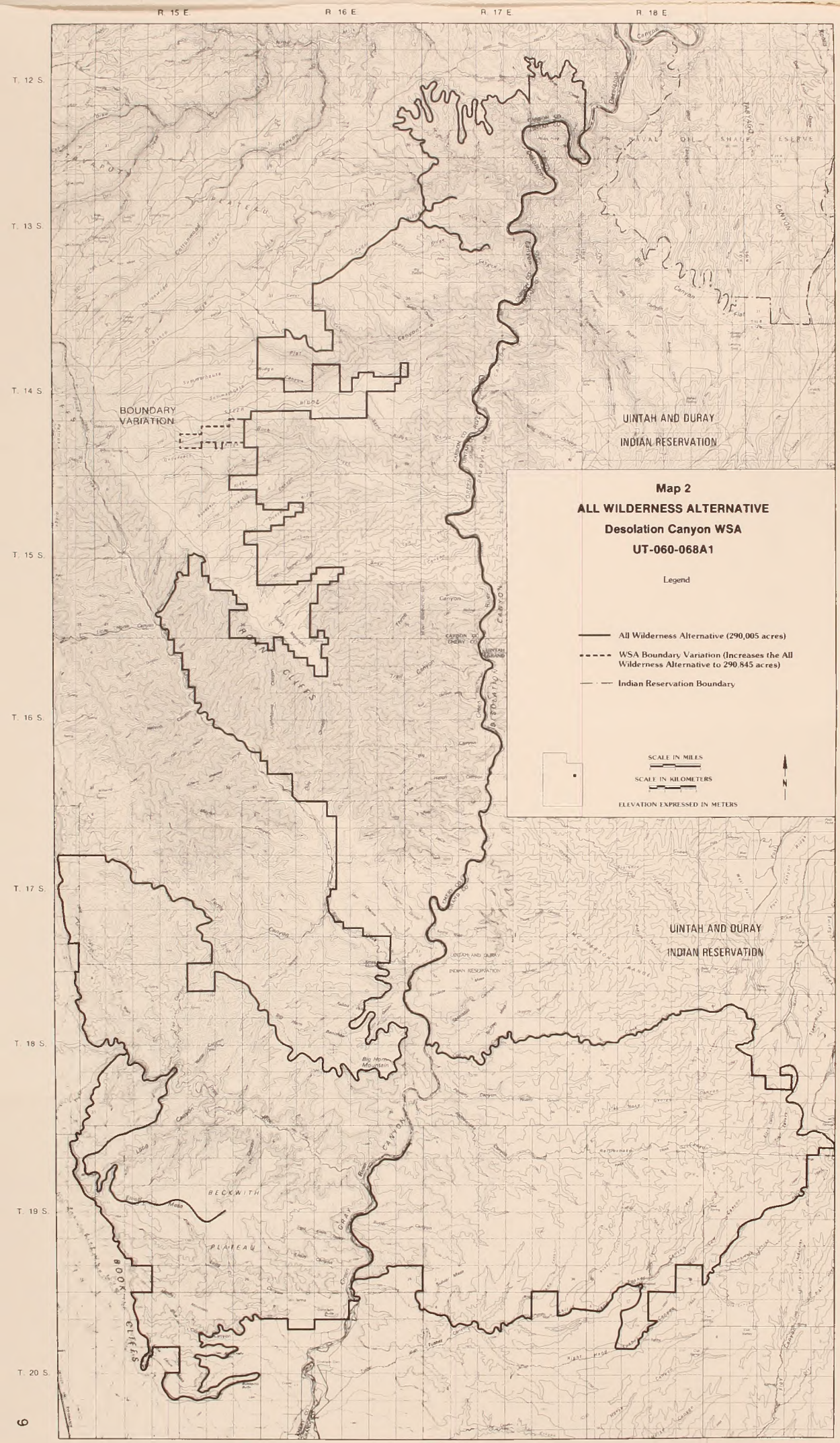
- All Wilderness Alternative

With the All Wilderness Alternative, all 290,845 acres of the Desolation Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands and provisions of BLM Wilderness Management Guidelines regarding private lands, it is projected that State and private lands would remain under existing ownership. There are 40 State sections (23,519.7 acres) and one tract of private land (40 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I); in addition, there are two parcels (355.2 acres) of split-estate Federal/State lands (Federal surface/State minerals) and one parcel of private surface/State minerals (77.7 acres) in the WSA. The figures and acreages given with this alternative are for Federal lands only including Federal surface split-estate lands.

- Management Conditions and Constraints

If the WSA were designated wilderness, all 290,845 acres would be withdrawn from mineral location. This represents an additional withdrawal of 161,885 acres since 128,960 acres are already withdrawn from mineral location by an oil shale withdrawal and public water reserve. Development work, extraction, and patenting would be allowed on that portion of the approximately 60 acres of three existing mining claims and any new claims located prior to wilderness designation if the claims are determined to be valid. Development of these claims would be regulated by unnecessary or undue degradation guidelines with wilderness considerations (43 CFR 3809). Because locatable minerals are not known or expected to be in the WSA, it is unlikely that any mining claims would actually be developed (see Appendix 6 in Volume I for mineral and energy development projections). The WSA would also be closed to new mineral leasing and sale. After designation, existing oil and gas leases involving 42,311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BOUNDARY VARIATION
UINTAH AND OURAY INDIAN RESERVATION
UINTAH AND OURAY INDIAN RESERVATION
Map 2
ALL WILDERNESS ALTERNATIVE
Desolation Canyon WSA
UT-060-068A1
Legend
All Wilderness Alternative (290,005 acres)
WSA Boundary Variation (Increases the All Wilderness Alternative to 290,845 acres)
Indian Reservation Boundary
SCALE IN MILES
SCALE IN KILOMETERS
ELEVATION EXPRESSED IN METERS
N
BECKWITH PLATEAU
CLIFFS
CANYON

acres would be phased out upon expiration unless an oil or gas find in commercial quantities is shown. It is projected that about 5,860 acres of oil and gas leases held by production would continue and would be developed following designation. Coal, tar sand, or oil shale development would not be allowed in the wilderness area.

Present domestic livestock grazing levels would continue as now authorized in the BLM planning documents. The 6,794 AUMs of forage in the WSA would remain available to livestock as presently allotted. Use and maintenance of range developments existing at the time of designation, as listed for the No Action/No Wilderness Alternative, would continue in the same manner as in the past, based on practical necessity and reasonableness. The proposed spring development and small pond maintenance would be allowed while the diversion dam would not be allowed. The existing wild horse herd of 25 animals would remain.

The water diversion structure proposed on Rock Creek would be constructed consistent with wilderness management guidelines. Major reservoir construction on the Green River would not be allowed with wilderness designation, but is not projected in any case.

The reclamation withdrawals, power site classifications, and Federal power projects would be removed from the WSA prior to, or following, designation; the public water reserves would continue.

New future bighorn sheep and elk transplants would be allowed.

The entire WSA would be closed to ORV use except for: (1) those users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved range developments, including those mentioned above. About 5.5 miles of existing vehicular way in the WSA would not be available for vehicular use, except as indicated above. Existing roads would be cherry-stemmed in four locations, totaling 29.5 miles: (1) Cedar Ridge, 1.5 miles; (2) the north side of Cedar Ridge Canyon, 3.0 miles; (3) along the east side of the Green River to Nefertiti Rapid, 7 miles; and (4) from Price River onto the Beckwith Plateau, 18 miles. These 29.5 miles of cherry-stemmed roads and about 18 miles of existing unpaved roads following the WSA boundary would remain open to vehicular travel. Vehicular use also would continue on roads that dead end at the boundary of the WSA in nine locations.

Low speed, wakeless downstream use of small outboard motors would be allowed to continue on the Green River along the east border of the WSA and through Gray Canyon.

Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means, for use on site.

Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The Historical Landmark and Archaeological District would continue, as noted under the No Action/No Wilderness Alternative.

- Action Scenario

Implementation of the All Wilderness Alternative would result in approximately 143 acres of surface disturbance. About 40 acres of surface disturbance would result from development of unitized areas and leases held by production in the Cedar Ridge-Jack Canyon and Big Horn Benches areas. Development would occur as described in the No Action/No Wilderness Alternative, except on a smaller scale. Approximately four wells would be drilled requiring 4 miles of new access road. No coal exploration or development would occur with this alternative because there are currently no coal leases in the WSA and new leases would not be issued prior to wilderness designation. New mineral location or leasing would not be allowed following wilderness designation.

About 100 acres would be disturbed resulting from access road construction to in-held State lands for mineral development purposes as previously described. This access could occur anywhere in the WSA but is most likely in Beckwith Plateau and Rattlesnake Canyon areas. Once constructed, these roads would remain for a long-term period of time.

Other actions projected for this alternative include the reconstruction of an existing diversion structure on Rock Creek, construction of a new

diversion structure, one spring development, and maintenance and enlargement of one small pond. About 3 acres of surface disturbance would result from these actions. No other livestock, wildlife habitat, or watershed improvement projects are projected with this alternative.

No disturbance from ORV activity is projected due to rugged terrain and wilderness management constraints.

Recreation use is projected to increase from the current estimated use of 70,000 visitor days per year to about 82,845 visitor use days per year by the year 2020. All use would be primitive in nature.

• Large Partial Wilderness Alternative (Proposed Action) (224,850 Acres)

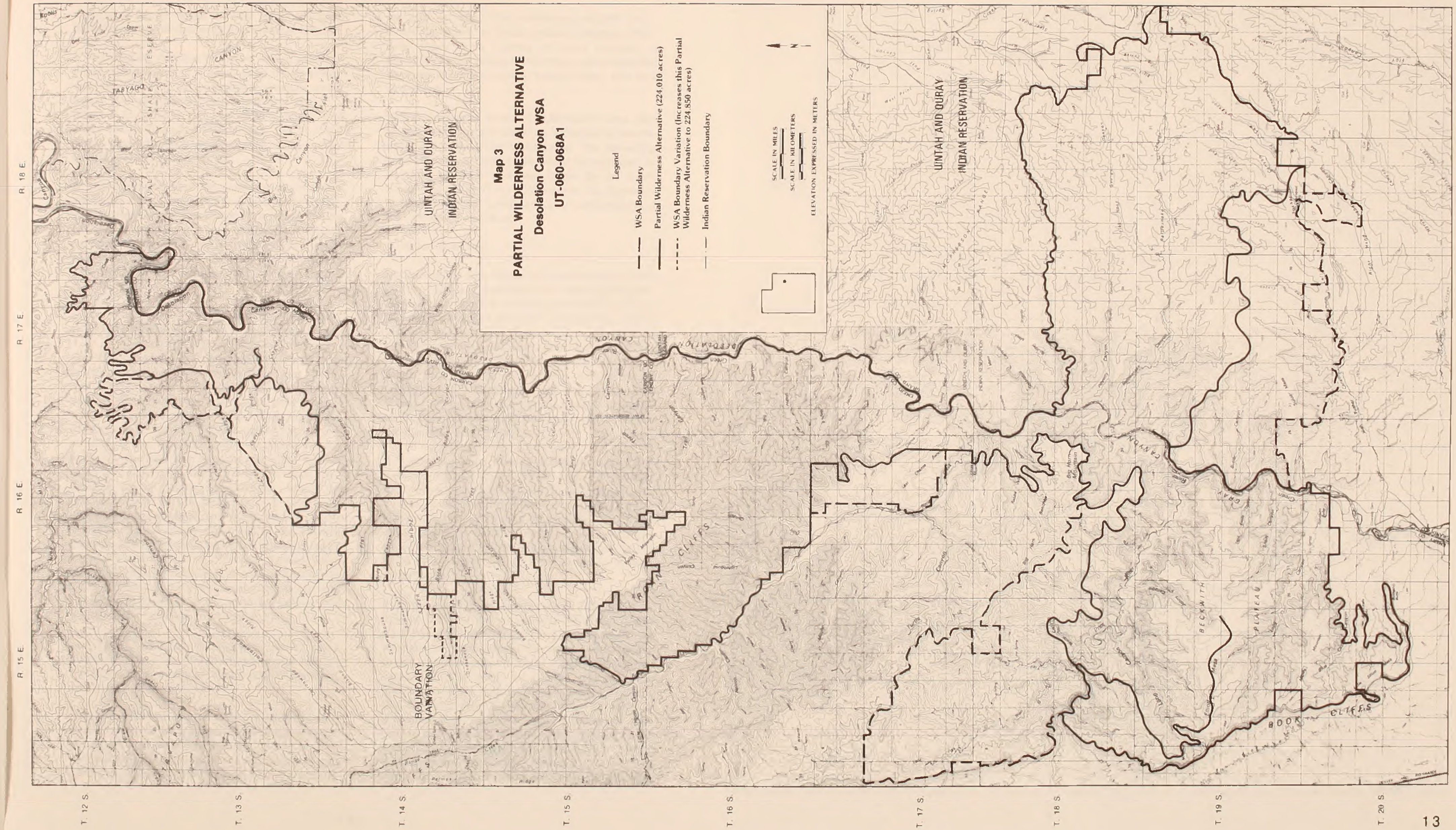
With this alternative, 224,850 acres of the Desolation Canyon WSA would be designated as wilderness (refer to Map 3). This alternative also includes an 840-acre addition to the WSA boundary in the upper part of the Rock Creek drainage. The objective of this alternative is to analyze as wilderness that portion of the WSA with the maximum primitive recreational opportunities while deleting some areas most likely to conflict with other uses or resources. Refer to Appendix 11 in Volume I for a summary of rationale for the BLM Proposed Action. The 65,995-acre area that would not be designated as wilderness would be managed in accordance with the BLM land use plans as described for the No Action/No Wilderness Alternative. The 224,850-acre area that would be designated as wilderness would be managed in accordance with the BLM's Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA and due to BLM Wilderness Management Guidelines regarding private lands, it is projected that State and private lands would remain under existing ownership. There are 36 State sections (19,379.4 acres), two split-estate sections with Federal surface/State minerals (355.2 acres), and two tracts of private land (117.7 acres) in the portion of the WSA that would be designated wilderness, including one parcel of 77.7 acres with private surface/State minerals (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given for this alternative are for Federal lands only including Federal surface split-estate lands.

• Management Conditions and Constraints

The 224,850 acres that would be designated wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. This represents a 109,410 acre increase in withdrawn lands. About 52,475 acres of the 65,995-acre area not designated would be open to mineral location, while the remainder would remain closed due to the oil shale withdrawal and public water reserves. In the designated area, development work, extraction, and patenting would be allowed to continue on the 60 acres of three existing mining claims and any new claims located prior to designation, provided they are valid. Development on these claims would be regulated by unnecessary or undue degradation guidelines with wilderness consideration. Development is not expected because the probability of occurrence of economically recoverable, locatable minerals is low. Existing oil and gas leases, covering 30,012 acres in the area that would be designated wilderness, would be phased out upon expiration unless a find in commercial quantities is shown. Approximately 1,560 acres of leases held by production in the vicinity of Jack Creek would continue. The 16,599 acres under oil and gas lease in the nondesignated area could be developed without concern for wilderness values. The 65,995-acre area that would not be designated as wilderness would be managed under oil and gas leasing Category 1 (25 acres), Category 2 (62,140 acres), and Category 4 (3,830 acres). The presence of producing gas wells indicates the likelihood of future exploration, and oil and gas production is high. Also, within the nondesignated portion, coal exploration and development within an 8,000-acre area near Little Park Wash could occur. Tar sand and oil shale exploration and development would be allowed within the nondesignated portion, however, the depth and quality of oil shale and tar sand indicate that these resources would not be developed even without wilderness designation.

Domestic livestock grazing would continue at present levels (5,316 AUMs) in the 224,850-acre area that would be designated. Three improved springs, one trough, and six fence segments in the 224,850-acre area could be used and


Map 3
PARTIAL WILDERNESS ALTERNATIVE
Desolation Canyon WSA
UT-060-068A1
Legend
WSA Boundary
Partial Wilderness Alternative (224,010 acres)
WSA Boundary Variation (Increases this Partial Wilderness Alternative to 224,850 acres)
Indian Reservation Boundary
SCALE IN MILES
SCALE IN KILOMETERS
ELEVATION EXPRESSED IN METERS
UINTAH AND OURAY INDIAN RESERVATION
BOUNDARY VARIATION
DESOLATION CANYON
BOOK CLIFFS
BECKWITH PLATEAU
TABYAGO
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maintained in the same manner as in the past, based on practical necessity and reasonableness.

It is projected that the proposed spring development, maintenance of a small pond development, and reconstruction of a diversion structure would occur. The existing wild horse herd would be allowed to remain. In the 65,995 acres that would not be designated wilderness, use of 1,478 AUMs would continue as authorized in the applicable BLM planning documents.

A proposed diversion structure on Rock Creek would be built. It is assumed that future reservoir construction on the Green River would not be allowed, although none was projected even with nondesignation. Reclamation withdrawals, power site classifications, and Federal power projects would be removed while public water reserves would continue.

Bighorn sheep and elk transplants would be allowed in both the designated and nondesignated areas.

The 224,850-acre area that would be designated wilderness would be closed to ORV use. Within this area, vehicular activity would be allowed only by BLM permit for users with valid mineral rights or for maintenance of approved rangeland developments. About 5.5 miles of existing vehicular way in the 224,850-acre area would not be available for vehicular use, except if the criteria given in the All Wilderness Alternative were met. Existing roads, totaling 19.5 miles, would be cherry-stemmed in two locations: (1) north side of Cedar Ridge Canyon, 1.5 miles; and (2) Beckwith Plateau, 18 miles. ORV use in the 65,995-acre nondesignated area would be limited to existing roads and trails. The 10 miles of cherry-stemmed road not in the designated area and about 14 miles of road forming the boundary, along with six roads dead-ended at the boundary of this alternative, would be open to vehicular travel.

Low speed, wakeless downstream use of small outboard motors would be allowed to continue on the Green River along the east border of the WSA and through Gray Canyon.

Harvest of forest products in the 224,850-acre area that would be designated wilderness would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means, for use on site. The remaining 65,995 acres would be open to forest product harvest. However, there is no harvest of forest products in the WSA at the present time, nor is any expected because of limited access, steep terrain, and lack of demand.

Visual resources in the 224,850-acre area that would be designated would be managed in accordance with VRM Class I standards. The remaining nondesignated 65,995 acres would be managed as Class II on 54,875 acres, Class III on 3,600 acres, and Class IV on 7,520 acres. Management of the Historical Landmark and Archaeological District would continue.

- Action Scenario

Approximately 273 acres of surface disturbance in the WSA are projected with this alternative. Eighty three acres of surface disturbance are projected for the 224,850-acre designated portion of the WSA. Ten acres would be disturbed as a result of oil and gas development on leases held for production as discussed for the All Wilderness Alternative. The majority of this activity would take place in Jack Canyon with some activity on leases held by production in the area. It is estimated one well would be drilled requiring about two miles of new access road.

It is also projected that 70 acres of surface disturbance would result from 35 miles of access-road construction to in-held State sections for mineral development purposes as discussed in the No Action/No Wilderness Alternative. All of the other projected developments (mostly livestock) would be located in the designated portion of the WSA. They would result in 3 acres of surface disturbance.

It is projected that approximately 190 acres of surface disturbance would occur in the 65,995-acre nondesignated portion of the WSA in the foreseeable future. About 160 acres would be disturbed due to leasable mineral exploration and development (150 acres for oil and gas activities and 10 acres for coal activities) as discussed for the No Action/No Wilderness Alternative. It is projected that 15 wells and 15 miles of new access would be constructed in the nondesignated area. Employment would be as projected for the No Action/No Wilderness Alternative. About 30 acres of surface disturbance would result from

up to 15 miles of access-road construction to State lands as previously described.

No disturbance related to ORV activity is projected due to wilderness management constraints and rugged terrain.

Recreation use is projected to increase from the current estimated use of 70,000 visitor use days per year to about 82,845 visitor use days per year by the year 2020. Less than 1 percent of the use would involve vehicular access.

• Small Partial Wilderness Alternative (144,510 Acres)

With this partial wilderness alternative, 144,510 acres of the Desolation Canyon WSA would be designated as wilderness (refer to Map 4). The objective of this alternative is to identify and analyze that portion of the WSA with wilderness characteristics primarily associated with the side canyons of the Green River and to provide for maximum development of other resources in the WSA. The 146,335-acre area within the WSA that would not be designated wilderness would be managed in accordance with the BLM land use plans, as described in the No Action/No Wilderness Alternative. The 144,510-acre area that would be designated as wilderness would be managed in accordance with BLM's Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative.

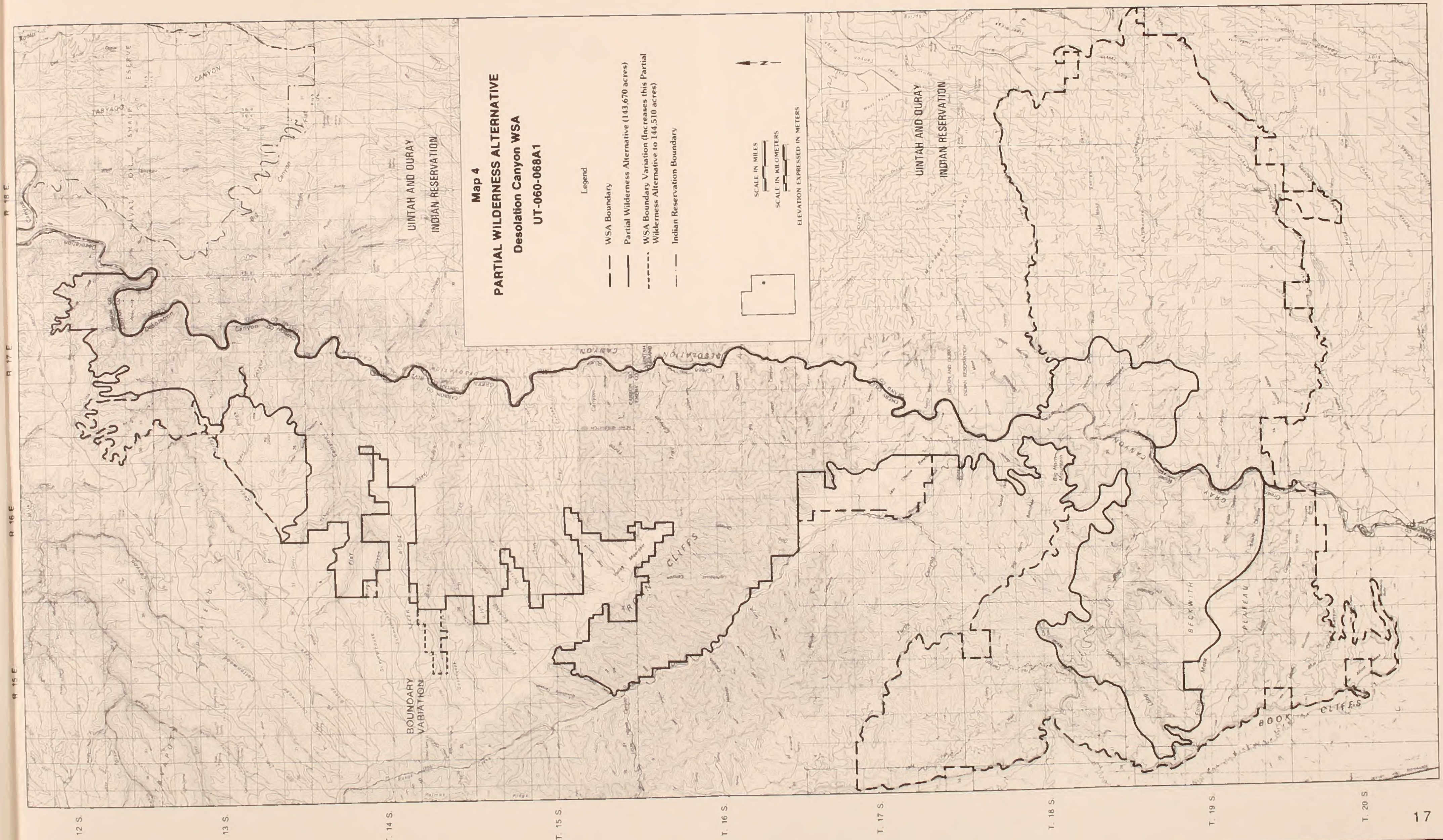
Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, and due to BLM Wilderness Management Guidelines regarding private lands, it is projected that State and private lands would remain under existing ownership. There are 19 State sections (10,901.1 acres), one split-estate section with Federal surface/State minerals (320 acres), and one parcel (77.7 acres) of private surface/State minerals in the area that would be designated wilderness. The figures and acreages given for this alternative are for Federal lands only, including Federal surface split-estate lands.

• Management Conditions and Constraints

The 144,510 acres that would be designated wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. This would be withdrawal of an additional 28,470 acres. Existing oil and gas leases, covering 17,987 acres, would be phased out upon expiration unless a find in commercial quantities occurs. Approximately 1,560 acres of leases held by production in the Jack Creek area would continue following designation. The 146,335-acre nondesignated area would be managed as leasing Category 1 (600 acres), Category 2 (141,285 acres), and Category 4 (4,450 acres) for existing and new leases. Because of present production in the WSA, development of oil and gas is likely. About 128,880 acres of this area would remain open to mineral location. Development work, extraction, and possible patent of three existing claims (60 acres) and future mining claims could occur without concern for wilderness values. Because of low resource potentials, actual development is unlikely in the foreseeable future (see Volume I, Appendix 6). The remaining 17,455 acres would remain closed to mineral location on oil shale withdrawal. Within the nondesignated area, coal is located on 8,000 acres and could be developed. Tar sand and oil shale exploration and development could also occur within the nondesignated portion, but because of depth of the resource and economic considerations, development of these resources is not considered likely in the foreseeable future.

Domestic livestock grazing in the WSA would continue as presently authorized (3,566 AUMs) in the 144,510 acres that would be designated wilderness. Existing range developments (three improved springs, one trough, and four fence segments) in the 144,510-acre area could continue to be maintained in the same manner as in the past, based on practical necessity and reasonableness. The proposed reconstruction of a water diversion on Rock Creek would occur. The existing wild horse herd would remain in the area. In the 146,335-acre area that would not be designated, use of 3,228 AUMs would continue as authorized in the applicable BLM planning documents. Existing range developments (two reservoirs and two fence segments) could be used and maintained. The proposed spring development and maintenance of a small pond would be allowed without consideration of wilderness values.

Major reservoir construction on the Green River would not be allowed if proposed in the future. It is also projected that the proposed Rock Creek diversion would be built, and that reclamation withdrawals, power site classifications, and Federal


Map 4
PARTIAL WILDERNESS ALTERNATIVE
Desolation Canyon WSA
UT-060-068A1
Legend
WSA Boundary
Partial Wilderness Alternative (143,670 acres)
WSA Boundary Variation (Increases this Partial Wilderness Alternative to 144,510 acres)
Indian Reservation Boundary
SCALE IN MILES
SCALE IN KILOMETERS
ELEVATION EXPRESSED IN METERS
UINTAH AND OURAY
INDIAN RESERVATION
UINTAH AND OURAY
INDIAN RESERVATION
BOUNDARY
VARIATION
CANYON
CLIFFS
BECKWITH
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power projects would be removed from the WSA while public water reserves would continue.

Transplants of bighorn sheep and elk into the WSA would be allowed.

The hills, ridges, and canyons comprising the 144,510 acres that would be designated wilderness would be closed to ORV use. Within this area, vehicular activity would be allowed only by BLM permit for users with valid mineral rights or for maintenance of approved rangeland developments. Approximately 3.5 of the 5.5 miles of vehicular way in the WSA are located in the proposed wilderness acreage. These 3.5 miles would not be available for vehicular use after designation, except if the criteria given in the All Wilderness Alternative were met. One existing road would be cherry-stemmed in the wilderness area. It is located on the north side of Cedar Ridge Canyon and extends into the wilderness portion of the WSA about 1.5 miles. Use of vehicles in the 146,335-acre nondesignated area would be limited to existing roads and trails, including 2 miles of way. The cherry-stemmed roads and roads forming the boundary of this alternative would be open to vehicular travel.

Low speed, wakeless downstream use of small outboard motors would be allowed to continue on the Green River along the eastern boundary of the WSA and through Gray Canyon.

Harvest of forest products in the 144,510 acres designated as wilderness would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means for use in the wilderness. The remaining 146,335 acres would be open to forest product harvest. However, there is no harvest in the WSA at the present time, nor is any planned.

Visual resources on the 144,510 acres designated as wilderness would be managed in accordance with VRM Class I standards. The remaining 146,335 acres would be managed as Class II on 132,675 acres, Class III on 6,000 acres, and Class IV on 7,660 acres. Management of the Historical Landmark and Archaeological District would continue.

- Action Scenario

About 173 acres of the WSA would be disturbed in the foreseeable future. Approximately, 40 acres of surface disturbance are projected for the 144,510-acre designated portion of the WSA. Ten acres would be disturbed as a result of oil and gas development in unitized areas as discussed for the All Wilderness Alternative. It is estimated that a well would be drilled requiring two miles of new access road in the designated area near Peter's Point. It is also projected that 30 acres of surface disturbance would take place as a result of construction of 15 miles of access road to in-held State lands for mineral development purposes as previously discussed.

It is projected that approximately 333 acres of surface disturbance would occur in the 146,335-acre nondesignated portion of the WSA in the foreseeable future. About 260 acres would be disturbed due to leasable mineral exploration and development (250 acres for oil and gas activities and 10 acres for coal activities) as discussed in the No Action/No Wilderness Alternative. It is projected that 25 wells and 19 miles of access road would be constructed in the nondesignated area. Employment would be as described for the No Action/No Widlerness Alternative. About 70 acres of surface disturbance would result from construction of 35 miles of new access-road construction to State lands as previously described.

All of the other projected developments (mostly livestock) would be located in the nondesignated portion of the WSA, resulting in 3 acres of surface disturbance.

No disturbance related to ORV activity is projected due to wilderness management and terrain constraints.

Recreation use is projected to increase from the current estimated use of 70,000 visitor use days per year to about 82,845 visitor use days per year by the year 2020. Less than 1 percent of the use would involve vehicular access.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of the alternatives analyzed in detail.

DESOLATION CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	No Action/No Wilderness	All Wilderness (290,845 Acres)	Large Partial Wilderness (224,850 Acres)	Small Partial Wilderness (144,510 Acres)
	Alternatives			
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 423 acres of the WSA. The disturbance would be due to mineral exploration and development, rangeland projects, and access to State in-holdings. Class A scenery would be directly reduced in quality in disturbed areas. Opportunities for solitude and primitive recreation, wildlife habitat, and scenic quality would be indirectly reduced in quality on up to 116,338 acres of the WSA. Wild and scenic river values would not receive additional protection but no loss is anticipated in the foreseeable future.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation and scenic quality would be directly lost on 143 acres of the WSA. The disturbance would be due to mineral exploration and development, rangeland projects, and access to State in-holdings. Opportunities for solitude and primitive recreation, habitat for wilderness-dependent wildlife species, and scenic quality would be indirectly reduced in quality on up to 58,170 acres of the WSA. All wild and scenic river values would receive additional protection.	Wilderness values would be preserved overall in the designated area which is 77 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost and Class A scenery would be directly reduced in quality on 223 acres of the WSA. The disturbance would be due to mineral exploration and development, rangeland projects, and construction of access to State in-holdings. Opportunities for solitude and primitive recreation, visual qualities, and habitat for wildlife associated with wilderness would be indirectly reduced in quality on up to 87,253 acres of the WSA. Most of the impact would be in the nondesignated area. All wild and scenic river values would receive additional protection.	Wilderness values would be preserved overall in the designated area which is 50 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost and the quality of Class A scenery would be directly reduced on 373 acres of the WSA. The disturbance would be due to mineral exploration and development, rangeland projects, and access to State in-holdings. Opportunities for solitude and primitive recreation, visual qualities, and habitat for wildlife associated with wilderness would be indirectly reduced in quality on up to 101,795 acres of the WSA. Most of the impact would be in the nondesignated area. All wild and scenic river values would receive additional protection.
Impacts on Geology and Topography	Topography would be altered by surface disturbance on about 0.1 percent (423 acres) of the WSA. Underground mining of coal would cause subsidence and surface fractures on up to 2.7 percent (8,000 acres) of the WSA.	Topography would be altered on 0.05 percent (143 acres) of the WSA.	Topography would be altered by surface disturbance on 0.09 percent (273 acres) of the WSA. Underground mining of coal would cause subsidence and surface fractures on 2.7 percent (8,000 acres) of the WSA.	Topography would be altered by surface disturbance on about 0.13 percent (373 acres) of the WSA. Underground mining of coal would cause subsidence and surface fractures on up to 2.7 percent (8,000 acres) of the WSA.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (290,845 Acres)	Large Partial Wilderness (224,850 Acres)	Small Partial Wilderness (144,510 Acres)
Impacts on Soils	There would be localized increases of erosion on 423 acres. Overall, annual soil loss from the WSA would increase by 1 percent (2,068 cubic yards).	There would be localized increases in erosion. Overall, soil loss from the WSA would increase by about 0.4 percent (699 cubic yards per year).	There would be localized increases to erosion on 273 acres (0.09 percent of the WSA). Overall soil loss from the WSA would increase by 0.7 percent (1,335 cubic yards per year).	There would be localized increases in soil erosion on 373 acres. Overall, loss from the WSA would increase less than 1 percent (2,068 cubic yards).
Impacts on Vegetation	Approximately 423 acres (0.1 percent) of the WSA would be modified with this alternative. Populations of special status species would be protected. Because necessary measures would be taken, it is concluded that individual plants could be inadvertently destroyed but the viability of populations of threatened, endangered, or special status plant species would be preserved with this alternative.	About 0.05 percent (143 acres) of the vegetation in the WSA would be disturbed. Populations of endangered, threatened, and special status plant species would be preserved.	Approximately 273 acres (0.09 percent) of the vegetation in the WSA would be modified. Populations of threatened endangered and special status plant species would be preserved.	Approximately 373 acres (0.13 percent) of the vegetation in the WSA would be modified with this alternative. Populations of threatened, endangered, or special status plant species would be preserved.
Impacts on Water Resources	Sediment and salinity in Jack Creek, Range Creek, the Price River, and Rattlesnake, Tusher, and Long canyons would increase slightly as a result of surface disturbance. Such increases would not create measurable changes in water quality in the Green River or the Colorado River system.	There would be slight increases in sedimentation in Jack Creek, Rattlesnake, and Long Canyons. Water quality in the Colorado and Green Rivers would not be measurably altered. Future water diversions and new consumptive uses of water on the Price River upstream of the WSA in Carbon County may be hampered or restricted in order to preserve resources such as recreational uses in the WSA.	Sediment and salinity in Jack Creek, Rattlesnake Canyon, Range Creek, and the Price River would increase slightly as a result of surface disturbance. Such increase would not be measurable in the Green and Colorado rivers. Impacts on water use upstream of the WSA would be the same as with the All Wilderness Alternative because the Price River would flow through the designated area.	Sediment and salinity in Jack Creek, Range Creek, The Price River, and Rattlesnake, Tusher, and Long Canyons would increase slightly as a result of surface disturbance. Such increases would not crate measurable changes in water quality in the Green River or the Colorado River system. Impacts on water use upstream of the WSA would be the same as with the All Wilderness Alternative because the Price River would flow through the designated area.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives			
	No Action/No Wilderness	All Wilderness (290,845 Acres)	Large Partial Wilderness (224,850 Acres)	Small Partial Wilderness (144,510 Acres)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims, and mineral developments could occur without restriction for the protection of wilderness values.	Wilderness designation would not affect production gas wells or future development of leases held by production. Potential for extraction of an unknown but locally significant amount of oil and gas would be foregone. In the long term, 50 to 70 million tons of recoverable coal could not be mined	Potential for extraction of oil and gas would be foregone on 74 percent of the leasable portion of the WSA. Coal exploration and production would not be affected. Loss of recovery potential of other mineral would not be significant because development is unlikely even without partial wilderness designation.	This alternative would not significantly reduce mineral and energy exploration or production from the WSA.
Impacts on Wildlife Habitat and Populations	Wildlife habitat and populations would be reduced slightly by direct disturbance of 0.1 percent (423 acres) of the WSA. Continued human presence and activities over the life of oil and gas wells and coal mines would reduce available habitat and intrude on populations of sensitive black bear, mountain lion, and bighorn sheep over about 40 percent (116,338 acres) of the WSA. Populations of endangered, threatened, and other special status animal and fish species would be preserved.	Wildlife habitat and populations would be protected by wilderness designation. Populations of wilderness-dependent species such as cougar, bear, and bighorn sheep would be adversely affected by activities on about 20 percent (58,170 acres) of the WSA. Populations of endangered, threatened, and special status animal and fish species would be preserved.	Wildlife habitat and populations would be reduced slightly by direct disturbance on 0.09 percent (273 acres) of the WSA. Continued human presence and activities over the life of oil and gas wells and coal mines would reduce avail-able habitat and intrude on populations of sensitive black bear, mountain lion, and bighorn sheep over about 30 percent (87,253 acres) of the WSA. Populations of endangered, threatened, and special status animal and fish species would be preserved.	Wildlife habitats and populations would be reduced by direct disturbance of 373 acres (0.13 percent) of the WSA. Continued activities over the life of development projects would disturb available habitat and possible populations of sensitive black bear, cougar, and bighorn sheep on 35 percent (101,795 acres) of the WSA. Populations of endangered, threatened, and special status animal and fish species would be preserved.
Impacts on Visual Resources	Visual resources would be degraded on approximately 40 percent (116,338 acres) of the WSA. VRM objectives would not be met on 0.1 percent (423 acres) of the WSA.	Visual resources would be protected. Visual resources would be degraded on 20 percent of the WSA and VRM objectives would not be met on 143 acres.	Visual resources would be protected in the designated area. Visual resources would be degraded on approximately 30 percent (78,253 acres) of the WSA and VRM objectives would not be met on 273 acres.	Visual resources would be protected in the designated area. Visual resources would be degraded on approximately 35 percent (101,795 acres) of the WSA and VRM objectives would not be met on 373 acres.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (290,845 Acres)	Large Partial Wilderness (224,850 Acres)	Small Partial Wilderness (144,510 Acres)
Impacts on Cultural Resources	All sites would continue to receive protection under existing laws. Inadvertent loss or damage to archaeological sites may occur due to surface development. Impacts would probably be slight because only 0.1 percent (423 acres) of the WSA would be disturbed. Intentional vandalism and artifact collection may increase due to human presence and continued vehicular access. Cultural resource management would continue without regard to wilderness management considerations.	Cultural resources would receive additional protection and few impacts are expected because only 0.05 percent of the WSA would be disturbed. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.	Seventy of the 76 recorded sites including the Flat Canyon Archaeological District, all National Register eligible sites, and the Desolation Canyon National Historical Landmark, would be protected by wilderness designation. The remaining six recorded sites and all unrecorded sites in the nondesignated portion would continue to be protected by existing laws.	Sixty-one of the 76 recorded sites including the Flat Canyon Archaeological District, all National Register eligible sites, and the Desolation Canyon National Historical Landmark, would be protected by wilderness designation. The remaining 15 recorded sites and all unrecorded sites in the nondesignated portion would continue to be protected by existing laws.
Impacts on Recreation Use	The quality of the primitive recreational experience would be directly degraded on 423 acres and indirectly degraded on about 40 percent (116,338 acres) of the WSA. Vehicular access to 5.5 miles of way would not be affected. Overall, recreational use would increase and water-based recreation on the Green River would not be affected because major disturbance would not occur along the river.	The quality of land and water based primitive recreational use would be protected and use would expand at the same rate as the No Action/No Wilderness Alternative. Overall, recreation use would be directly degraded on 143 acres and indirectly degraded on 20 percent (58,170 acres) of the WSA. The loss of vehicular opportunities in the WSA would not be significant on a regional basis because of the availability of nearby ORV areas.	Primitive recreation opportunities would be protected in the designated area. The quality of primitive recreation opportunities would be directly degraded on 273 acres and indirectly degraded on 30 percent (87,253 acres) of the WSA. Overall, recreational use would increase at the same rate as the other alternatives.	Primitive recreation opportunities would be protected in the designated area. The quality of the primitive recreational experience would be directly degraded on 373 acres and indirectly degraded on about 35 percent (101,735 acres) of the WSA. Overall, recreational use would increase at the same rate as the other alternatives.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives: No Action/No Wilderness	All Wilderness (290,845 Acres)	Large Partial Wilderness (224,850 Acres)	Small Partial Wilderness (144,510 Acres)
Impacts on Economic Conditions	Implementation of the No Action/No Wilderness Alternative would not alter existing local economic conditions. Future increases in recreation use, and oil, gas, and coal exploration and development would contribute significantly to the local economy of Carbon, Emery, and Grand Counties. Coal, oil, and gas development could increase employment in Carbon County by up to 500 jobs at one time. This would be a 3.8 percent increase in the projected employment in the county in the year 2010. Recreation-related local sales could contribute up to $1,264,265 to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $484,110 to over $1 million per year depending on production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would continue.	The potential for 300 jobs related to coal mining would be foregone. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue on 5,860 acres of leases held by production, but would be for a shorter period of time than with the No Action/ No Wilderness Alternative because potential for oil and gas production would be foregone on 97.6 percent of the leasable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 annually to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $472,390 annually would be foregone because 236,195 acres presently open to lease and not held by production could not be leased. Additionally, potential Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.	In the long term, coal mining would provide 300 jobs. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue in the nondesignated area and on 1,560 acres of leases held by production in the designated area, but would be for a shorter period of time than with the No Action/ No Wilderness Alternative because potential for oil and gas production would be foregone on 74 percent of the leasable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $356,660 annually would be foregone because 178,330 acres presently open to lease and not held by production could not be leased. Additionally, potential Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.	In the long term, coal mining would provide 300 jobs. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue in the nondesignated area and on 1,560 acres of leases held by production in the designated area, but would be for a shorter period of time than with the No Action/ No Wilderness Alternative because potential for oil and gas production would be foregone on 41 percent of the leasable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $197,220 annually would be foregone because 98,610 acres presently open to lease and not held by production could not be leased. Additionally, potential Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. The probability of this impact would be less than with the All Wilderness and Large Partial Wilderness Alternatives. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.

DESOLATION CANYON WSA

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

At 290,845 acres, Desolation Canyon WSA easily meets the size criteria for wilderness study. Its configuration is irregular, but approximates an L-shape. The WSA is about 50 miles long, north to south, and ranges in width from 1 to 28 miles, east to west.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Spruce, Flume, Turtle and Jack Canyons WSAs) that are wither managed as roadless or are under study for wilderness status.

- Naturalness

The road along the Price River and onto the Beckwith Plateau presents an imprint to naturalness, but has been excluded from the WSA by cherry-stemming. It was mechanically constructed and maintained in 1974 and 1975 and has segments of cut and fill and/or removed tree cover. It is about 18 miles long and ends in a drill site that was identified as a significant imprint by visual resources during the wilderness inventory.

In the head of Naylon and Bobby canyons, segments of a way constructed in the 1950s to access mining prospects remain. All segments are inaccessible and for the most part are only visible for short distances. Four prospects are located along the way. These affect a small area and also are not substantially noticeable.

Other imprints in the WSA include two livestock reservoirs, five spring developments, historic structures, gap fences, and a trough, none of which are considered substantially noticeable.

A 5.5-mile long way in Little Park is used for access to maintain livestock ponds as needed. A 1-mile section of mechanically constructed trail (not passable by vehicles) runs between Range Creek and the Last Chance Benches. About 4 miles of two partially revegetated seismograph lines extend out on the points between the Green and Price rivers. Portions of an abandoned road extending about 6 miles along the west side of the Green River between Gunnison Butte and the Price River are still visible, although much of the road has either revegetated or been covered by land slides.

Since the intensive inventory, about 4.2 miles of road and 6.2 acres of gas well pad disturbance has occurred for purposes of drilling five sites in the WSA. This disturbance occurred on leases issued between 1951 and 1971. Production has been attained at three of the sites, and the roads are likely to remain for 20 to 30 years. About 1.5 miles of road also extends to a drill site along Cedar Ridge to the south of Jack Creek (now cherry-stemmed from the WSA). About 3 miles of abandoned road extends out of a southern fork of Cedar Ridge to an abandoned drill site. This also is cherry-stemmed from the WSA. Some revegetation has occurred and it is not believed to receive any use at this time.

Other surface-disturbing activities that have occurred since the BLM Wilderness Inventory, include seismic lines, trail maintenance, and stream exclosures and stabilization structures on Rock Creek. These activities have not significantly affected the naturalness of the WSA as a whole. In 1989, approximately 1,800 acres on the northern edge of Rattlesnake Canyon were burned by wild fire.

Overall, imprints significantly affect about 1 percent (2,935 acres) of the WSA. The remainder of the WSA (essentially 287,910 acres) meets the naturalness criterion for areas under wilderness review.

- Solitude

The size, configuration, topography, and vegetation of the WSA enhance opportunities for solitude. Canyons ranging from 1,000- to 5,000-feet deep are separated by narrow ridges in the north and benches or plateaus in the south. There are about 400 to 450 miles of canyon bottom within the WSA. Lines of sight along the bottoms rarely exceed 0.5 mile and are

usually considerably less. Canyons in the north half of the WSA generally become more V-shaped from east to west. Canyons along the river and in the south of the WSA nearly all alternate near vertical walls with steep talus slopes. The topography in 90 percent (261,760 acres) of the WSA creates outstanding opportunities for solitude.

In about 65 percent (189,000 acres) of the WSA, vegetation augments opportunities for solitude based on significant cover by tree or large shrub species. The remaining 35 percent (101,845 acres) is dominated by rock outcrop and smaller brush types which do not contribute to opportunities for solitude in the WSA.

One off-site influence that affects opportunities for solitude is the presence of the Uintah and Ouray Indian Reservation along the Green River. This land is rugged and scenic and has topographic and vegetation features similar to those on the opposite side of the river. It is undeveloped with the exception of a dirt road between Chandler Canyon and Florence Creek that has been impassable to most vehicles since 1983.

The most significant off-site influences include the town of Green River near the WSA on the south and vehicular use of 7 miles of cherry-stemmed county road east of the Green River. The road receives regular vehicle use, and recreational use is a combination of day use, floatboating, and park use by residents of Green River. Elsewhere, the WSA is separated from the town by 1,000-foot cliffs. The roads in Jack Creek and on Cedar Ridge affect opportunities for solitude as they are regularly used to check the existing well locations. Interstate 70 (I-70) and Utah Highway 6/50 are visible from points along the Book Cliffs at distances of 2 to 5 miles. Vertical separation is about 1,000 feet and influence on solitude is not significant. The Book Cliffs, ridge tops, and high benches south of the Roan Cliffs offer extensive overlooks of the terrain within the WSA. Looking from the WSA outward are vistas of mountain ranges to the north, south, and west 50 to 100 miles away.

In all, about 90 percent (261,760 acres) of the WSA meets the criterion for solitude due to very rugged terrain or to terrain and vegetation. Another 9 percent of the WSA (26,150 acres) in the areas where topographic screening is not dominant, also meet the criterion due solely to vegetative cover. In the remaining 1 percent (2,935 acres) in the drainages of Jack Creek, on Cedar Ridge, and along the east side of the Green River along the existing roads, opportunities for solitude are less than outstanding.

- Primitive and Unconfined Recreation

Recreational opportunities are discussed in detail in the Recreation section. The entire WSA is very well suited for a diversity of outstanding primitive recreation. Present use is primarily whitewater river running, and the camping, hiking, fishing, swimming, and sightseeing activities associated with it. Based on these opportunities, the entire WSA meets the outstanding primitive recreation criterion for areas under wilderness review. Outstanding opportunities and uses likely to expand in the near future include horseback activities and more extensive hiking, including backpacking or dayhikes from lodges or access points around the WSA. Hunting uses would be expected to continue, and some increased use for mountaineering or winter sports may occur.

- Special Features

The WSA has a substantial number of important features. Elevation varies by more than 5,500 feet and types of vegetation and wildlife habitat vary. In the north portion of the WSA, water is relatively abundant, especially for an area in the arid southwest. The extreme ruggedness of the terrain contributes to the WSA's scenic quality, remoteness, and habitat for species such as raptors and bighorn sheep which are sensitive to development. The WSA contains both canyon desert and high mountain environments.

Among the most unique of the special features is Desolation Canyon's topographical diversity. The WSA has an extensive system of deep canyons. The canyon at Rock Creek is over 1 mile deep. The WSA contains arches, pinnacles, and other erosional remnants not known to occur elsewhere in the Wasatch Formation in similar concentrations or settings. Vegetation is diverse, ranging from desert to high mountain types in a distance of only 5 or 10 miles. The Uintah Basin hookless cactus (Sclerocactus glaucus) is a threatened plant species that may occur in or near the WSA. There are five plant species that are considered special status that occur, or may occur, within the WSA. The diversity of wildlife in the WSA is unusual compared with public lands surrounding the WSA. There are six animal species (peregrine falcon, black-footed ferret, bald eagle, Colorado squawfish, humpback chub, and bony-tail chub) listed as endangered that occur, or may occur, in the WSA.

There are ten other special status animal species and five plant species that are considered sensitive that occur, or may occur, within the WSA. One of these species, the razorback sucker, has been designated as threatened in Utah by UDWR. The WSA has populations of cougar, elk, Rocky Mountain bighorn sheep and black bear, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

Approximately 90 percent (261,860 acres) of the WSA is rated Class A for scenic quality.

The WSA includes both Flat Canyon Archaeological District and a portion of Desolation Canyon National Historical Landmark. The WSA has several known archaeological sites in addition to those in the archaeological district. Seven of the known sites are potential National Register sites (refer to the Cultural Resources section).

The Range Creek wild horse herd of approximately 25 horses is located on Cedar Ridge in the WSA.

Water is abundant in the northern half of the WSA. The WSA has about 200 miles of perennial rivers and streams. Approximately 191 miles of three rivers (Green River, Price River, and Range Creek) that flow through the WSA are wild and scenic river inventory segments.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland, saltbush-greasewood, and Douglas fir forest. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Affected Environment, Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is located in a PSD Class II air quality attainment area as defined in the 1977 Clean Air Act Amendments, and currently meets National Air Quality Standards. The nearest Class I areas are Arches National Park, 24 air miles to the southeast, and Canyonlands National Park, about 50 air miles to the south. Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River and Moab areas, and the Uinta Basin. Point sources in the vicinity include power plants in Castle Valley, and coal, oil and gas exploration, production, and processing activities. Fugitive dust, the most significant air pollutant to the WSA, is intermittent depending mainly on localized activities and wind patterns. Visibility from promontories in the WSA remains good, ranging from 30 to 100 miles (Aerocomp, Inc., 1983).

Geology and Topography

The Desolation Canyon WSA is located on the southern flanks of the Uinta Basin section of the Colorado Plateau Physiographic Province that extends from the Book Cliffs to the Uinta Mountains. Elevations range from about 4,000 feet to over 9,600 feet. The Uncompahgre Uplift crosses the southern portion of the WSA and goes deeper to the south. Sedimentary rocks exposed at the surface in the WSA range from the Cretaceous to the Tertiary periods. The exposures represent approximately 9,500 feet of sedimentary strata between the Parachute Creek Member of the Green River Formation and the Mancos Shale. These formations which extend from Colorado to central Utah are known to be fossiliferous. The Mancos Shale contains an abundance of marine invertebrates. The Green River Formation is famous for its well-preserved invertebrate, vertebrate, and plant fossils. Fossil assemblies, including important vertebrate fossils, have also been found in the upper Cretaceous formations represented in the WSA.

From the north boundary south to Big Swale and the mouth of Flat Canyon, 80- to 250-foot tongues of interbedded outcrops consist of members of the Green River Formation, and 250- to 900-foot tongues of Wasatch Formation outcrop in buff, brown, red, black-stained, and gray-green sandstones and shales.

South from about Flat Canyon to the Roan Cliffs, the Green River cuts through an additional 2,000 feet of sandstones and shales of the Wasatch Formation, which is increasingly more down-warped toward the Uinta Basin to the north from the Roan Cliffs. These walls of Desolation Canyon and its tributary canyons, including the upper reaches of Range Creek and canyons to its north, rise 3,000 to 5,000 feet above the river. The canyons meet the Parachute Creek Member

of the Green River Formation, which caps the Tavaputs Plateau at elevations ranging from 8,000 to 9,600 feet. At the Green River, these canyons vary considerably in width. Some are open at their confluence (e.g., Three Canyon), while Calf Canyon, only 2 miles upstream from Three Canyon, presents a very narrow opening. Between the river and the plateau, canyons vary in steepness and length. Some rise the 3,000 to 5,000 feet quickly in 3 to 6 miles; others rise more gradually. Ridges separating these canyons are sharp, rugged, rocky, and irregular. The Roan Cliffs area at the south of this portion of the WSA is a very formidable series of broken cliffs, pinnacles, and spires blocked out from the red lower unit of the Wasatch Formation.

South from the base of these formidable cliffs topography changes dramatically with the change in formations exposed at the surface. A thin layer of Flagstaff limestone marks the transition to the sandstones and shales of North Horn, Tusher, Farrer, Price River, and Blackhawk formations to the south. Vertical relief between canyon bottoms and benches ranges from 1,000 to 2,000 feet. Elevations range from about 4,000 feet to just over 7,000 feet west of the Green River and from about 4,140 to 9,200 feet east of the river. To the south and west, the WSA is bounded by the 1,000-foot Book Cliffs comprised of the same formations. The cliff line is skirted at the base by Mancos talus slopes and badlands that are not within the WSA.

Soils

About 30 percent (86,895 acres) of the WSA is rock outcrop and rubble. Along the Green and Price rivers, soils are generally deep to very deep alluvial bottom types manifested in sandy, gravelly, and loamy terraces or alkali flats. From the Roan Cliffs north, soils in the tributary canyon bottoms grade from deep loams to deep mountain loams, while to the south deeper soils in the drainages generally grade to shallow loams or rubble land. The upper reaches of Range Creek, Rattlesnake, and Flat Nose George canyons are exceptions where deep loamy soils occur in the drainage bottoms.

In nearly 45 percent (131,503 acres) of the WSA, steep slopes influence both deep and shallow soils present. Soils on these slopes are protected by extremely gravelly, stony surfaces and/or dense vegetation. North of the Roan Cliffs, soils on the slopes near the river are shallow loams grading to deep mountain loams in 1 to 4 miles with the increase in elevation to the west. South of the Roan Cliffs at the Green River shallow loams dominate, although some deeper mountain loams are found in the eastern extremities of Rattlesnake, Flat Nose George, and Coal Creek canyons.

Agricultural lands north of the town of Green River are adjacent to the southern boundary of the WSA at the base of the 1,000-foot Book Cliffs.

A high percentage of shallow soils and steep slopes (nearly 80 percent coverage by steep slopes) make much of the WSA sensitive to erosion when disturbed. Table 2 contains information on soil characteristics and land types in the WSA. Table 3 shows the erosion condition for the WSA.

Approximately 40 percent (116,340 acres) of the WSA is strongly saline while 60 percent is slightly saline. Average annual salinity production is 73 lb of salt per acre. The saline soils are located mainly in the Carbon County portion of the WSA.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Shallow to very deep stony soils on steep mountainsides	45	131,503	1.0	10
Rock outcrop and rubbleland	30	86,895	0.0	0
Shallow loamy soils on sloping benches and ridges	20	57,930	1.0	5
Deep and very deep loamy soils on gently sloping alluvial fans and valley floors	5	14,517	0.1	1
Totals	100	290,845		

Source: Hansen, 1985.

Approximately 75 percent (218,398 acres) of the WSA is unsuited to seeding because of rock outcrop, steep slopes, and shallow soils. Seeding potential is fair to good on the remaining 25 percent (72,447 acres) of the WSA.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	45	131,502	1,315,020
Medium	5.0	-	-	-	20	57,930	289,650
Low	1.0	65	189,467	189,467	5	14,518	14,518
Very Low	0.1	5	14,483	1,448	-	-	-
None	0.0	30	86,895	-	30	86,895	-
Totals		100	290,845	190,915[a]	100	290,845	1,619,188[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.66 under present conditions; 5.57 if disturbed).

Vegetation Including Special Status Species

Vegetation in the Desolation Canyon WSA consists of 12 major types as summarized in Table 4. A large portion of barren land is also located in the WSA.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	76,400	26
Barren-rock outcrop	74,500	26
Pinyon-juniper/Douglas fir	58,920	20
Douglas fir	28,340	10
Riparian	12,300	4
Saltbush	12,335	4
Grassland	12,300	4
Curlleaf mountain mahogany	5,800	2
Sagebrush	6,700	2
Blackbrush	2,300	1
Mountain shrub	700	Less than 1
Conifer forest/Aspen	250	Less than 1
Total	290,845	100

Source: USDI, BLM, 1989

Significant variety is found within the vegetation types due to the considerable range in elevation, moisture, and soils.

The pinyon-juniper woodland type is found at lower elevations in the WSA where soils are shallow and slopes are moderate. Understory is scattered but commonly includes large shrubs such as Utah serviceberry, cliffrose, squawbush, mountain mahogany, curlleaf mountain mahogany, and birchleaf. Also common are Mormon tea, snakeweed, black sagebrush, bullgrass, Salina wildrye, Indian ricegrass, galleta grass, slenderbush eriogonum, and scarlet gilia.

The barren or rock outcrop type is found on steep, rocky soils. Vegetation is sparse but diverse. Common species are shadscale, nuttall saltbush, snakeweed, Mormon tea, cliffrose, Utah serviceberry, Utah juniper, pinyon pine, squawbush, galleta grass, Indian ricegrass, Salina wildrye, eriogonum, gilia, pepperweed, and aster.

The pinyon-juniper/Douglas fir type is an intermediate type occurring on steep slopes between the pinyon-juniper woodland and the curlleaf mountain mahogany and Douglas fir types. Common understory plants are Utah serviceberry, Oregon grape, snowberry, birchleaf mountain mahogany, locoweed, Salina wildrye, western wheatgrass, and squirreltail.

The Douglas fir type is a high mountain type occurring mainly on steep slopes. Other common species in this type are curlleaf mountain mahogany, Utah juniper, squawbush, currant snowberry, bluegrass, and slender wheatgrass. Another high elevation mountain type is dominated by curlleaf mountain mahogany. This type produces important browse for big game and is found on steep to moderate slopes near the top of the Tavaputs Plateau. Common understory plants are birchleaf mountain mahogany, snowberry, Utah serviceberry, big sagebrush, Oregon grape, rabbitbrush, locoweed, sedge, Salina wildrye, and wheatgrass.

The riparian type in the WSA includes five distinct associations: tamarisk-greasewood complex, cottonwood-willow complex, tamarisk, greasewood, and big sagebrush. The first three associations occur in the canyon bottoms with seasonally high water tables.

The greasewood association type is found on alkali flats and adjacent to moist or wet sites with low annual precipitation. The big sagebrush association is found along wet or moist drainages with deeper, more productive soils, including the canyons between Jack Creek and Rain Canyon; also Upper Range Creek, Rattlesnake, and Flat Nose George canyons.

Tamarisk-dominated sites include rubber rabbitbrush, common reed, saltgrass, alkali sakaton, and pepperweed. In slightly drier sites, a tamarisk-greasewood complex is found. Common plants also found at these sites are cottonwood, Douglas fir, green rabbitbrush, cheatgrass, saltgrass, rush, sweet clover, pepperweed, seepweed, and lambsquarter. Cottonwood-willow complex is found in small, narrow sites adjacent to rivers and streams. Other trees and shrubs common to the complex include tamarisk, squawbush, box elder, greasewood, and rabbitbrush. A diversity of forbs, grasses, horsetail, and rushes is also present.

On greasewood flats, understory plants include shadscale, prickly pear cactus, yellow bee plant, seepweed, globemallow, saltgrass, galleta grass, sand dropseed, and cheatgrass. Other common shrubs and trees are shadscale, snakeweed, Utah juniper, pinyon pine, prickly pear cactus, squawbush, snowberry, rubber rabbitbrush, and Utah serviceberry. Major forbs and grasses include eriogonum, Russian thistle, locoweed, lupine, cheatgrass, sand dropseed, needle-and-thread grass, and Indian ricegrass. Riparian types are valuable for recreation, wildlife, and range uses.

The salt bush type is found on relatively flat areas at lower elevations. A variety of desert plants is common in this type and includes winterfat, Mormon tea, snakeweed, rabbitbrush, big sagebrush, galleta grass, Indian ricegrass, bullgrass, and needle-and-thread grass.

The grassland type generally consists of Salina wildrye and is found on relatively flat areas on Suluar Mesa at elevations of about 5,200 to 6,400 feet. Pinyon pine and juniper trees are intermixed with the grasses and small brush species. Other grasses, shrubs, and forbs found in this type include bluebunch wheatgrass, Indian ricegrass, sand dropseed, globemallow, sagebrush, rabbitbrush, and Mormon tea.

Two species dominate the sagebrush type which is found at high elevations among the aspen and mountain mahogany. On the deep soils, Wyoming big sagebrush dominates associated species including Utah serviceberry, snowberry, and woods rose. Common understory plants are balsam root, lupine, aster, Salina wildrye, western wheatgrass, bluegrass, needle grass, and thurber fescue. On shallower soils, black sagebrush dominates with associated species commonly found with the Wyoming big sagebrush.

Three types occurring in localized areas contribute to the diversity of vegetation found in the WSA. A blackbrush type is found between the Green River and the Big Horn Benches. A Gambel oak type is found in moist areas at the heads of the two upper forks of Three Canyon and at the head of Flat Nose George Canyon. Four aspen stands are found within the WSA, three on Buckskin and Van Duesen Ridges and one on Flat Top Mountain.

Sclerocactus glaucus, a threatened plant species, is known to occur in and near the WSA. Five Category 2 candidate species (Gailardia flava, Penstemon grahamii, Psorathanmus polyadenius var. jonesii, Hedysarium occidentale var. canone, and Physaria acutifolia var. purpurea) may occur in the WSA.

The Desolation Canyon WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types in the WSA are listed on Table 5.

Table 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	144,825	50
Saltbush-greasewood	86,930	30
Douglas fir forest	59,090	20
Total	290,845	100

Source: USDI, USGS, 1978.

Water Resources

The Desolation Canyon WSA includes about 68 miles of the Green River and related side drainages. These side drainages include all or portions of Price River, Range Creek, Coal Creek, Rattlesnake Creek, and Jack Creek. All major drainages within the WSA are tributary to the Green River or the Price River. Total live water stream mileage within the WSA is between 150 and 200 miles. There are also numerous seeps and springs. The relative abundance of water between Jack Creek and Range Creek is due to a substantial aquifer underlying the Tavaputs Plateau.

DESOLATION CANYON WSA

The Green River originates in Wyoming and flows through Wyoming, Utah, and Colorado before flowing through the Desolation Canyon WSA.

The Green River drainage is a major tributary of the Colorado River. The Colorado River Basin includes portions of seven states and Mexico. The river's water, now and in future years, has been fully allocated through a long history of appropriations and negotiations that include acts, compacts, decrees, and an international treaty (USDI, BOR 1986).

The Colorado River drainage is administratively divided into the Upper and the Lower Basins (or hydrologic subregions). The Upper Colorado River Basin is comprised of the drainage area above Lees Ferry, Arizona. Utah is one of the upper basin states and the Green River is very important to Utah's allocated share of the water. In addition to State laws that provide for intrastate control of water, use of water in the Upper Colorado River Basin is administered by three significant documents. These are: The Colorado River Compact of 1922, The Mexican Treaty of 1944, and The Upper Colorado River Basin Compact of 1948 (Hansen, 1976).

Utah has been apportioned about 23 percent (or about 1.4 to 1.7 million acre-feet) of the water available to the upper basin for annual use (Hansen, 1976 and UDNRE, DWR, 1981). Current annual consumptive use of this allotment is less than 1 million acre-feet, although many additional water filings exist. The Green River is commonly referred to as being "oversubscribed," but since many water filings have not been acted on, the river is considered as not fully appropriated by the State Water Rights Office (Water Right Adjudica-tion Areas 47, 91, and 92). Temporary and fixed-time applications for more than .015 cubic feet per second (cfs) on the Green River could be considered. Isolated springs may be appropriated not to exceed .015 cfs (UDNRE, DWR, 1988).

Entitlements of the Ute Indians under the 1908 Winters Doctrine would be included in the Utah water use. Quantification of the Indian water rights has been under discussion between the State and the Tribe for many years and has yet to be officially determined.

Allotments under the Upper Colorado River Compact provide for water diversion and use of water from the Green River drainage in Wyoming and Colorado.

The average annual flow of the Green River in Desolation Canyon is about 3.9 million acre-feet (UDNRE, DWR, 1981). Although it varies from year to year, this flow is regulated to a large extent by upstream diver-sions and by operation of Flaming Gorge Dam and Res-ervoir. Operation of the dam is carried out by the Bureau of Reclamation according to a system program which accounts for the other projects in the Colorado Basin (such as Glen Canyon and Hoover dams) and con-sistent with the legal requirements of the governing documents noted above.

Various projects have been constructed, or may be constructed in the future, upstream from Desolation Canyon in order for each of the upper basin states to use its entitlement under the compact. This may include projects to transfer water between subbasins or to areas outside of the Green River drainage. The amount of water flow depletion in Desolation Canyon is and likely will continue to be constrained somewhat by four major factors: (1) the releases required from Flaming Gorge to accommodate operation of the downstream dams, (2) existing Federal reserved water rights which may be associated with the downstream Canyonlands National Park, (3) the amount of water which must be allowed to flow to the lower Colorado River basin states, and (4) the consideration of water needs for the endangered fish species in the Green River. With such factors, it is expected that sufficient water flows would be available in the Desolation Canyon to maintain water related resources.

The Price River originates in western Carbon County in the Manti-LaSal National Forest and flows east to its confluence with the Green River inside the Desolation Canyon WSA. The river is used for irrigation, municipal, coal mining, and other industrial purposes, and it is likely that additional diversions or reservoirs would be built upstream of the Desolation Canyon WSA.

Within the Desolation Canyon WSA, consumptive water use is by livestock, wildlife, and recreation visitors. Domestic and industrial (primarily associated with mineral exploration and extraction) use of water from the WSA occurs on some drainages outside the WSA. Recreational floatboating and fish habitat are the major nonconsumptive water uses within the WSA.

The three perennial streams that have established water quality standards are Green River, Price River, and Range Creek. The water quality standards for Green River and tributaries, from confluence with Colorado River to State line, are as follows: Class 1C (protected for domestic purposes with prior

treatment by treatment processes as required by the Utah Department of Health); Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3B (protected for warm water species of game fish and other warm water aquatic life); and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

The water quality standards for Price River and tributaries, from confluence with Green River to Castle Gate, are: Class 3c (protected for nongame fish and other aquatic life), and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering). The water quality standards for Range Creek Pumping Station are: Class 3A (protected for cold water species of game fish and other cold water aquatic life), and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering). Range Creek and tributaries, from confluence with Green River to headwaters, is also classified as antidegradation segments.

Salinity is the major water quality concern. Salinity of the Green River is related to the overall salinity conditions of the Colorado River system, addressed in three Federal laws: Federal Water Pollution Control Act Amendment of 1972 (PL 92-500), Colorado River Basin Salinity Control Act of 1974 (PL 93-320), and Colorado River Basin Salinity Control Act Amendment of 1984 (PL 98-569). Salinity control within the river system is required to allow the US to meet its water quality obligations to Mexico.

The Green River within the Desolation Canyon WSA is considered to be rated as slightly saline, according to established salinity classes. Salinity conditions of the Green River at Green River, Utah, have a recorded historical (1973 to 1984) level of 456 milligrams/ per liter (mg/l) (USDI, BOR, 1987).

Within the Desolation Canyon WSA, lands along the Price River considered to be moderately to strongly saline and lands south of the Price River considered to be slightly saline have been identified as potential contributors to Green River salinity during periods of high runoff, erosion, and sediment yield (USDI, BLM 1983b). TDS in the Green River at Jensen, Utah (102 miles north from the WSA), average about 347 mg/1 compared to about 456 mg/l at Green River, Utah (immediately downstream from the WSA). Most of the increase is attributed to the inflow of the Price River. The Price River is considered to be the largest single contributor of salt to the Colorado River system.

The BLM land use plan for the WSA along the Price River includes management objectives to avoid increased erosion, but no salinity control projects are planned for water sources or rivers within the WSA. Diffuse source salinity control activities are planned for the Price River unit under the Colorado River Water Quality Improvement Program, which would include reduction of saline irrigation return flows upstream from the WSA (USDI, BOR, 1986).

Another water quality concern is coliform bacteria in water sources which may be used for human consumption. This may occur where recreation visitors desire to use water in areas of concentrated livestock use.

Existing water facilities in the WSA include three spring developments, two livestock reservoirs, and small erosion control or diversion structures of natural materials on Rock Creek. One new spring development and one new livestock reservoir have been proposed. Although proposals to construct a major dam and hydroelectric power plant on the Green River have been proposed for Desolation Canyon in the past, plans to do so are not currently active. A potential dam and reservoir site was identified on the Green River downstream from the confluence with the Price river (USDOE, FERC, 1981). With about a 100-foot high dam, the reservoir would inundate about 2,000 acres within the canyon. Power site and reclamation withdrawals inside the WSA are presently under review. Final decisions on maintenance or revocation will not be made until 1991.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Desolation WSA is given in Table 6. Appendix 6 in Volume I explains the mineral and energy resource rating system.

There are no materials listed as strategic or critical known to occur in the WSA (USDoD, 1988).

Three mineral-related designations have been made for areas in the WSA and are summarized in Table 7. An oil shale withdrawal established in the 1920s covers 128,960 acres of the WSA. In addition to prohibiting oil shale development, the withdrawal also prohibits mineral location. Leasable minerals are not affected. This withdrawal has been proposed for revocation and the proposal is currently under review. Public water reserves prohibit metalliferous mining.

Table 6
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 3	c4	10 to 60 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Tar Sand	f 2	c4	Less than 10 million barrels
Oil Shale	f 3	c4	Between 10 and 50 million barrels of oil
Uranium/Vanadium	f 2	c2	Less than 500 metric tons
Coal	f 4	c4	105 to 140 million metric tons
Hydropower	f 4	c4	Greater than 25 megawatts

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

Table 7
Mineral-Related Designations in and Around the WSA

	Total Acres	Approximate Acres in WSA
Oil shale withdrawal	2,757,310	128,960.00
Sunnyside STSA	157,445	1,640.00
Public water reserves	Not available	752.39

Source: BLM File Data.

- Leasable Minerals

Current mineral production from the WSA is for gas produced from the Peters Point field around Jack Canyon and Cedar Ridge in the northern portion of the WSA.

- Oil and Gas

Rocks exposed at the surface or underlying the WSA have produced significant amounts of oil and gas from many fields in eastern Utah. Portions of three fields are found within the WSA on the northern, central-western, and eastern margins (Greater Jack Canyon, Range Creek, and Rattlesnake Canyon, respectively). Strata within the WSA have characteristics that have been strongly influenced by geologic processes associated principally with the Uinta Basin and the Uncompahgre Uplift, and to a lesser degree by the sedimentation of the Paradox Basin. These three areas all contain numerous oil and gas fields that have yielded approximately 650 million barrels of oil and 1.8 trillion cubic feet of natural gas (through December 1986). Folsum, in 1963, estimated that the Uinta Basin contained 1.25 to 2 trillion cubic feet of undiscovered recoverable gas. Dolton and others in 1981 estimated that the Uinta Basin contained 1.6 billion barrels of undiscovered recoverable oil and 8.9 trillion cubic feet of undiscovered recoverable gas, and the Paradox Basin contained 112 billion barrels of undiscovered recoverable oil and 3.8 trillion cubic feet of undiscovered recoverable gas. The WSA is, therefore, located in the midst of two very large productive oil and gas basins. Wells in or near the WSA in the vicinity of Peter's Point have had an average annual production of 145,818 million cubic feet since 1982.

Eighty-seven wells have been drilled within 6 miles of the WSA boundaries, concentrated mostly to the northwest and the southwest. Five wells have been drilled within the WSA, three are gas producers in the formerly designated Greater Jack Canyon KGS, and of the remaining two, one is a plugged and abandoned well on the Beckwith Plateau and one is an abandoned well in the vicinity of Peter's Point. The three producing wells have produced an annual average of 86,355 million cubic feet since 1982. The former Greater Jack Canyon KGS had included 70,822 acres, of which 10,390 were located within the WSA. Several other wells have been drilled on the boundaries of the WSA. Five of these wells discovered gas in the Dakota and Cedar Mountain formations. Two of the wells were drilled by Gulf Oil in the bighorn benches area, with reported productive capabilities of 275 thousand and 1 million cubic feet of gas per day. These wells were drilled in 1982 and 1983. The formerly designated Range Creek KGS was established around these wells and included 5,721 acres, of which 1,400 acres were within the WSA. The third well was drilled by Ten-neco Oil in 1981 in Rattlesnake Canyon, with a re-ported productive capacity of 298 thousand cubic feet of gas per day. Based on this one hole, an un-defined KGS was established in 1981 that encom-passed 1,788 acres, of which 430 acres were within the WSA. These three wells have been shut-in since completion for lack of pipelines. The poor gas market, distance to tie-ins, and rugged ter-rain involved make pipeline construction uneco-nomic at the current time.

In addition to these wells, two wells drilled by Bow Valley Petroleum in 1981 and 1984 in the central western portion of the WSA had significant shows of gas in the Dakota, Cedar Mountain,

Buckhorn, and Morrison formations. These wells were tested for completion and reported recoveries of 85 thousand cubic feet of gas in the first, and 779 thousand cubic feet of gas and 72 barrels of water per day in the second. Based on these discoveries, the formerly designated Trail Canyon KGS was established in 1985 and encompassed 345 acres, of which 120 acres were located within the WSA. Difficulties with the water encountered resulted in both wells being plugged and abandoned in 1985. With the exception of the Jack Creek area, only eight other wells have been drilled within 1 mile of the WSA. Two of these wells reported shows (in Pennsylvanian, Triassic, and Cretaceous age strata), two were very shallow with no reported shows, three conducted no tests, and one was tested and found dry in all formations.

In addition to this data, studies on a regional scale further indicate excellent oil and gas potential in Tertiary, Cretaceous, Jurassic, Triassic, Permian, and Pennsylvanian age strata. This represents a continuous section of strata 15 to 20 thousand feet thick below the surface of the WSA.

The potential in Tertiary strata is found in the Green River and Wasatch formations. The Peters Point and Jack Canyon fields on the northwest margin of the WSA (both within the former Greater Jack Canyon KGS) produce from lenticular sandstones in both formations. These sandstones intertongue with fine grained deltaic and lake deposits of the Green River Formation to the north and east, to form stratigraphic traps throughout the Uinta Basin. Cumulative production from the Peters Point and Jack Canyon fields as of December 1986, has been 4 billion cubic feet of gas and 143 thousand barrels of oil. Trapping within these fields has also been structurally enhanced by the Jack Canyon anticline, which trends north-west-southeast through the northern section of the WSA. However, this structural enhancement is not necessarily required, as evidenced by the magnitude of Wasatch-Green River production to the north and east from stratigraphic traps without structural components. The northern half of the WSA (approximately the area north of Township 18 South) would be the most favorable for additional oil and gas fields in the Wasatch and Green River formations.

The potential for oil and gas in Cretaceous strata is found primarily in the Dakota Sandstone Formation, with the Cedar Mountain Formation and the Castlegate Sandstone also having excellent potential. In the Dakota Sandstone, regional data suggest a pronounced north-south trending thickening of lenticular sandstone bodies in the entire WSA west of the Green River. This thickening suggests a stacking and overlapping of beach sand deposits, which could contain tremendous amounts of gas. These types of deposits, in single, thinner lenses, produce gas from several fields 25-40 miles east of the WSA along the Utah-Colorado border. The Dakota in these fields has produced from 1 to 15 billion cubic feet of gas and minor amounts of associated oil. The Dakota provides excellent reservoir rocks and forms both stratigraphic and structural traps. The projected source for the gas would be from swamps found to the west that formed during Dakota deposition, or from Pennsylvanian age organic-rich black shales below, which conceivably migrated upward along a major fault which borders the Uncompahgre Uplift on a south-west flank. Oil and gas is also found in the Cedar Mountain Formation in lenticular sandstone deposits surrounded by fine-grained muds and clays. The two shut-in gas wells in the former Range Creek KGS are dually productive from both the Dakota and Cedar Mountain. The Castlegate Sandstone forms a broad wedge of sandstone and conglomerates which thin and pinchout to the east of the WSA, providing stratigraphic traps. Several shows of gas have been reported from wells just east of the WSA.

Triassic potential is found in the Moenkopi and Wingate formations, and is considered to be low. The Moenkopi produces oil and gas from the Grassy Trail field 15-20 miles west of the central portion of the WSA. This field produced from a fractured reservoir situated on a small anticlinal structure. The field has produced 430 thousand barrels of oil and 135 million cubic feet of gas as of December 1986. The Moenkopi is typically a fine-grained deltaic and mudflat sequence that forms poor reservoir rock without associated fracturing and folding. Such structural enhancement could be provided by depth by movement along the Uncompahgre Uplift. This would limit its potential primarily to the southern half of the WSA. The Wingate forms a broad blanket sandstone which would require structural components to form a trap. No production is known from the Wingate, but wells have reported show just to the southwest of the WSA.

Potential is found in the Jurassic, Entrada, Navajo, and Morrison formations. The Entrada typically occurs as a blanket sandstone grading to fine grained muds and silts on the San Rafael Swell southwest of the WSA. The sandstones provide excellent reservoir rocks where structurally enhanced. The Entrada produces from several fields 20 to 30 miles southeast of the WSA. These fields have produced from 6 to 19 billion cubic feet of gas. The Navajo also forms a blanket sand-stone, forming good reservoirs where structural components form traps. The Navajo produces from the Blaze Canyon field 8 to 10 miles south of the WSA. This field produces from a small anticline and has reported cumulative production of 17 thousand barrels of oil through December 1986. The Morrison Formation contains channel sand deposits in the Brushy Basin Member, which produces from several fields 10 to 25 miles east and southeast of the WSA. These fields have reported Morrison production of 3.5 to 15 billion cubic feet of gas and 10 to 20 thousand barrels of oil. Morrison traps would be stratigraphic in nature, but also appear to be structurally enhanced where productive. The eastern and southern portions of the WSA appear to be most favorable for containing Morrison pools.

Permian potential is closely associated with the Uncompahgre structural linement. White Rim Sandstone forms excellent reservoir rocks, and well data indicates this unit may pinchout along the southwestern margin of the Uncompahgre Uplift, forming stratigraphic traps. Source rocks would be found in the underlying Pennsylvanian shales. To the south of the WSA (40 to 50 miles), a stratigraphic pinchout of the White Rim Sandstone contains a tar sand deposit estimated to contain 12 billion barrels of oil (the Tar Sand Triangle). Prior to being breached by erosion, this tar sand deposit was a conventional oil and gas reservoir. The White Rim has not been exposed by erosion within the WSA, and could conceivably contain similar trapping conditions although not containing resources of the magnitude found in the Tar Sand Triangle. There has not been enough deep drilling in and around the WSA to better define this potential, but the best potential for such traps would be in the central and southwestern sections of the WSA.

Potential in Pennsylvanian strata would also be associated with the Uncompahgre structural linement. The organic-rich black shales of the Paradox Basin abut the southwestern margin of the Uncompahgre Uplift. While not containing outstanding reservoir rock in this area, the prolific source rocks could feed deep structural traps formed by movement along the Uncompahgre Uplift during Permian time. Some studies have suggested movement along this structure was by thrust faulting to the southwest which, if proven, would substantially increase potential in these Pennsylvanian strata. This potential would be greatest in the southwestern half of the WSA.

In summary, all strata from Pennsylvanian through Tertiary age, approximately 15,000 to 20,000 feet in thickness, have potential to contain oil or gas resources within the WSA. This is considered to be an exceptional assemblage when exploring for oil and gas reservoirs. This analysis is based on regional stratigraphic and structural interpretations from drill hole and seismic data, combined with comparisons of surrounding productive fields producing under conditions which can be projected to occur within the WSA. There could also be potential for reservoirs in rocks of Devonian and Mississippian age within the WSA. However, there have not been enough deep drill holes in this region to adequately characterize this potential. In addition, relatively little is known of the exact character of the structure along the southwestern margin of the Uncompahgre Uplift, which extends northwestward through the central portion of the WSA. If structural movement has been in the form of thrust faulting as some data suggest, the potential for the WSA to contain significant reserves of deep oil and gas would be greatly enhanced. Younger rocks covering the Uncompahgre Uplift mask structural conditions at depth and further drilling and seismic work is needed to better understand the full significance of this uplift and potential oil and gas resources associated with it.

The oil and gas potential of the WSA is rated as an f3, indicating a potential for 10 to 60 million barrels of oil and 60 to 300 billion cubic feet of gas (SAI, 1892). BLM's analysis of the WSA agrees with this rating and BLM believes actual figures would approach the upper limits of this estimate. BLM's analysis would also raise the certainty of occurrence of these resources from SAI's c3 (moderate) to a c4 (high) based on the actual, known occurrence of gas within the WSA in four fields which straddle the borders of the WSA.

The primary reason that more exploratory drilling has not taken place within the WSA is the severe topography in about 65 percent of the area. This increases costs and limits access and drilling locations. The oil and gas industry is very interested in the general region in and around the WSA. Drilling was relatively active in the late 70s and early 80s, but the recent decline of oil prices has significantly curtailed activity. This trend would be expected to reverse as oil prices go up in the future.

Oil and gas leasing categories for the WSA are depicted in Table 8. There are presently 58 oil and gas leases in the WSA, covering 48,171 acres (6,295 acres pre-FLPMA; 41,876 post-FLPMA).

Table 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open to leasing	680	Less than 1
2. Open with special stipulations	241,255	83
3. Open with no surface occupancy	120	Less than 1
4. No leasing	48,790	16
Total	290,845	100

Source: USDI, BLM, 1983a and 1983b.

Lease holders and leases not under production or held by established production are constantly subject to change. Portions of two oil and gas units or leases held by production are within the WSA. An oil and gas unit is formed from leases grouped together in a block for the purpose of exploration and/or production. All leases within the unit may be held by diligent development or production on any lease within the unit. The units are listed in Table 9. About 5,860 acres of lease are held by production.

Table 9
Oil and Gas Units

Unit	Total Approximate Acres	WSA Acres
Peters Point	10,080	5,350[a]
Range Creek	7,450	0[b]

Source: USDI, BLM, 1983b.

[a]These are all pre-FLPMA leases.

[b]None of the actual Range Creek unit is in the WSA. There are approximately 160 acres of a pre-FLPMA lease and 350 acres of a post-FLPMA lease inside the WSA that are held by production associated with the Range Creek unit.

- Coal

Coal is found in the Cretaceous age Blackhawk Formation in the Book Cliffs coal field on the western side of the Green River, and in the Cretaceous age Neslen Formation in the Sego coal field east of the Green River. The Book Cliffs coal field is the most important in the state, having produced just under 300 million metric tons of coal since the 1890s. Total reserves within the field are estimated to be 3.7 billion tons (Doelling, 1972). The coal is high quality and is generally found in seams greater than 5 feet. Within the WSA, 8,000 acres are known to be underlain by recoverable coal. To date, no coal production has occurred within the WSA. The nearest production has been from the Sunnyside and Horse Canyon areas, 5 to 10 miles west of the central portion of the WSA.

Based on information presented (Doelling, 1972), BLM has estimated the presence of 105 to 140 million metric tons of in-place coal within the WSA, of which 50 to 70 million metric tons would be recoverable by underground mining methods. This area is located in the vicinity of Little Park in T. 17 S., T. 18 S., R. 14 and 15 E. North and northeast of this area the coal becomes cover-ed with over 3,000 feet of overburden, making mining unfeasible with current technology. To the south and southeast, the coal seams become thin and split, making recovery doubtful.

The Sego coal field east of the Green River is less important because coal is split into thin seams. It is found in seams greater than 4 feet thick only in the Sego Canyon area, where mining between 1912 and 1954 produced 2.6 million tons. Total estimated reserves in this field are estimated to be 294 million tons. Development within the WSA located in this field is very doubtful in the foreseeable future.

An additional 100,000 acres of the WSA in the south central section of the WSA is believed to be underlain by coal with greater than 3,000 feet of overburden and in thin, unminable seams. A rough estimate of reserves would be 100 to 200 million metric tons, but under current technology is considered to be unrecoverable.

The WSA is rated f4 for coal favorability, indicating large tonnages of recoverable coal are present. The certainty of occurrence is rated as high

(c4) based on measured and observed coal outcrops in the southwestern portion of the WSA. There are no existing coal leases in the WSA.

• Tar Sand

The WSA is located along the eastern edge of the Sunnyside STSA, with about 1,640 acres of the STSA extending into the WSA. The tar sand is found in sandstones and siltstones of the Upper Wasatch and Lower Green River formations. The deposit is roughly 300 feet thick in outcrops 3 to 10 miles west of the WSA. It dips northeast into the Uinta Basin, where it is covered by 1,000 to 1,200 feet of overburden. Drill data indicates the deposit thins rapidly and diminishes in grade to the northeast, away from the outcrop.The basinward extent of the deposit in the subsurface is undetermined to date, with oil impregnated sandstones occurring in canyons as far as 8 miles northeast of the outcrops.

The Sunnyside deposit was mined intermittently from 1892 to 1956 for use in road asphalt, producing a total of 335,000 tons. No mining has taken place within the WSA. The entire Sunnyside deposit contains reserves of 3.5 to 4 billion barrels of oil (Ritzma, 1979). Maximum reserves within the WSA are estimated to be less than 10 million barrels, due to the diminishing thickness and grade away from the outcrops. Combined with the extreme depth of overburden in the WSA, mining in this area appears infeasible.

One identified competitive lease tract, Sunnyside No. 9, overlaps about 200 acres of the WSA. The tract was analyzed and made available for leasing by the Utah Combined Hydrocarbon Leasing Regional EIS (USDI, BLM, 1984c). To date, no interest has been expressed by industry in leasing and developing this tract. No combined hydrocarbon lease conversion applications are pending in the WSA.

The tar sand favorability of the WSA is rated f2 indicating potential for containing less than 10 million barrels of oil. The certainty of occurrence is rated high (c4) due to thin outcrops being present in deep canyons in the northwestern portion of the WSA (SAI, 1982).

• Oil Shale

Oil shale beds in the Uinta Basin are found in the Parachute Creek Member of the Green River Formation. They are thicker and contain higher oil content in the center of the basin, and decrease in thickness and grade toward the southwest margin, in the region of the WSA. The richest oil shales contain up to 90 gallons of oil per ton of rock, but generally vary from three to 60 gallons per ton. Oil shale beds in the Uinta Basin are estimated to contain 320 billion barrels of oil, in zones up to 700 feet thick. Within the WSA, there are roughly 70,000 acres underlain by low-grade deposits, containing less than 15 gallons per ton. There are 1,800 acres in the extreme northeastern margin of the WSA that contain 15 gallons per ton oil shale in beds at least 15 feet thick. This area is estimated to contain 23.5 million barrels of oil in-place. The remainder of the 70,000 acres is underlain by very low-grade deposits, estimated to contain less than five gallons per ton in beds less than 10 feet thick. Estimated in-place oil in this area is roughly 280 million barrels. Estimated in-place resources within the WSA are about 40 to 60 million barrels (USDI, USBM, 1988). Exploration or production of oil shale has not occurred in or near the WSA, but has concentrated to the northeast and east in areas of thicker, higher-grade deposits. Currently, there are no oil shale producers in the United States. Development of low-grade deposits, such as occur within the WSA, is not likely to occur in the foreseeable future. Roughly, 128,960 acres of the WSA is included in an oil shale withdrawal established in the 1920s to prevent the location of oil shale by mining claims. This withdrawal is currently under review and may eventually be revoked.

The oil shale favorability of the WSA is rated f2 indicating potential for low-grade and/or very thin deposits (SAI, 1982). BLM has changed that favorability rating to f3 based on BLM and USBM estimates. An f3 indicates a reserve potential of 10 to 50 million barrels. The certainty of occurrence is rated high (c4) based on observed outcrops within the WSA on Cedar Ridge and above the upper forks of Jack's Creek.

• Hydropower

A favorability rating of f4 was assigned for hydropower resources within the WSA based on a potential to produce at least 25 megawatts of

power (SAI, 1982). Hydropower is evaluated based on potential dam sites on the Green River. Six potential sites have been identified over a number of years associated with potential for power generation and/or agricultural water. Construction on one site at Coal Creek actually began but was abandoned by 1915. More recent proposals include the Desolation and Rattlesnake sites identified by the Bureau of Reclamation in 1942. In 1971, the Bureau of Reclamation requested that withdrawal be lifted for these sites because they were no longer needed. This withdrawal has been revoked as the two sites are no longer considered likely to be constructed. Other overlapping withdrawals for power sites and power projects, most of which are over 30 years old, are presently being reviewed to determine if they should be revoked. With the exception of one site, they are not expected to indicate high hydroelectric potential. One potential site remains, located near the confluence of the Green and Price rivers. Construction of this reservoir would inundate a total of about 2,000 acres of the Green and Price River canyons and would extend north along about 10.5 miles of the Green River to about the base of the Roan Cliffs. The dam would be about 100 feet in height and could potentially produce about 25 megawatts of power. A few years ago, Utah Power and Light Company expressed interest in a dam and reservoir on the Green River, although no specific plans were prepared. No current proposal or expressed interest in the site is known to exist.

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA. There are presently three mining claims, covering 60 acres.

- Uranium/Vanadium

The WSA was evaluated for uranium/vanadium, manganese, and copper. Uranium/vanadium was assigned a favorability of f2, indicating potential for less than 500 metric tons, with a low certainty of occurrence (c2) (SAI, 1982). This rating is based on the occurrence of small uranium prospects in the Wasatch Formation located in the WSA in T. 19 S., R. 18 E., sec. 15, in upper Rattlesnake Canyon. Reportedly, 92 lb of U3O8 were mined from one of the prospects, the date of which is unknown. As a whole, the Wasatch Formation is considered only marginally favorable for uranium and vanadium in small deposits. The primary uranium/vanadium producing formations of the Colorado Plateau, the Triassic age Chinle Formation, and the Jurassic age Morrison Formation, both occur at depths of 3,000 to 12,000 feet below the surface of the WSA. These depths preclude development by mining methods.

- Salable Minerals

Salable minerals in the WSA include sand, gravel, and rock. However, due to difficult access and more favorable locations elsewhere, there is no demand for the salable minerals in the WSA.

Wildlife Including Special Status Species

A large diversity of habitats is present, including riparian along stream and river bottoms in about 4 percent (11,600 acres) of the WSA. Variety in vegetation (including highly productive types), extensive cliff and talus habitat, considerable variation in elevation, and overall ruggedness have resulted in the presence of a wide variety of wildlife species. Economically important species include the Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, blue grouse, ruffed grouse, sage grouse, chukar, golden eagle, prairie falcon, Cooper's hawk, goshawk, American kestrel, red-tail hawk, channel catfish, rainbow trout, and brown trout. Endangered species present in the WSA include the bald eagle, peregrine falcon, bonytail chub, humpback chub, Colorado squawfish, and black-footed ferret.

Twenty-two Rocky Mountain bighorn sheep were reintroduced on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek across the river from the WSA in 1970 and 1973. They are reoccupying historical range in and around Desolation Canyon, including the WSA. In all, there are 11 recorded sightings by the UWDR and BLM in the vicinity of the WSA. These are believed to represent two herds. Portions of range for each of these herds are found in the WSA. Population and range data for the WSA appear in Table 10. The portions of the WSA north of Jack Creek and south of the Price River on to the Beckwith Plateau are also historic desert bighorn sheep range. No desert bighorn sheep are known to presently inhabit the Beckwith area. Domestic sheep grazing has been retired in the grazing allotments south of Turtle Canyon (except Little Park Wash) to allow for bighorn sheep use. Transplants of bighorn into the area are planned by UDWR in 1989.

Table 10
Rocky Mountain Bighorn Seep Population and Range Data

Herd	Present Total Population	Prior Stable Carrying Capacity	Acres of Range in WSA	Percent of Total Range in WSA
Range Creek	60	1,330	192,800	81
Book Cliffs	30	608	88,125	Uncertain

Source: USDI, BLM, 1983a, 1983b, and 1988a.

Mule deer winter, crucial winter, summer, and year-long range all occur in the WSA. The most heavily used crucial winter ranges are in the canyon bottoms along the Green River, in Range Creek, and in Little Park. The WSA's support for populations of deer by herd unit, seasonal range type, and carrying capacity are shown in Table 11. According to BLM observations, the herd is presently expanding in the vicinity of Flat Canyon.

Elk populations in the Range Creek and Book Cliffs herds are slowly being re-established. One hundred elk were transplanted to Cottonwood Ridge, west of the WSA, and 100 more are scheduled for transplant in 1989. Present estimated populations of elk, carrying capacities, range within the WSA, and percentage of total herd range within the WSA are given in Table 12.

Mountain lion and black bear are both common to the entire WSA, although accurate counts or population estimates are not available. Mountain lion distributions are closely associated with mule deer and rely heavily on them for prey.

Blue grouse, ruffed grouse, and chukar partridge are the major upland game birds present. Blue and ruffed grouse are found in the upper elevations of the WSA on mule deer summer range. Approximately 80 acres of sage grouse habitat are located in the head of the Rock Creek drainage. Chukar occur at low elevations where permanent water is available.

No raptor surveys have been completed for most of the WSA. One systematic survey of 6 miles of cliff within the WSA along the Book Cliffs by the FWS identified five nests. Casual survey has identified 12 more nests in the remainder of the WSA. Potentially nesting raptors occur throughout the WSA and include golden eagle (a BLM sensitive species), prairie falcon, Cooper's hawk, goshawk, American kestrel, red-tail hawk, and peregrine falcon (an endangered species). Four sightings of the peregrine falcon have been made within the WSA and two near the WSA have been documented. Suitable nesting habitat is abundant

Table 11
Deer Herd Units in WSA

	Herd Unit	Present Total Population	Carrying Capacity	Acres of Range in WSA	Percent of Total Range in WSA
Crucial Winter Range	27B	1,458	3,281	65,620	53
Summer Range	27B	59	1,399	37,767	15
Summer Range	28	334	792	21,382	6

Source: USDI, BLM, 1983a, 1983b, and 1988a.

Table 12
Range Creek and Book Cliffs Elk Data

	Herd	Present Population	Carrying Capacity	Acres of Range in WSA	Percent of Total Range in WSA
Winter Range	Range Creek	75	370	109,170	34
Summer Range	Range Creek	10	69	6,885	7
Winter Range	Book Cliffs	20	162	47,310	2
Summer Range	Book Cliffs	6	49	4,940	Less than 1

Source: USDI, BLM, 1983a and 1983b.

(estimated at 66,500 acres). The bald eagle, also an endangered species, uses the WSA during winter migration. Eight bald eagles were identified in 1984 and 19 in 1985. Indications are that use is mostly concentrated between Rock Creek and Range Creek on the Green River.

Birds present in the WSA are numerous and diverse, with 245 bird species potentially present. Confirmed observations of 83 of these species were made over the 1981 and 1982 summer seasons.

Several desirable fish species are present in the WSA. Channel catfish are abundant in the Green River. Rainbow and brown trout are present in Rock and Range Creeks, which provide high quality fisheries. Three endangered species of fish (Colorado squawfish, humpback chub, and bonytail chub) and one proposed species (razorback sucker) are present in the Green River along the unaltered stretches of river within the WSA. The WSA contains approximately 100 miles of fish habitat.

The FWS has also identified the black-footed ferret (an endangered species) and eight other candidate species under status review (ferruginous hawk, western snowy plover, white-faced ibis, long-billed curlew, southern spotted owl, western yellow-billed cuckoo, southwestern otter, and Great Basin Silverspot butterfly) as occurring or potentially occurring in the WSA (see Appendix 4 in Volume I). Unconfirmed sightings of the black-footed ferret have occurred near the WSA east and west of the Town of Green River and along the Price River between Woodside and the WSA. However, no habitat areas are known within the WSA.

Other common wildlife present include cottontail rabbit, bobcat, coyote, ringtail cat, gray fox, a variety of rodents, and some reptiles, such as the side-blotched lizard and the midget-faded rattlesnake.

Forest Resources

Production of forest products has not occurred in the WSA. Adequate resources in the WSA for timber harvest could produce limited amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees. About 163,910 acres in the WSA contain pinyon pine, juniper, aspen, spruce, or Douglas fir. Slopes, however, are prohibitive in most of the WSA, accessibility is very poor, and distance to potential sites is not favorable. More suitable stands are available elsewhere. No commercial or noncommercial interest has been expressed in any of the forest resources in the WSA, and none is expected in the foreseeable future. Therefore, the forested area is considered as nonproductive and noncommercial timber.

Livestock and Wild Horses/Burros

The WSA contains all or portions of 15 grazing allotments as listed in Table 13. There are seven water developments within the WSA. Two developed springs are located in the Rock Creek Allotment, one at the head of Rock Creek, and one near Van Duesen Ridge. One developed spring (pipeline and trough) is located in the Pack Trail Allotment in Trail Canyon. Two reservoirs are located west of Little Park Wash in Little Park Allotment. There is a trough at Nutters Hole on the Showerbath Springs Allotment.

There are six segments of fence in the WSA. Two are old, short-gap fences across Rattlesnake Canyon. There are similar gap fences in Flat Canyon and along the Green River between Sand Knolls and Short Canyons and at Rock Creek. With the Rock Creek gap fence is a 0.25-mile stretch post and pole exclosure near the historical Rock Creek Ranch.

Of these developments, only the reservoirs in Little Park require and currently receive maintenance by mechanical equipment. With the exception of use of ways in Little Park and upper Range Creek, all livestock activities are conducted on horseback.

Last Chance, River, Big Horn, and Elliot Mountain allotments were in nonuse status from at least 1975 through 1988. The livestock AUMs identified in the Bighorn, Elliot Mountain, River, and Pack Trail allotments were retired in 1989 and are presently identified for use by bighorn sheep. The allotments are, in large part, not well suited to intensive investments for grazing management. The probability of major range projects occurring in these allotments is low. Maintenance of one small reservoir and a spring development are proposed to keep livestock from utilizing only the river and stream bottoms. Another rancher has applied for reconstruction of the existing diversion dam on Rock Creek near the historical ranch, using existing irrigation ditches.

There is an established sheep camp 0.25 mile inside the WSA in the Rattlesnake Allotment.

Predator control was not conducted in the 1986 to 1987 period in the allotments that comprise the Desolation Canyon WSA (USDA, APHIS, 1988).

Table 13
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number[d] of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Big Horn[a]	26,786	7,977	650	227	N/A[c]	N/A[c]	0
Buckskin	503	503	156	107	600 Cattle	06/16-09/30	1
Elliott Mountain[a]	43,147	43,147	725	725	N/A[c]	N/A[c]	0
Green River	122,845	25,085	8,584	600	1,200 Cattle	01/01-12/31	1
Last Chance	13,162	11,200	400	239	500 Sheep	02/01-05/31	1
Little Park	17,842	7,700	242	179	54 Cattle	05/24-10/10	2
Price River	3,477	3,477	40	40	40 Cattle	04/16-05/15	1
Range Creek	43,899	18,845	300	55	300 Cattle	06/01-06/25 10/01-10/15	1
Range Mountain	291	291	120	111	300 Cattle	06/16-10/15	1
River[a b]	12,378	11,110	600	560	692 Sheep	12/01-04/10	0
Rock Creek	66,358	58,465	1,594	877	300 Cattle 20 Horses	03/01-10.31	2
Pack Trail	23,566	23,566	698	698	N/A[c]	N/A[c]	1
Rattlesnake	47,745	42,750	3,951	3,763	90 Cattle 3,259 Sheep	11/16-04/30 11/01-03/31	1
Showerbath Spring	41,290	30,434	601	443	89 Cattle	05/01-10/24	1
Tusher Wash	12,560	5,100	944	380	250 Cattle	03/01-05/31	1
Totals	475,849	289,650	12,581	9,004			14

Source: BLM File Data.

[a]Livestock AUMs retired in 1989 for bighorn sheep use.

[b]No use since 1973.

[c]Not applicable.

[d]Of the 9,004 AUMS in the WSA, 2,210 are presently allocated to bighorn sheep use and 6,794 allocated to livestock.

The Range Creek wild horse herd of approximately 25 horses is located on Cedar Ridge in the WSA. The WSA includes 6,850 acres or 19 percent of the total herd range.

Visual Resources

About 90 percent (261,860 acres) of the WSA is rated as Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water in most of the canyons, and rich and pleasing color combinations. Areas from Little Park to the clifflines north of the Price River and on Cedar Ridge were identified as Class B scenery primarily due to lesser amounts of vertical relief.

All Class B scenery areas (28,985 acres) are in the foreground view from the Little Park/Turtle Canyon road or the Owlhoot Trail through Trail Canyon, except for the southern Little Park Wash vicinity and

top of the point between the confluence of the Green and Price rivers. South Little Park Wash and Cedar Ridge are rated as seldom seen while the benches on either side of Little Park Wash are in the background to most viewers. The point above the confluence of the two rivers is in the background to most viewers. The VRM class adopted for 87 percent of the WSA (253,685 acres) is Class II. Another 22,000 acres are in VRM Class I, a special designation covering Desolation Canyon National Historic Landmark. About 2,560 acres along Little Park Wash and 6,600 acres along Cedar Ridge are VRM Class IV, while about 6,000 acres on either side of the Little Park Wash and on the point between the two rivers are Class III (refer to Appendix 7 in Volume I for an explanation of BLM's VRM rating system).

The geology, topography, vegetation, and water characteristics of the WSA discussed above combine to create dramatic landscapes, formidable in scale and rich in variety, contrast, form, and color. Ridges and canyon walls from 1,000 to 5,000 feet, spires, pinnacles, balanced rocks, arches, fins, overhangs, buttresses, dense stands of Douglas fir and junipers clinging to rock, sheared weathering surfaces on rock, and creeks and rivers all are landscape elements of the WSA. A diversity of landscapes is present between the high mountain, forested slopes along the Tavaputs Plateau and the cottonwoods and greasewoods on the alkali flats, dunes, and beaches along the rivers.

Cultural Resources

There are two special designation areas, Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District, within the WSA.

An estimated 22,000 acres of the Desolation Canyon National Historical Landmark (36 percent of the total landmark acreage) are in the WSA, covering an area extending 1 mile west of the Green River from the WSA's northern boundary south to Rain Canyon. The National Landmark designation was approved by the Secretary of the Interior in November 1968, and was dedicated in June 1969. The landmark is based on natural values and environs present when Major John Wesley Powell explored the canyon in 1869. Desolation and Gray Canyons and many of the features along the river, including side canyons, were named by the Powell expeditions of 1869 and 1871.

The 300-acre Flat Canyon Archaeological District was established in 1975 based on known high quality examples of the San Rafael Fremont rock art and structures and the strong likelihood of evidence related to permanent occupation. The significance of a site that could yield important data on Fremont peoples is in part a result of a lack of known, high quality sites that have not been disturbed. Additional sites of this type may occur within the WSA.

There are 76 sites recorded within the WSA. Twenty-three are rock art sites, 15 are rock shelters of which at least nine have structural remains, one site is a burial, and two sites are historical structures (USDI, BLM, 1988b). The remaining sites are open, unprotected sites such as lithic scatters. All but the historical sites are Fremont, although possible Ute figures may appear on one Fremont rock art site. Few habitation sites are known to occur within the WSA. Based on present limited information, 100 or fewer of the semi-nomadic Fremont people were residing in Desolation and Gray canyons at any one time hunting, farming the canyon bottoms, and collecting pine nuts or harvesting Indian ricegrass. Their travels were probably limited to the Tavaputs Plateau and surrounding canyon bottoms.

Non-BLM documentation has also identified a number of rock art sites for Fremont peoples around the Tavaputs Plateau. Of these, 23 sites are in or immediately adjacent to the WSA. Some of these duplicate BLM recorded sites; others do not. A number of additional sites, mainly rock art, are known but not recorded.

Most of the recorded sites have not been evaluated for National Register significance. Of those which have been evaluated, seven are considered to be eligible for nomination.

Approximately 2,240 acres representing 0.77 percent of the unit have been intensively inventoried within the boundaries of the WSA (Hauch, 1977). A total of seven sites were recorded. Using these figures, an average site-density of 72 sites per 23,000 acres was computed for the WSA as a whole. Portions of the WSA are within the Range Creek and Book Mountain planning units. Average site-densities for each of these units are 40 sites per 23,000 acres and 79 sites per 23,000 acres respectfully (Hauck, 1977), roughly comparable to the WSA. This inventory was not specifically designed for the WSA, thus, statistics based on it may be questionable. However, the potential for finding additional sites is considered to be moderate. Most of these would be small prehistoric lithic scatters, but additional Fremont rock art and habitation sites are also likely to be present.

DESOLATION CANYON WSA

The Gunnison crossing of the Old Spanish Trail in the mid-19th century is located just south of the WSA. Gunnison Butte and Beckwith Plateau are named for members of a survey party searching for a transcontinental railroad route through the area.

Several of the trails in the WSA were commonly used by the Wild Bunch of western outlaw history. Trails through Trail Canyon, along the Price River, in Rattlesnake Canyon, along the Green River, over the Golden Stairs, and in Range Creek are among these. Activities of the Wild Bunch and their encounters with local lawmen and ranchers within the WSA are records of western history. Other than the trails, some of which may have been established by the Wild Bunch and possibly some historical structures in Range Creek on private land, no physical historical outlaw evidence has been located. Many tributary canyons in Gray Canyon are named for the Wild Bunch, among them Dilly, Curry, Joe Hatch, and Flat Nose George canyons.

At least five historical structures are reportedly in the WSA, including a labor camp site of rock houses associated with the abandoned Coal Creek dam project and a rock house near the Green River. Recent information indicates other historical structures at the head of Short Canyon on the Beckwith Plateau, in Rattlesnake Canyon, and in Rabbit Valley that have not been documented. Historical structures on private or Indian land adjacent to the WSA are found near the ranch and lodge in Range Creek, at Rock Creek, at Florence Creek, and on the Tavaputs Plateau. All are known or thought to have been built by early pioneers and ranchers in the area.

Recreation

Portions of three stream segments identified in the Nationwide Rivers Inventory as potential candidates for the Wild and Scenic Rivers System are within the WSA. Portions of the Green and Price rivers and Range Creek were identified (USDI, NPS, 1982).

The most highly used access points to the WSA are the Sand Wash road and airstrip and 8 miles of county road along the east side of the Green River (cherry-stemmed road in the southern portion of the WSA) and Turtle Canyon road (also a boundary). Sand Wash, 7 miles northeast of the WSA, is the most used access. From Sand Wash the WSA is accessed by 16 miles of river. Some recreationists also reach the WSA boundary by public access along Horse Bench, from Woodside to the Book Cliffs, in Tusher Canyon, and through Sego Canyon. Physical access to the WSA also exists in Range Creek, on Range Valley Mountain, and at times in Chandler Canyon. Use of access routes in these areas depends on permission of private land owners or the Ute Indian Tribe. Access is not encouraged by land owners and is generally not available to the casual user. The road in Chandler Canyon has not been usable since 1983.

There are 11 segments of developed trail totaling about 144 miles. In addition, the Beckwith Plateau cherry-stemmed road connects three segments of trail. The trails include Flat Canyon, Van Duesen (Rock Creek), Trail Canyon (north-upper segment is no longer passable except on foot), Last Chance, Trail Canyon, Owlhoot along the Price River, Golden Stairs, Long Canyon (south Beckwith), Short Canyon, Rattlesnake Canyon, and the Green River trails. Innumerable off-trail routes are possible, and some are commonly used to the point where foot trails have become well established. Wash and creek bottoms are also commonly used. A substantial number of potential routes in steeper canyons, across ridges between canyons, in very densely vegetated bottoms, and in canyons requiring short rock ascents or traverses are also present that are now receiving little or no use.

Sand Wash Ranger Station (north of the WSA) is the major BLM facility related to recreation use for the WSA. The site is used for camping, launching boats, sightseeing, fishing, and picnicking. Other BLM facilities associated with recreation use of the WSA include a toilet and trash collection facilities at Swasey Rapid and ramp sites, fire pits, and a small ramp and visitor register at Nefertiti Rapid.

Within the WSA, there are about 50 riparian bottoms along the Green River commonly used for camping. These sites are all primitive with no facilities. About 175 to 400 people camp in the canyons at these sites at any one time during the floatboating season. The most common drinking water supply points along the river are at Rock Creek and Range Creek. Visitor use on the Green River is controlled by permitting and scheduling launches.

There are four privately-owned lodges adjacent to the WSA, two on the Tavaputs Plateau and two in Range Creek. Present combined capacity of the lodges is about 85 guests. A ranch south of the WSA offers outdoor sports activities and the operator has applied to conduct some of these activities, including horseback outfitting, in the WSA. A dirt landing strip that extends into the WSA (reported as a way during the

wilderness inventory) is occasionally used for access to the ranch. A private boat ramp and vehicle shuttle service are also located south of the WSA. One of the more heavily used services in the community of Green River connected with the use of the WSA is an air shuttle service to Sand Wash. There is also a boat rental business in Green River renting primarily to groups using the river in the WSA. Other services provided are vehicle shuttles by individuals, motel accommodations, developed camping, restaurant services, etc.

Green River State Park is located in the Town of Green River south of the WSA. It is a large camping and picnicking facility with a boat ramp sometimes used as a takeout, particularly for large boats, after trips through the WSA.

Presently, there are about 30 outfitting businesses primarily involved with river excursions offering services in the WSA. Several outfitters have begun offering trips combined with horseback riding and stays at the lodges on the Tavaputs Plateau. River trips range from 3 to 10 days with some trips offering extended hikes. Some also offer training in boating skills and seminars or trips tailored to special groups.

The Green River through Desolation and Gray Canyons (in the WSA) is covered by nearly all whitewater guidebooks addressing major rivers in Utah and the West. A number of map and interpretive guides that apply to the WSA are available, including journals of members of the Powell expeditions, covering rapids, geology, history, archaeology, natural features, and sites of interest.

The recreational use of the WSA is currently estimated at 70,000 visitor days annually. Of this amount, 60,000 visitor days are attributed to water-based recreation controlled by BLM's permit system in Desolation and Gray canyons on the Green River (30,000 visitor days for commercial use and 30,000 visitor days for noncommercial use). The remaining 10,000 visitor days are attributed to 3,000 visitor days of noncommercial land-based activities such as hunting and horseback recreation and 7,000 visitor days of float boating on the Price and Green rivers that is not managed by BLM's permit system. There is no use solely for ORV play activities. Less than 1 percent (no more than 200 visitor days) is attributabed to use involving vehicular access on existing ways.

Floatboating in the WSA is the primary recreational activity for the WSA. The portion of the Green River in the WSA contains about 60 rapids of varying degrees of difficulty. The difficulty of rapids also varies considerably with water levels. The rapids are rated Class III to IV, with Class V being the most difficult on the International Scale of Whitewater Difficulty.

Inflatable boats, ranging in size from 10-foot rafts to large 23-foot-long pontoon boats, are the most commonly used craft. A diversity of other water craft is also used including kayaks, sport yaks, whitewater canoes, and dories. Motors are sometimes used.

The Desolation Canyon and Gray Canyon sections of the Green River River Management Plan focus primarily on recreation (USDI, BLM, 1979c). Among other spcific management actions, the plan establishes a river-use carrying capacity of 64,000 visitor days.

A permit system is used by BLM for monitoring both commercial and private river use from about April through mid-October. Of Green River users interviewed 82 percent perceived they were in a wilderness. Fifty-four percent of the use comes from cities over 250,000 in population. Thirty-six percent of the use is sponsored by formal organizations such as school, church, and youth groups. Use comes from the Wasatch Front (25 percent), Denver metropolitan area (20 percent), California (17 percent), and other localities, states, and countries. Due to the length of the trip, most users spend 1 to 6 months planning their trips, often to coincide with vacations from work (Schreyer and Nielson, 1978). The river trips are often advertised as a "wilderness" trip.

About 100 users per year float on the Price River. High quality floating is available during high spring/early summer flows for about a 3- to 6-week period. The 12 to 15 major rapids can be difficult, technical, and rocky. The river is suitable for small rafts, kayaks, and canoes.

Fishing use of the Green River is made by a small percentage of floatboaters and residents of the towns of Green River and East Carbon. Fishing is for catfish, carp, and suckers. The river has a large fish population and propagation is good. Rock Creek and Range Creek are trout fisheries within the WSA. Rock Creek contains brown, rainbow, and strains of cutthroat trout. Present fishing use is light. Short segments of Range Creek with good to fair fishing opportunities for rainbow trout occur within the WSA, although

access is limited by adja-cent private lands. Fishing use in Rock Creek is by floatboaters and in Range Creek is primarily by guests at the lodges.

Deer hunting opportunities in the WSA are good; however, rugged terrain and sometimes weather are major limiting factors. About 200 to 250 hunters use the WSA. Areas of concentrated hunting use are Little Park, Turtle Canyon, and Range Creek. Use in other portions of the WSA is low due to low deer numbers, terrain, or access. Presently, elk populations are not sufficient for hunting west of the Green River.

Use figures for chukar hunting are not available. High quality opportunities are available in the canyon bottoms from Range Creek south in the WSA. Populations of chukar partridge, particularly along the Price and Green rivers, are good to excellent. Significant amounts of use occur in these areas now.

The WSA is closed to ORV use except on existing roads and trails. However, use is very limited since most of the WSA's topography is not favorable for ORV activities. The 5.5 miles of way in the WSA are infrequently used. Some use of the jeep trail along Range Creek occurs, although it is mainly for access to the river rather than for vehicular recreation. The trail is confined to the gravel terraces in the canyon bottom crossing the creek 27 times and is not always passable. Throughout the entire WSA, vehicular use is estimated to be fewer than 200 visits annually.

The WSA is well suited for hobby activities such as photography, bird watching, and plant identification. These generally occur in conjunction with other recreation activities. Rockhounding is limited by the lack of known gem quality stones. Some sightseeing at a fossil site just north of Peters Point in the Wasatch Formation is known to occur.

In 1983, Beckwith Plateau was identified as a potential National Natural Landmark. The identified area is 37,760 acres, of which about 35,000 acres are within the WSA. Significant features of the potential natural landmark identified are (1) its isolation as a topographic feature separated by two rivers and vertical cliffs of about 1,000 feet; (2) the exposed formations at the locations recording the eastward crowding of the Mancos seaway; (3) the presence of visible coal seams at the surface; (4) excellent expression of erosional features of the Book Cliffs, such as castellate and buttressed upper slopes and complex badlands; and (5) botanical features. The principal reason cited for potential designation was use as an interpretive model of processes leading to formation of coal in a classic regressive coastal sequence (S.L. Welch, et al., 1980).

Land Use Plans

Lands within and adjacent to most of the WSA are primarily Federally owned, managed by BLM. Large blocks of non-Federal land adjacent to the WSA include the Uintah and Ouray Indian Reservation, private land along the top of the Tavaputs Plateau, and a string of private parcels in Range Creek. There are 40 sections of land with State-owned surface and minerals in-held in the WSA for a total of 23,519.7 acres. In addition, there are three parcels (432.8 acres of split-estate lands) with State mineral rights in-held within the WSA. Of the State lands, there are 8,403.4 acres under grazing permits and 15,578.9 acres under lease for oil, gas, and hydrocarbons. Seven sections have existing rights-of-way or rights of entry. The management philosophy of the State is to maximize economic returns for the State school fund and to reserve it position regarding exchange of in-held State lands (see Chapter 1 in Volume I). In 1986 the Utah State Legislature passed S.C.R. No. 1 opposing wilderness designation of BLM lands in Utah.

Rights-of-way adjacent to the WSA form boundaries in Turtle Canyon and on the Big Horn Benches. One BLM right-of-way exists in the WSA in Jack Creek for the purpose of gas production. There are no other rights-of-way or pending applications for rights-of-way in the WSA.

The Carbon County has zoned the area within the WSA (79,520 acres [27 percent of the WSA]) as Critical Environmental 1 (CE-1) (Carbon County Commission, 1981). Land use objectives for the CE-1 zone are: (1) to protect and conserve the water supply, vegetation, soils, wildlife, and other natural resources within the watershed; (2) to avoid the creation of hazard from floods, fire, and other dangers; (3) to preserve the aesthetic appearance of the landscape; and (4) to prevent the degradation of the environment and waste of natural and financial resources.

Permitted use under CE-1 includes grazing and pond construction. Major construction requires review and approval by the county.

Emery County has zoned the Emery County portion of the WSA (178,255 acres [61 percent of the WSA]) for mining and grazing (Emery County Board of Commissioners, 1984). Land use objectives are: (1) to

promote the conservation of water, land, mineral, and other resources; (2) to prevent the degradation of the natural and social environment; (3) to foster agriculture, mining, and industry within the State; and (4) to provide a location for certain types of agricultural, industrial, and other uses that, because of certain characteristics of operation such as odor, noise, etc., are not compatible with urban development. Permitted uses include grazing, pond construction, minor mines and utility projects, and buildings. Major construction, mining, etc., requires county review and approval.

The Grand County Master Plan identified no specific management plan or zoning for the 83,070 acres (28 percent of the WSA) of the county in the WSA; however, the plan does not favor wilderness designation in the county and generally emphasizes continuation of present uses and maximizing mineral development (UofU, BCD, 1979). The Grand County Commission also does not favor wilderness designation in Grand County. All three counties have embraced the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposed wilderness designation for BLM lands in Utah.

Public lands in the WSA are managed under the BLM land use plans. Wilderness is not addressed in the current BLM land use plans. Wilderness is part of the BLM multiple-use concept and the BLM Utah Statewide Wilderness EIS is linked to the land use plans through analysis of the present plans as the No Action/No Wilderness Alternative. The Price River MFP (USDI, BLM, 1983b) identifies specific management proposed for the WSA including (1) river recreation management as identified in the Desolation and Gray canyons of the Green River River Management Plan (refer to Recreation discussion); (2) oil and gas development of Peters Point field; (3) management for water and fishery quality in Rock Creek under the Rock Creek Habitat Management Plan; (4) protection of watershed, wildlife, cultural, and visual resources; (5) establishment of oil and gas leasing categories; and (6) maintenance of existing grazing management and practices. The Grand RMP (USDI, BLM, 1983) identifies: (1) establishment of oil and gas leasing categories; (2) maintenance of existing grazing management (no intensive management projects such as chainings, etc.); and (3) protection of watershed, wildlife, cultural, and visual resources.

Approximately 128,960 acres (44 percent) are within an oil shale withdrawal as discussed in the minerals section. There are also 9,164 acres (3 percent) of power site classification; 2,786.72 (less than 1 percent) of reclamation withdrawal; 3,862.07 acres (1 percent) of power site projects; and 752.39 acres (less than 1 percent) in public water reserves. Public water reserves are closed to metalliferous mining. The other classifications are being reviewed and decisions on continuation will be made in 1991.

Socioeconomics

- Demographics

The WSA includes portions of Carbon, Emery, and Grand Counties. Due to access and population distribution, Carbon County, more than Emery County, would be the area most affected by future mineral development or wilderness designation or nondesignation. The Town of Green River in Emery County is a staging area for many activities in the WSA. The major towns of Grand County are south of the WSA. All three counties are discussed below.

Carbon County can be summarized as rural with an urban area around the City of Price. Emery County is classified as rural with a string of small communities in Castle Valley. Grand County is characterized as rural and sparsely populated. Communities closest to the WSA include: Price, Wellington, East Carbon, Sunnyside, and Green River. The City of Price (1980 population of 9,086) is located in Carbon County, 30 miles west of the WSA, and serves both Carbon and Emery Counties as a major service center (USDC, Bureau of the Census, 1981). The adjacent communities of East Carbon and Sunnyside (total 1980 population of 2,553) are located in eastern Carbon County, 8 miles west of the WSA, and provide land access to the western part of the WSA. Green River (population of 1,048), located on the county line between Emery and Grand Counties, 6 miles south of the WSA, provides downstream river egress from the WSA. A road leading north from the Town of Green River also provides access to southern portions of the WSA along the river.

Carbon and Emery Counties comprise 5,916 square miles or 3,781,952 acres. About 73 percent of the counties is managed by the Federal government, 10 percent by the State, and 17 percent is privately owned.

About 80 percent of Grand County is owned by the Federal government, 15.5 percent by the State, and 4.5 percent by private landowners. The land in Grand

County comprises about 4.5 percent of the State, or about 3,615 square miles.

Table 14 shows the baseline and projected total population data for Carbon, Emery, and Grand Counties. From 1970 to 1980, the population of Carbon County grew from 15,647 to 22,400, an overall increase of about 43 percent. Carbon County has less than 2 percent of the State population of about 1.5 million (Utah Office of Planning and Budget, 1984). Table 14 presents baseline and projected population data for Carbon County. It is estimated that between 1980 and 1987, the population increased to about 23,100. Population projections indicate that the number of people living in Carbon County in the year 2010 will be about 28,000 for about a 25-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

Table 14
Baseline and Projected Population and Employment Growth
Carbon, Emery, and Grand Counties

	1980	1990	2000	2010
Carbon County				
Population	22,400	23,400	23,200	28,000
Employment	9,372	9,400	10,700	13,000
Emery County				
Population	11,600	12,000	11,900	14,000
Employment	5,480	4,900	5,500	6,700
Grand County				
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980, the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800 (less than 1 percent of the State's population of 1.5 million). Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

From 1970 to 1980, the population of Grand County grew from 6,600 to 8,250, an overall increase of about 23 percent. It is estimated that between 1980 and 1987, population decreased to about 7,250. Population projections for the county indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab, which is approximately 55-road miles from the WSA.

- Employment

Growth in the Carbon-Emery area, particularly Carbon County, is linked with the coal industry. The region's population increased 62 percent between 1970 and 1980, and Emery County has the highest rate of grow in Utah for the largest share of income earned in the region (USDC, Bureau of the Census, 1981). Between 1981 and 1983, employment in the local coal industry decreased 15 percent (Utah Department of Employment Security, 1981 and 1983). Despite the recent slump, the coal industry remains the area's largest employer. Construction and operation of electrical generating plants also provide a large share of employment in the Carbon-Emery area. Local income and employment attributable to these power plants are reflected in the construction, public utility, and mining sectors. A number of other businesses depend on the mines and powerplants to purchase their products, and many retail and service businesses depend on the workers' local expenditures.

Carbon, Emery, and Grand Counties are part of the Southeast MCD. Table 15 shows the baseline (1980) and projected employment by source for the MCD to the year 2010.

Table 15
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18

percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent and that services will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total; while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

- Sales and Revenues

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, hunting, and recreation. Table 16 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies in general the multipliers used to estimate sales and revenues.

Gas production and exploration of the WSA for oil and gas has brought some income and employment to residents of the area. The WSA also has three mining claims. Regulations require a $100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Table 16
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	Unknown	$107,130[b]
Mineral Production	$300	None
Livestock Grazing	$135,880	$10,463
Recreational Use	$1,152,000	$55,155
Total	$1,288,180	$172,748

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

[b]Includes up to $96,342 in lease fees and up to $10,788 in royalties.

Twelve livestock operators in 15 allotments have grazing privileges in the WSA. Based on the consumption of 6,794 AUMs of forage by cattle, it is estimated that the WSA accounts for $135,880 of livestock sales, including $33,970 of ranchers' returns of labor and investment. These expenditures would be significant to local ranchers; however, they are of low significance to the local and regional economies.

Due to terrain, hunting pressure is low in most areas. Related expenditures would only be significant to the lodges and commercial outfitters using the WSA.

The WSA supports significant private and commercial boating use. Commercial boating and other recreational use accounts for an estimated $1.15 million in local sales by the 30 operators using the WSA, 15 outfitters are located outside the affected area and their operations contribute less to the local economy than do the 15 local outfitters. Including multiplier effects, the purchases of local outfitter services, the local purchases by nonlocal outfitters, and the local expenditures by private users account for $461,000 of earned income and about 40 jobs in Carbon, Emery, and Grand Counties. Economic effects are concentrated in (1) certain communities such as Green River, which has an employment work force of 238; and (2) certain industrial sectors such as retail and service businesses. Therefore, expenditures related to boating use of the WSA are significant to a number of local businesses.

Land-based recreation use of the WSA is low. Except for the four lodges near the WSA, the related local expenditures are well distributed and locally insignificant. Some of the use of these lodges, is associated with use inside the WSA. There has also been an expressed interest in beginning a number of new commercial horseback trips through the area. The WSA does support some land-based motorized use; however, use is low and related expenditures are insignificant locally and to any business.

The WSA generates revenues to the Federal Treasury from three sources: mineral leasing and royalties, grazing fees, and recreation use permits. Within the WSA, about 48,171 acres are currently leased for oil and gas. At $2 per acre, this generates up to $96,342 annually. Half of this, or about $48,171, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 6,794 AUMs of forage consumed by livestock in the WSA and a grazing fee of $1.54, the WSA annually accounts for $10,463 of grazing fee revenues to the Treasury. One-half of this is allocated back to the local BLM District for the construction of range improvement projects. Commercial and private water-based recreation use of the WSA generates about $55,155 in Federal revenues annually.

Average annual production of 86,335 thousand cubic feet (MCF) of natural gas has been produced from three wells in the former Greater Jack Canyon KGS (Peters Point area) of the WSA since 1982. This production has generated an estimated 1.7 work years of employment over the past 3 years, much of which

represents local employment. Royalties of approximately $10,788 are paid to the Federal government annually on this production. Half of this money is also allocated back to the State of Utah.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Desolation Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the BLM Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class I management on 22,000 acres and VRM Class II management on 253,685 acres; management under oil and gas leasing Category IV [closed to leasing] on 48,790 acres and oil and gas leasing Category III [no surface occupancy] on 120 acres; continued withdrawal from mineral location on 128,960 acres; and ORV limitations [roads and trails only] throughout the entire WSA).

In the foreseeable future, disturbance of approximately 423 acres from exploration and development of oil, gas, and coal; from development of access to inheld State lands; and from development of rangeland projects would result in a loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Most special features, including topographical diversity, geological features, diverse animal and plant populations including special status species, wildlife associated with wilderness, Flat Canyon Archaeological District, Desolation Canyon National Historical Landmark, wild horses, and perennial rivers and streams, would not be significantly affected because the direct disturbance would involve only 0.2 percent of the WSA. Although the wild and scenic values of 191 miles of inventory river would not receive the additional protection wilderness designation would provide, no significant change in these values is anticipated in the foreseeable future. Some Class A scenery would be reduced in quality in the disturbed and adjacent areas. Appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Refer to the Vegetation and Wildlife Including Special Status Species, and Cultural Resource sections for more information.

During the period of activity, the visual and audible disturbance from mineral exploration and development, from development and vehicular use of access to State inholdings, and from construction of rangeland developments would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas, but also indirectly on adjacent portions of the WSA. As much as 40 percent (116,338 acres) of the WSA could be so affected in the foreseeable future. Continued human presence and activities over the life of oil and gas wells and coal mines would reduce available habitat and intrude on populations of sensitive black bear, mountain lion, and bighorn sheep in that 40 percent area. Improved access would increase changes for vandalism of cultural sites.

Because future vehicular use would be limited by terrain to existing vehicular ways, no additional disturbance from ORV activity is anticipated in the future. The continued and increased vehicular use of existing ways and future access roads would detract from opportunities for solitude and primitive recreation.

The increased visitor use that would occur over time would not be expected to significantly reduce the quality of wilderness values because the additional use would be largely primitive in nature, the WSA is large enough to incorporate the additional use adequately, and the amount of river use would be controlled.

Other than for coal, the extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness management and los would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 423 acres of the WSA. Opportunities for solitude and primitive recreation, wildlife habitat, and scenic quality would be

indirectly reduced in quality on up to 116,338 acres of the WSA. Class A scenery would be reduced in quality in the disturbed and adjacent areas, and wilderness dependent wildlife species would be displaced. Wild and scenic river values would not receive additional protection but no significant impact to these values is anticipated.

• Impacts on Geology and Topography

Impacts on geology and topography in the WSA would result from surface disturbances associated with oil, gas, and coal exploration and development activities on about 423 acres. Topography would be altered in areas disturbed by up to 70 miles of new roads and well-pad construction. Reclamation would be required following production (approximately 30-year well life), but noticeable scars would remain over the long term in several of the canyons of the WSA. The main Desolation and Gray Canyon systems would not be affected by disturbance.

In addition to surface disturbance, subsurface effects resulting from underground mining of coal in the long term would also occur. An undetermined amount of subsidence would result in settling of the surface and possibly surface fracturing. This impact would be limited to the 8,000-acre area underlain by coal in the vicinity of Little Park Wash.

Conclusion: Topography would be altered by surface disturbance on about 0.1 percent (423 acres) of the WSA. Underground mining of coal would cause subsidence and surface fractures on up to 2.7 percent (8,000 acres) of the WSA.

• Impacts on Soils

It is estimated that about 423 acres of soil would be disturbed by mineral exploration and development activities. The average rate of soil loss at present is estimated at about 0.65 cubic yard per acre per year for undisturbed areas and 5.54 cubic yards per acre per year on disturbed areas. Soil loss on the 423 acres would increase from 275 cubic yards per year to 2,343 cubic yards per year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 2,068 cubic yards (1 percent) over current annual soil loss. Only about 60 acres of disturbance would occur on highly saline soils in the Carbon County portion of the WSA. There would be slight increases in erosion and salinity production. Any increases would be small and would not be measurable in the Colorado River system.

Conclusion: There would be localized increases of erosion on 423 acres. Annual soil loss from the WSA would increase by 1 percent (2,068 cubic yards).

• Impacts on Vegetation Including Special Status Species

The anticipated 423 acres of disturbance due to energy and mineral exploration and development would affect composition of vegetation types on 0.1 percent of the WSA. Acreage disturbed by energy developments in woodland would result in obvious changes with the removal of the dominant vegetation (i.e., trees). However, no significant impacts to any specific vegetation type are projected. Disturbed areas would eventually revert back to the original vegetation type unless they are disturbed again (e.g., retreating the vegetation treatment areas). Riparian vegetation would not be affected because projected activities would not be located in riparian zones.

Six special status plant species, including the threatened Sclerocactus glaucus, may occur within the WSA. The known habitat for all of these species extends beyond the WSA boundary. Nearly all of the special status species are located in pinyon-juniper woodland, sagebrush and desert shrub vegetation types. However, Gailardia flava is located on stream terraces and riparian areas and Hedysarium occidentale var. canone is located in lower spruce-fir forests and mountain brush areas where no major surface disturbance is projected.

Before authorizing any surface disturbing activities, BLM would require site specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request by the Endangered Species Act and BLM policy. BLM would request a biological opinion when necessary (see Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Therefore, while surface disturbing activities could result in the inadvertent loss of some individual plants of these species, threats to the continued existence of any of the species would not occur. Because necessary measures would be taken to protect these species, the viability of populations of

special status species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Four hundred twenty three acres, 0.1 percent, of the vegetation in the WSA would be modified with this alternative. No vegetation types would be significantly altered. Populations of special status species would be protected.

- Impacts on Water Resources

Impacts on water interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Presently, most erosion in the WSA is natural rather than caused by human activity. Surface disturbance from activities projected with this alternative would result in an increase in soil loss of approximately 2,068 cubic yards per year (1 percent). Actual sediment yield increases would be lower if surface disturbance took place on more stable soils or with successful reclamation or protection measures.

Increases in erosion would also cause increases in stream sediment loads and possible changes in some chemical parameters from dissolution and leaching. Water quality in lower Jack Creek, Range Creek, and the Price River would be affected by a slight increase in sediment loading and concentrations of dissolved minerals. The quality of water in intermittent flows from Rattle Snake Canyon, Tusher Canyon, and Long Canyon would also be affected. The trout fishery in Range Creek would also be adversely affected by a reduction in spawning success resulting from sedimentation.

Secondary increases in salinity in the Green River would be small. The increase would not be significant due to the required retention and reclamation procedures and the small acreage that would be disturbed. Only about 60 acres of the projected disturbance would take place on highly saline soils near Jack Canyon and Cedar Ridge, and this area has previously been disturbed by gas exploration and production activities.

The extent and quality of groundwater resource in the WSA is not known. However, the location of numerous springs and seeps in the WSA indicates abundant groundwater presence. Underground mining of coal could disrupt groundwater movement and lower groundwater quality. Some of the springs could dry up or experience reduced flow. Development of the oil and gas resource would likely not affect groundwater in the WSA due to the expected wide distribution of wells.

Conclusion: Sediment and salinity in Jack Creek, Range Creek, the Price River, and Rattlesnake, Tusher, and Long Canyons would increase slightly as a result of surface disturbance. Such increases would not create measurable changes in water quality in the Green River or the Colorado River system.

- Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Species sensitive to human presence or surface disturbance, such as black bear, mountain lion (cougar), bighorn sheep, and nesting raptors, would be adversely affected by surface-disturbing activities on about 423 acres or about 0.1 percent of the WSA. In addition to direct disturbance of habitat, construction and intermittent use of up to 70 miles of new road, including access roads to State lands, would increase human presence on about 40 percent (116,338 acres) of the mountain lion and black bear habitat in the WSA. Carrying capacity for bighorn sheep would be temporarily reduced by four animals, but the long-term presence of roads would lead to continued interference from human activities.

Elk and mule deer are presently expanding in the WSA where gas production is in place. Total range and carrying capacity would be temporarily reduced by direct disturbance in the WSA. Loss of carrying capacity for deer would be about 20 animals on crucial winter range and 5 on summer range, while elk carrying capacity would be reduced by 3 on winter range and 2 on summer range.

The greatest impact on mule deer ranges and populations would occur during gas and coal exploration in Range Creek and in the vicinity of Little Park Wash.

Activity during periods of stress could lead to death of weakened animals.

Category 2, 3, and 4 leasing stipulations would protect these species through restrictions on activities during critical projects, selective placement of facilities and denial of surface occupancy on over 99 percent of the WSA.

Raptor nesting habitat, including potential nesting habitat for peregrine falcon (endangered species), would be reduced by the 423 acres of projected disturbance. Wintering bald eagles (endangered) along the Green River would not be affected because surface-disturbing activities are not expected along the Green River. Six other FWS candidate bird species under review for endangered or threatened status may occur in or near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and would informally consult with the FWS as required by BLM policy (refer to Appendix 4 in Volume I). If threatened or endangered species could be affected, BLM would initiate Section 7 consultation with FWS under provisions of the Endangered Species Act. Appropriate mitigation measures such as relocation, timing of projects, and avoidance of sensitive areas would be taken to protect them.

The spawning and reproductive success of trout in Range Creek would be adversely affected by slight increases in sedimentation caused by oil and gas exploration and production. Endangered fish in the Green River would not be affected by the activities projected for this alternative.

Conclusion: Wildlife habitat and populations would be reduced slightly by direct disturbance of 0.1 percent (423 acres) of the WSA. Continued human presence and activities over the life of oil and gas wells and coal mines would reduce available habitat and intrude on populations of sensitive black bear, mountain lion, and bighorn sheep over about 40 percent (116,338 acres) of the WSA. Populations of special status animals and fish would not be affected.

- Impacts on Visual Resources

Approximately 22,000 acres of the WSA would be managed under VRM Class I, a special designation covering Desolation Canyon National Historic Landmark, and another 253,685 acres would be managed under VRM Class II objectives requiring that surface-disturbing activities not be generally apparent.

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by about 423 acres of surface disturbance from mineral and energy development would be degraded. VRM objectives would probably not be met in VRM Class I and II areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. Approximately 40 percent (116,338 acres) of the WSA would receive some long-term visual impacts from the construction of roads for mineral exploration and access to State lands, with specific areas being affected to a significant degree. Scenic conditions along most of the Green and Price rivers would not be altered. Coal development along Little Park Wash could be an intrusion along about 2.5 miles of the Price River.

Conclusion: Visual resources would be degraded in the directly disturbed and surrounding areas. VRM objectives would not be met on 423 acres (0.1 percent) of the WSA.

- Impacts on Cultural Resources

In the short term, 423 acres of surface disturbance is expected due to mineral development and road construction. Potential impacts to specific cultural resources are unknown; however, all sites in the unit would continue to receive protection under existing Federal and State antiquities laws. Any surface disturbance would be preceded by standard inventory and mitigation procedures. However, unrecorded archaeological sites that may be buried in alluvial terraces and cannot be detected by surface inspection may be inadvertently damaged by road construction and/or mineral exploration. In addition, increased human presence in developed areas may provide opportunities for illegal artifact collection and vandalization (Nickens, et al., 1981).

The WSA would remain open to ORV use and general vehicular access on existing roads and ways. ORV activity does not currently constitute a major use of the unit and is not expected to increase appreciably in the future due to topographic constraints. Most of the recreational use is confined to canyon bottoms accessible only by boat, and the unit experiences little general vehicular traffic. Little disturbance to archaeological sites due to motorized traffic is expected.

Alluvial terraces in major river canyons provide good camping locations prehistorically, historically, and contemporaneously (Knudson et al., 1982). As a

result, prehistoric and historic habitations are receiving heavy visitation from floatboaters during the river running months and some sites in the Desolation Canyon WSA have been inadvertently damaged by campers (USDI, BLM, 1988b). Under this alternative, vulnerable sites could be protected through standard cultural resource management procedures including inventory, avoidance, stabilization, interpretation, and test excavations without the restrictions of wilderness values maintenance.

Conclusion: All sites would continue to receive protection under existing laws. Inadvertent loss or damage to archaeological sites would occur due to surface development. Intentional vandalism and artifact collection would increase due to increased human presence and continued vehicular access. Cultural resource management would continue without regard to wilderness management considerations.

- Impacts on Recreation

Because the rugged terrain in the WSA limits ORV access and the BLM land use plan restricts use to existing roads and trails, use of vehicles would be restricted to 29.5 miles of existing roads, 5.5 miles of existing way, and up to 70 miles of new roads. About 423 acres of the WSA would be directly disturbed, including the disturbance for new roads. Vehicle use on the roads would increase slightly. Overall, the quality of the primitive recreational opportunity would be indirectly reduced on up to 40 percent (116,338 acres) of the WSA. However, the disturbed areas would be outside the Green River corridor where the large bulk of primitive recreational use takes place. The major uses in the affected areas are presently hunting and horseback riding; therefore, primitive use would not significantly decline as a result of mineral exploration and development.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Jungst, 1978; Hof and Kaiser, 1981; and Cordell and Hendee, 1982), it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year over the foreseeable future. However, this is only true for a small portion of the recreation use in the Desolation Canyon WSA. Approximately 60,000 visitor days annual use are associated with permitted private and commercial float boating on the Green River in Desolation and Gray Canyons. This use is considered to be near full capacity for the area and is expected to increase by only 4,000 visitor days in the future. The remaining 10,000 visitor days annual use (3,000 land-based and 7,000 water-based) not controlled by permits would also increase. Because water-based use and hunting are seasonal attractions, the rate of increase in these uses would probably be near the lower end of the projected range at about 2 percent per year. Therefore, overall recreational activity is expected to increase from the current 70,000 visitor days use per year to 82,845 visitor days use per year by the year 2020.

Conclusion: The quality of the primitive recreational experience would be directly degraded on less than 1 percent (423 acres) and indirectly degraded on as much as 40 percent (116,338 acres) of the WSA. Recreational use would increase and water-based recreational opportunities on the Green River would not be affected.

- Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of implementation of this alternative. The existing ability to explore and develop mineral resources would remain as at present. Development of oil, gas, and coal in the WSA would contribute significantly to employment and income for Carbon, Emery, and Grand Counties. Up to 500 jobs would be provided in the foreseeable future mainly by coal development. This is comparable to a 5.3-percent increase in the present employment level of Carbon County, or 3.8 percent of the projected county employment in the year 2010. An undetermined number of secondary jobs would also be created by this employment. Five hundred jobs would be about 1.7 percent of the projected employment in the Southwest MCD in the year 2010.

Recreational use of the WSA is currently estimated at 70,000 visitor days annually. About 3,000 visitor days are attributed to land-based use, while the remaining 67,000 visitor days are attributed to water-based use. The majority of this use is controlled by BLM's permit system and use could only increase from 60,000 to 64,000 visitor days because the Green River in Desolation and Gray canyons is being operated at near full capacity at the present time for the majority of the WSA's length. However, visitor days could increase in the lower end of the WSA where use on the Price and Green rivers is unrestricted. Therefore, local expenditures related to 3,000 land-based and 7,000 water-based visitor days is projected to increase at a rate of 2 percent/year

over the foreseeable future. This recreational use is estimated to increase from 10,000 to 18,845 visitor days/year by the year 2020 and related average local income would be $4.10 per visitor day. The resulting increase in local sales would lie about $36,265 above current amounts. River use that would be controlled by permit would increase from 60,000 visitor days to 64,000 by the year 2020. The resulting increase in local sales would be about $76,000 above current amounts. Overall, local sales from all recreation in the WSA would be about $1,264,265 annually by the year 2020. Because many of the operators are locally based, much of the increased expenditures would benefit the local economy. The demand for commercial outfitter services now offered in the area.

Existing oil and gas lease revenues and royalties would not be affected. There are 193,884 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to $387,768 additional Federal lease fee revenues per year in addition to new royalties from lease production and bonus bids from new leases. Future royalties could be over $100,000 per year because present royalties on three gas wells amount to about $10,788 per year. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees ($10,463 per year) would continue.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not alter existing local economic conditions. Present use and future increases in recreation and in oil, gas, and coal exploration and development would contribute significantly to the local economy of Carbon, Emery, and Grand Counties. Coal, oil and gas development could increase employment in Carbon County by up to 500 jobs at one time. This would be a 3.8 percent increase in the projected employment in the county in the year 2010. Recreation-related local sales could contribute up to $1,264,265 to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees and roylalty payments could contribute from $484,110 to over $1 million per year depending on production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would continue.

All Wilderness Alternative (290,845 Acres)

- Impacts on Wilderness Values

Designation and management of all 290,845 acres as wilderness would contribute to the preservation of wilderness values in the Desolation Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and solitude would be protected on approximately 287,910 acres that meet and 2,935 acres that do not meet wilderness study criteria. Primitive and unconfined recreation would be protected on all 290,845 acres that meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including topographical diversity, geological features, diverse animal and plant species including endangered and sensitive species, wildlife associated with wilderness, Class A scenery, Flat Canyon Archaeological District, Desolation Canyon National Historical Landmark, wild horses, and perennial rivers and streams including approximately 191 miles of Wild and Scenic River inventory segments, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of the existence of valid existing rights. In the foreseeable future, disturbance of up to 143 acres is anticipated from exploration and development of pre-FLPMA oil and gas leases, from development of access to State inholdings, and from rangeland projects. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 20 percent (58,170 acres) of the WSA could be so affected. Special features would not be significantly affected because the direct disturbance would involve only 0.05 percent of the WSA. Appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Some Class A scenery would be reduced in quality in areas of disturbance. Some wildlife associated with wilderness would be displaced in disturbed and adjacent areas during the period of activity.

Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. Rangeland projects, on the other hand, would be designed to meet wilderness management criteria and upon completion would not be substantially noticeable in the area as a whole. All in all, disturbance could affect wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the area as a whole.

Vehicular use of existing ways would generally cease with ORV closure, improving naturalness and opportunities for solitude and primitive recreation.

The potential for long-term development of pre-FLPMA leases and State and private inholdings is not accurately known, but would be less with this alternative than with the No Action/No Wilderness Alternative due to application of mitigation that would protect wilderness values subject to valid existing rights.

Increased visitor use that would occur with time would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation and scenic quality would be directly lost on 143 acres of the WSA, and opportunities for solitude and primitive recreation, habitat for wilderness-dependent wildlife species, and scenic values would be indirectly reduced in quality on up to 58,170 acres of the WSA. Wild and scenic river values would receive additional protection.

- Impacts on Geology and Topography

Because coal would not be mined in the WSA, geology and topography would not be affected in the Little Park Wash portion of the WSA. Construction of 54 miles of new roads for oil and gas exploration and production on leases held by production in the Jack Creek, Cedar Ridge, and Bighorn Benches, and to access State lands mainly in Rattlesnake and Tusher canyons and near the Beckwith Plateau, would alter topography on 143 acres (0.05 percent of the WSA).

Conclusion: Topography would be altered on 0.05 percent (143 acres) of the WSA.

- Impacts on Soils

It is estimated that approximately 143 acres of the WSA would be disturbed following wilderness designation. The average rate of soil loss is estimated at about 0.65 cubic yards per acre per year on undisturbed areas and 5.54 cubic yards per acre per year on disturbed sites. Therefore, soil loss on the 143 acres that would be disturbed would increase from 93 cubic yards per year to 792 cubic yards per year. Therefore, annual soil loss in the WSA would increase by approximately 699 cubic yards per year which would be a 0.4 percent increase over existing conditions. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Only 40 acres of the disturbance is expected on highly saline soils in the Carbon County portion of the WSA. There would be slight increases in erosion and salinity production, but increases would be small and would not be measurable in the Colorado River system.

Conclusion: There would be localized increases in erosion. Soil loss from the WSA would increase by about 0.4 percent (699 cubic yards per year).

- Impacts on Vegetation Including Special Status Species

The anticipated surface disturbance of 143 acres would alter vegetation types on less than 0.1 percent of the WSA. Habitat for one threatened and five candidate plant species that may occur in the WSA would receive additional protection by a reduction in the potential for disturbance of the WSA. Continuation of oil and gas exploration and development on leases held by production and construction of access to State lands could result in inadvertent destruction of individual plants of these species. Because of the small acreage of expected surface disturbance and requirements for FWS consultation and mitigation, the viability of populations of these plants would be preserved.

Conclusion: Less than 0.1 percent (143 acres) of the vegetation in the WSA would be disturbed. Populations of endangered, threatened, and other special status plant species would be preserved.

- Impacts on Water Resources

Restraints on mineral development would protect water quality. The potential for increased soil erosion

and sediment yield from 143 acres of gas disturbance related to oil and gas exploration and production and access to State lands would be less than changes in water quality discussed for the No Action/No Wilderness Alternative. Increases in sediment loading are most likely in Rattlesnake Canyon, Log Canyon, and possibly in Lower Jack Creek during periods of flow.

Mineral exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not be expected to significantly alter groundwater flow or reduce groundwater quality.

Because of requirements for flows to areas and states downstream of the WSA and because of present constraints on water management including releases for operation of downstream dams, protection of National Parks, and consideration of endangered fish species (see Chapter 3 Water Resources in Volume I) it is unlikely that upstream diversion would reduce flows in the mainstream of the Green River through the WSA to a point that would conflict with recreation or other water uses and values in the WSA, or that upstream uses would have to be restricted to protect water uses on the Green River in the WSA. However, development on the Price River upstream of the WSA from its headwaters on the Manti-LaSal National Forest through Carbon County would be hampered because changes in use, changes in points of diversion, or transfer of water rights could be protested by the Federal Government to maintain flow through the WSA. Potential uses of water on the Price River upstream of the WSA include irrigation, municipal, coal mining, and industrial purposes.

Conclusion: There would be slight increases in sedimentation in Jack Creek, Rattlesnake, and Long Canyon. Water quality in the Colorado and Green Rivers would not be altered. Future water diversions and new consumptive uses of water on the Price River in Carbon County upstream of the WSA may be hampered or restricted.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

    Approximately 48,171 acres (6,295 pre-FLPMA and 41,876 acres post-FLPMA) are under oil and gas lease in the WSA. Current gas production from the WSA (three producing wells are located inside WSA boundaries in the Peters Point field) would not be affected. Future production from leases held by production in the Peters Point field and near Bighorn Benches would also not be affected because these leases have valid existing rights. The remaining post-FLPMA leases would expire without production and would not be reissued. About 193,884 acres in the WSA would remain unleased for oil and gas. The gas held in unitized leases could be produced. Exploration for and development of an unknown but locally significant portion of the potential oil and gas resource in the remainder of the WSA would be foregone.

    In the long term, about 50 to 70 million metric tons of recoverable coal (105 to 140 million metric tons are estimated to be in-place) could not be mined from the WSA. The recoverable coal underlies 2,900 acres of a known 8,000-acre coal-bearing zone in the Little Park Wash portion of the WSA. Another 100,000 acres of the WSA are underlain by thin-bedded, low-grade coal. Most of this is more than 3,000 feet below the surface and is not considered recoverable. There are no coal leases in the WSA.

  - Locatable Minerals

    After designation, all 290,845 acres would be withdrawn from mineral location. About 128,960 acres are already withdrawn from mineral location by the oil shale withdrawal; therefore, the total withdrawal represents an additional 161,565 acres. The potential exists for less than 500 tons of uranium oxide, probably occurring as deposits in the Wasatch Formations at the base of the Roan Cliffs. Only about 60 acres of the WSA are in three mining claims, and development is not expected in the foreseeable future regardless of wilderness designation. Therefore, there would not be a significant loss of locatable mineral production.

  - Salable Minerals

    Wilderness designation would prohibit development of sand, gravel, and rock located in the WSA. The potential of resource development is low due to more favorable locations elsewhere. Prohibiting salable mineral development is not a significant impact.

Conclusion: Wilderness designation would not affect producing gas wells or future development of leases

held by production. Potential for extraction of significant amounts of oil, gas, and coal would be foregone.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep that are sensitive to human presence and surface disturbance) would benefit by designation and the subsequent reduction of potential surface disturbance from about 423 acres to 143 acres. Black bear, mountain lion, and bighorn sheep populations would be affected by development of oil and gas leases held by production and construction of access roads to State land. Approximately 20 percent (58,170 acres) of the WSA would be affected. Habitat for nesting raptors (WSA-wide), potentially including the endangered peregrine falcon (66,500 acres of habitat) and bald eagle, would be protected. Habitat for six other threatened, endangered or other special status bird species would also be protected.

Bighorn sheep range on and near the Beckwith Plateau would be maintained in its present condition. Habitat for other game species would also receive additional protection by the reduction in potential surface disturbance. Deer and elk habitat and populations would be protected on winter ranges in Range Creek and Little Park Wash and carrying capacities would not be significantly reduced. Habitat for fish species (including trout, three endangered, and one threatened or endangered species) would be preserved and maintained.

Conclusion: Wildlife habitat and populations would be protected by wilderness designation. Populations of wilderness-dependent species such as cougar, bear, and bighorn sheep would be adversely affected by activities on about 20 percent (58,170 acres) of the WSA. Populations of special status animals and fish would be preserved.

• Impacts on Visual Resources

Wilderness designation would contribute to the preservation of the area's visual resources. With this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through management under VRM Class I, which generally allows for only natural ecological change.

With this alternative, 40 acres would be disturbed in the Cedar Ridge and Peter's Point areas of the WSA by oil and gas exploration and development. Approximately 50 miles of access road to State lands would be built. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class II management objectives would not be met during the short term on 143 acres of disturbed areas. Even after rehabilitation (30 or more years in the future), some permanent localized degradation would remain. Overall, visual resources would be indirectly degraded on about 20 percent (58,170 acres) of the WSA where disturbance would be visible.

Conclusion: Visual resources would be protected in the designated area. Visual resources would be degraded in both directly and indirectly disturbed areas. VRM objectives would not be met on the 143 acres that would be directly disturbed.

• Impacts on Cultural Resources

The Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District would be within the designated wilderness. Designation would be consistent with the purpose of the historical landmark and the archaeological district.

The entire unit would be closed to mineral location leasing and only 143 acres of surface development is expected in the short term. The entire WSA would be closed to vehicular access. Few intentional or unintentional impacts to cultural resources would occur under this alternative.

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. However, due to the lack of vehicular access, collection of large artifacts and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, inaccessibility following wilderness designation. The Fremont rock art and structural sites in the WSA may meet these requirements (Wylie, 1988). The protection of cultural resources from all ORV activity, vehicular access, and surface development would, however, probably outweigh any increases in vandalism due to increased recreational use.

Alluvial terraces in major river canyons provide good camping locations prehistorically, historically,

and contemporaneously (Knudson et al., 1982). As a result, prehistoric and historic habitations are receiving heavy visitation from floatboaters during the river-running months and some sites in the Desolation Canyon WSA have been inadvertently damaged by campers (USDI, BLM, 1988). With this alternative, all cultural resource management procedures would be subject to the restrictions of wilderness designation (Neumann and Reinburg, 1988). It may be more difficult to protect vulnerable sites through inventory, avoidance, stabilization, interpretation, and test excavations. Access to sites for these procedures may be limited or denied due to wilderness management.

Conclusion: Cultural resources would receive additional protection and few impacts would occur. Cultural resource management may be limited in scope and execution due to wilderness management.

- Impacts on Recreation Use

As with the No Action/No Wilderness Alternative, if the WSA were designated wilderness, total recreational use in the WSA would increase from the current 70,000 visitor days annually to 82,845 visitor days by the year 2020. However, with this alternative, all use would be primitive in nature. Management provided through a Wilderness Management Plan would control recreation uses. The entire 290,845 acres would be closed to ORV recreational use. In addition, recreational use of the Green River would continue to be limited and, due to the size and configuration of the WSA, the quality of the primitive recreation experience would not be negatively affected by increased primitive recreationaluse.

Vehicular hunting, and sightseeing in the WSA that could occur without designation would be eliminated following wilderness designation. Because there are suitable ORV play areas in the vicinity of the WSA, Vehicular use would not experience an overall decline in the area. Closure of about 5.5 miles of way would make hunting access more difficult and may indirectly reduce overall hunting volume slightly, particularly in the southeast portion of the WSA. Hunting use would resume and even increase with time, however.

Commercial and private river outfitting under BLM's permit system would provide by only about 4,000 of the total visitor days of increase that would occur by the year 2020. This is because the Desolation and Gray Canyon areas of the Green River are already being managed at near full capacity. Other commercial operations relying on land-based recreational activities could increase as the area becomes better known.

Oil- and gas-related surface disturbance on up to 40 acres could cause localized impairment of primitive recreational values in the vicinity of Cedar Ridge and Peter's Point. However, this area is already impacted by the presence of roads and wells and the overall change would be negligible.

Conclusion: Land- and water-based primitive recreational opportunities would be preserved and primitive use would increase. Restrictions on ORV use would be insignificant because of the availability of nearby ORV areas.

- Impacts on Local Economic Conditions

Overall, there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on exploration and production of oil, gas, and coal, there would be a loss in local employment, income, and Federal revenues that could occur under the No Action/No Wilderness Alternative.

Existing oil and gas leases that are held by production would be developed; however, designation would preclude new oil, gas, and coal leases from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development with the No Action/No Wilderness Alternative. Over the long term, wilderness designation would eliminate approximately 300 jobs that would have been provided mainly by coal development. This is equivalent to 3 percent of the current employment of Carbon County. An undetermined number of secondary jobs arising from this employment would also be lost.

Livestock use and ranchers' income would continue as at present with $135,880 of livestock sales including $33,970 of ranchers' return to labor and investment.

Recreational use would increase to the same degree as would occur with the No Action/No Wilderness Alternative. By the year 2020, there would be an increase in local sales of about $112,265 over current amounts. Overall, local sales from all recreation in the WSA would be about $1,264,265 annually.

Motorized ORV recreational use of the WSA is light, and any change in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 42,311 acres of leases not held by production would cause an eventual loss of up to $84,622 per year of lease fees to the Federal Treasury as compared to the existing situation. There would also be a potential additional loss of up to $387,768 annually in Federal revenues from the 193,884 additional acres that could be leased for oil and gas without designation. Present production and royalties would continue. However, any potential royalties from new lease production and bonus bid revenues from new leases would also be foregone. Potential coal leases on up to 8,000 acres would also be lost along with any Federal lease fees, bonus bids, or royalties.

Recreation-related Federal revenues (currently $55,155 annually) would increase as the WSA becomes better known after designation. The opportunity of increasing commercial recreation in the WSA is limited and would be restricted to about a 4,000 visitor day increase on the Green River and to increases in land-based uses.

Conclusion: The potential for 300 jobs related to coal mining would be foregone. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue on 5,860 acres of leases held by production, but would be for a shorter period of time than with the No Action/No Wilderness Alternative because potential for oil and gas production would be foregone on 97.6 percent of the leaseable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 annually to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $472,390 annually would be foregone because 236,195 acres presently open to lease and not held by production could not be leased. Additionally, potential Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.

Large Partial Wilderness Alternative (Proposed Action) (224,850 Acres)

- Impacts on Wilderness Values

Wilderness designation of 224,850 acres would contribute to preservation of the area's wilderness values. Wilderness values would be protected in the designated area, which is approximately 77 percent of the WSA. In the foreseeable future, this partial wilderness alternative would reduce the potential for surface disturbance that would impair wilderness values in the WSA to about 65 percent of that identified for the No Action/No Wilderness Alternative. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure including closure of about 5.5 miles of way, and closure to future mineral leasing and location. Naturalness, outstanding opportunities for solitude and primitive recreation (all acres in the designated portion have these values), and special features, including about 85 percent of the WSA's Class A scenery, the Flat Canyon Archaeological District, all of the known National Register eligible sites, Desolation Canyon National Historical Landmark, all of the 191 miles of Wild and Scenic River inventory segments, and most of the habitat in the WSA for wildlife associated with wilderness and for special status species, would be protected.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil, gas, and coal exploration and development, from developing access to State inholdings, and from rangeland projects would occur on up to 83 acres within the designated portion and on up to 190 acres within the nondesignated portion. Special features would be largely preserved because direct disturbance would involve only 0.09 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface disturbance, and it can be assumed that no negative impact would occur to these values. Some Class A scenery would be reduced in quality in the disturbed and adjacent areas and some wildlife associated with wilderness would be displaced in disturbed and adjacent areas during the period of activity.

Sights and sounds from foreseeable development would indirectly reduce opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to approximately 30

percent (87,253 acres) of the WSA. About 70 percent of this type of impact would be in the nondesignated area.

Elimination of ORV use, including vehicular use of 5 miles of ways in the designated area, would improve opportunities for naturalness, solitude, and primitive recreation in the WSA.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known, but would be less than with the No Action/No Wilderness Alternative due to limitations on development in the designated area, subject to valid existing rights.

Conclusion: Wilderness values would be preserved overall on the 77 percent (224,850 acres) of the WSA which would be designated. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost and the quality of Class A scenery directly reduced on 273 acres of the WSA. Opportunities for solitude and primitive recreation, visual qualities, and habitat for wildlife associated with wilderness would be indirectly reduced in quality on up to 87,253 acres of the WSA. All wild and scenic river values in the WSA would receive additional protection.

- Impacts on Geology and Topography

Impacts on geology and topography in the WSA would result from surface disturbances associated with oil, gas, and coal exploration and development activities on about 83 acres in the designated and 190 acres in the nondesignated portions of the WSA. Topography would be altered on the 273 acres disturbed by road and well-pad construction. Reclamation would be required following production (approximately 30 years), but noticeable scars would remain in several of the canyons in the WSA. Potential disturbance in Log Canyon, the Beckwith Plateau, and the Rattlesnake Canyon areas would be reduced. Construction of up to 50 miles of road for access to in-held State lands would affect topography. Overall, less than 0.1 percent of the WSA would be affected. The main Desolation and Gray Canyon systems also would not be affected.

In addition to surface disturbance, subsurface effects resulting from underground mining of coal would occur in the long term. An undetermined amount of subsidence would result in settling of the surface and possibly surface fracturing. This impact would be limited to the 8,000 acres of the Little Park Wash area that are underlain by coal.

Conclusion: Topography would be altered by surface disturbance on 0.09 percent (273 acres) of the WSA. Underground mining of coal would cause subsidence and surface fractures on 2.7 percent (8,000 acres) of the WSA.

- Impacts on Soils

It is estimated that up to 273 acres of soil could be disturbed, mainly by mineral exploration and development in the WSA and construction of access roads to State lands. Of that, 83 acres would be within the portion designated as wilderness and 190 acres would be in the nondesignated area. The average rate of soil loss at present is estimated at 0.65 cubic yard per acre per year on undisturbed areas and 5.54 cubic yards per acre per year on disturbed areas. Soil loss from the 83 acres in the designated portion would increase from 54 cubic yards per year to 460 cubic yards per year. Soil loss in the nondesignated portion on the 190 acres would increase from 124 cubic yards per year to 1,053 cubic yards per year. Overall, soil loss from the WSA would increase by about 1,335 cubic yards (0.7 percent) per year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. Only about 40 acres of disturbance would occur on highly saline soils in the Carbon County portion of the WSA. There would be slight increases in erosion and salinity production. Increase would not be measurable in the Colorado River system.

Conclusion: There would be localized increases to erosion on 273 acres (0.09 percent of the WSA). Soil loss from the WSA would increase by 0.7 percent.

- Impacts on Vegetation Including Special Status Species

The projected 273 acres of surface disturbance affecting less than one percent of the designated and nondesignated portions of the WSA would alter portions of certain vegetation types. Acreage disturbed by energy developments and roads in woodland or forest types would result in the long-term removal of the dominant vegetation. Because of oil and gas leasing stipulations along the Green and Price rivers, no disturbance of the riparian vegetation type is anticipated. Over time, disturbed areas would revert back to the original vegetation type.

Within the designated portion, only 83 acres of surface disturbance are expected. Vegetation types would not be significantly altered.

One threatened plant species and five candidate plant species may occur within and near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas and would consult with the FWS as required by BLM policy (refer to Appendix 4 in Volume I). BLM would take necessary measures to protect these species. Because necessary measures would be taken, while individual plants could be inadvertently destroyed, the viability of populations of threatened, endangered, or other special status plant species would be preserved with this alternative.

Conclusion: Two hundred seventy three acres (0.09 percent) of the vegetation in the WSA would be modified. Populations of special status plant species would not be affected.

- Impacts on Water Resources

Impacts to water interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect water quality. Most erosion in the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development within the designated portion could impact 83 acres, with a soil loss increase of approximately 406 cubic yards per year. Within the nondesignated portion, soil loss could increase by about 929 cubic yards per year.

Impacts to water resources for the designated wilderness portion from construction of roads to State sections would be as described for the No Action/No Wilderness Alternative. Sediment production in Long and Rattlesnake canyons would be reduced slightly because the acreage of disturbance would be reduced as compared to the No Action/No Wilderness Alternative. In the nondesignated area, water quality could be affected in certain areas such as Jack Creek by increased sediment loading and dissolved mineral concentrations. The most likely resources to be developed in the WSA are gas and coal. Oil and gas leasing categories and lease terms on leases issued after 1984 contain stipulations specifically designed to protect sensitive water resources.

An undetermined short-term increase in salinity would occur due to surface disturbances in the Rouge Creek drainage and along the Price River in the vicinity of Little Park Wash where coal exploration and production would take place.

The extent and quality of groundwater in the WSA is not well known. However, the location of numerous springs and seeps in the WSA indicates groundwater presence. Underground mining of coal would disrupt groundwater movement and lower groundwater quality. Certain of the springs could dry up or experience reduced flow. Development of the oil and gas resource would likely not affect groundwater in the WSA because of widely spaced wells.

Impacts on the use of water in the Price River upstream of the WSA would be the same as with the All Wilderness Alternative because the Price River would flow through the designated area.

Conclusion: Sediment and salinity in Jack Creek, Rattlesnake Canyon, Range Creek, and the Price River would increase slightly as a result of surface disturbance. Such increases would not be measurable in the Green and Colorado rivers. Future water diversions and new consumptive uses of water on the Price River in Carbon County upstream of the WSA may be hampered or restricted.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

  Anticipated impacts to the oil and gas resource within the WSA would be similar to those discussed for the All Wilderness Alternative. However, 62,165 additional acres (nondesignated area minus Category 4 acreage) would be available for less restrictive conventional oil and gas production.

  Potential production of oil and gas would not be foregone on leases held by production in the designated portion of the WSA if exploration and production occurs before the current leases expire. The approximately 224,850 acres of wilderness would be placed in the no leasing category (Category 4).

  The area within the nondesignated portion of the WSA is excluded with this alternative primarily to avoid conflicts with oil, gas, and coal development. Approximately 27 percent of the leasable portion of the WSA would be available for oil, gas, and coal exploration and development. This

includes most of the portion of the former Greater Jack Canyon KGS within the WSA, along with additional acreage to the north with potential associated with Jack Creek anticline; about 24,000 acres south of the Uncompahgre Uplift on Sulvar Mesa and Tusher Canyon in Grand County; and portions of Range Creek and the Bighorn Benches and Water Canyon area north of the Beckwith Plateau. Oil and gas categories would remain as at present in the nondesignated portion. The wilderness stipulations on post-FLPMA leases would be lifted and an undetermined but regionally significant amount of oil and gas would be produced.

The long-term potential for extraction of coal from the Little Park Wash area would remain open as described for the No Action/No Wilderness Alternative. The recoverable coal underlies 2,900 acres of an 8,000-acre coal-bearing area. The coal-bearing area would be in the nondesignated portion of the WSA.

The 224,850-acre designated area is underlain by thin-bedded, low-grade coal. Most of this is more than 3,000 feet below the surface and is not considered a viable recoverable resource. Therefore, this alternative would not affect coal development in the WSA.

- Locatable Minerals

Within the nondesignated acreage (65,995 acres), approximately 52,475 acres would be open to mining claim location. The remaining 13,500 acres would continue to be withdrawn to claim location. Of three existing mining claims covering 60 acres, one (20 acres) is in the area that would not be designated.

Within the designated acreage (224,850 acres), the area would be closed to mining claim location. Approximately 115,440 acres are under the oil shale withdrawal. Presently, there are two mining claims (40 acres) located within the designated area. Loss of locatable mineral development potential would not be significant because of low resource potentials and the low probability of development even without wilderness designation.

- Salable Minerals

Although sand, gravel, and rock are located in the WSA, the potential for development of these resources is low due to more favorable locations elsewhere. Wilderness designation would prohibit development of significant quantities of these resources.

Conclusion: Potential for extraction of oil and gas would be foregone on 73 percent of the leasable portion of the WSA. Coal exploration and production would not be affected. Loss of potential recovery of other minerals would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Species sensitive to human presence or surface disturbance, such as black bear, mountain lion (cougar), bighorn sheep, and nesting raptors, would be adversely affected by surface-disturbing activities on about 273 acres (less than one percent of the WSA). In addition to direct disturbance of habitat, construction and intermittent use of approximately 67 miles of new road including access roads to State lands would increase human presence on about 30 percent of the mountain lion and black bear habitat in the WSA. Carrying capacity for bighorn sheep would be temporarily reduced by about three animals, but the long-term presence of roads would lead to continued interference from human activities.

Elk and mule deer are presently expanding in the WSA where gas production is in place. Nevertheless, total range and carrying capacity would be temporarily reduced by direct disturbance in the WSA. Loss of carrying capacity for deer would be about 13 animals on crucial winter range and 3 on summer range, while elk carrying capacity would be reduced by 2 on winter range and 1 on summer range.

The greatest impact on mule deer ranges and populations would occur during gas and coal exploration in Range Creek and in the vicinity of Little Park Wash. Activity during periods of stress could lead to death of weakened animals. Stipulations on the timing of mineral activities would eliminate most of the adverse affects of mineral exploration on elk and mule deer.

Raptor nesting habitat, including potential nesting habitat for peregrine falcon (endangered species), would be reduced by the 273 acres of projected disturbance. Wintering bald eagles (endangered) along the Green River would not be affected because surface-disturbing activities are not expected along the Green River. Six other FWS candidate bird species may occur in or near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and

would consult with the FWS as required by BLM policy (refer to Volume I, Appendix 4). If threatened, endangered, or special status species would be affected, BLM would take appropriate mitigating measures such as relocation or timing of projects to protect them.

The spawning and reproductive success of trout in Range Creek would be adversely affected by sight increases in sedimentation caused by oil and gas exploration and production. Endangered fish in the Green River would not be affected by the activities projected for this alternative.

Conclusion: Wildlife habitat and populations would be reduced slightly by direct disturbance on 0.09 percent of the WSA. Continued human presence and activities over the life of oil and gas wells and coal mines would reduce available habitat and intrude on populations of sensitive black bear, mountain lion, and bighorn sheep over about 30 percent (87,253 acres) of the WSA. Populations of endangered, threatened and other special status animals and fish would be preserved.

- Impacts on Visual Resources

Wilderness designation of 224,850 acres would contribute to the preservation of the area's visual quality. In the designated portion, the potential for surface-disturbing activities that could impair visual quality would be reduced through management under VRM Class I, which generally allows for only natural ecological change. The 273 acres anticipated to occur in the foreseeable future, including 65 miles of new roads, would be in VRM Class II management areas and VRM objectives would not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected. Development of roads and drill pads would indirectly reduce visual quality on areas adjacent to the disturbance involving as much as 30 percent of the WSA. Visual resources of the Desolation and Gray canyons along the Green River would not be affected by mineral-related disturbance.

Conclusion: Visual resources would be protected in the designated area. VRM objectives would not be met on approximately 273 acres that would be directly disturbed. Visual resources would be degraded in both directly and indirectly impacted areas.

- Impacts on Cultural Resources

All of Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District located with the WSA would be within the designated wilderness. The historical landmark would benefit, as designation would be consistent with the purpose of the landmark. The archaeological district would be protected from most surface disturbance.

There are 70 recorded sites including all seven National Register eligible sites located within the designated portion. These sites and all unrecorded sites would be protected from surface disturbance and all vehicular access would be eliminated. However, vandalism and/or deterioration due to recreational use such as float-boating and camping might occur. Designation could make stabilization, protection, inventory, interpretation, and scientific study more difficult since vehicle access could not be established and certain cultural resource management procedures could be inappropriate in a wilderness area.

There are six recorded sites within the undesignated area. These sites and all unrecorded sites would continue to be protected by existing Federal and State antiquities laws. Minimal surface disturbance is expected and all developments would be preceded by appropriate inventory and mitigation procedures. Inadvertent loss or damage could occur in the disturbed areas. Vandalism which is not currently a problem may increase in the future.

Conclusion: Seventy of the 76 recorded sites, including the Flat Canyon Archaeological District, all National Register eligible sites, and the Desolation Canyon National Historical Landmark, would be protected by wilderness designation. Cultural resource management may be restricted due to wilderness designation. The remaining six recorded sites and all unrecorded sites in the undesignated portion would continue to be protected by existing laws.

- Impacts on Recreation

For this partial wilderness alternative, total use levels in both the designated and undesignated portions of the WSA would be expected to increase to a total of about 82,845 visitor days from the current level of 70,000 annual visitor days by the year 2020 as described for the No Action/No Wilderness and All Wilderness Alternatives. The majority of this increase would be water-based use in sections of the Price and Green River that do not require a BLM permit. The

designated portion of the WSA, including 5.5 miles of way, would be closed to vehicular use. Nearly all of this area is unsuitable and/or inaccessible for ORV use at present. In the nondesignated portion of the WSA, ORV use would continue to be restricted to existing roads and trails.

Primitive recreational values within the 224,850-acre designated area would benefit because of the reduction of potential surface disturbance. Only 83 acres of disturbance in the form of roads and drill pads are estimated to occur within the designated portion. Increased access to the nondesignated area could result in a slight increase in motorized recreation activities along new roads. This increase would reduce the quality of primitive values present in the nondesignated portion of the WSA.

Conclusion: The quality of primitive recreation opportunities would be directly degraded on less than 1 percent (273 acres) and indirectly degraded on as much as 30 percent (87,253 acres) of the WSA. Overall recreational use would increase and water-based recreational use on the Green River would not be affected.

- Impacts on Local Economic Conditions

There would not be a loss of current employment or income as a result of implementation of the Large Partial Wilderness Alternative. Because of restrictions placed on the use of resources with partial wilderness designation, there would be slight losses in Federal revenues currently provided by resources in the WSA (refer to Table 16), as well as loss of potential increases in both local income and Federal revenues that could occur with the No Action/No Wilderness Alternative. Development of oil, gas, and coal would provide approximately 300 jobs in the foreseeable future. This is comparable to a 2.3-percent increase in the projected employment levels in Carbon County in the year2010. Employment in oil and gas production would continue but would be for a shorter period of time than with the No Action/No Wiilderness Alternative because potential oil and gas production would be foregone on 74 percent of the leaseable area in the WSA. Existing grazing use (6,794 AUMs) and ability to maintain and replace developments would remain as at present.

Recreational use would increase to the same degree as described for the No Action/No Wilderness and All Wilderness Alternatives. By the year 2020, there would be an increase in local sales of about $112,265 over current amounts. Overall, local sales from all recreation in the WSA would b4e about $1,264,265 annually.

Surface-impacting activities that would be allowed in the WSA would not be expected to reduce the demand for commercial outfitter services now offered in the area due to existing land use planning constraints, the anticipated location of activities outside the Green River corridor, and the type of use (hunting and horseback riding) in the affected areas. ORV use is light in the area that would be designated wilderness and closure to use would not result in a significant decrease in use or related local expenditures.

The loss of 30,012 acres of leases that would be phased out in the designated area would cause an eventual loss of up to $60,024 per year to the Federal Treasury as compared to the existing situation. There would also be a potential additional loss of up $296,636 annually in Federal revenues from the 148,318 acres that could be leased for oil and gas without designation. Present production and royalties would continue from wells that are located in the nondesignated area. However, potential royalties from new lease production and bonus bid revenues from new leases in the designated area would also be foregone. Opportunities for coal leasing and production would not be affected because the coal-bearing area would not be designated wilderness with this alternative.

Recreation-related Federal revenues (currently $55,155 annually) would increase as the WSA becomes better known after designation.

Conclusion: In the long term, coal mining would provide 300 jobs. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue in the nondesignated area and on 1,560 acres of leases held by production in the designated area, but would be for a shorter period of time that with the No Action/No Wilderness Alternative because potential for oil and gas production would be foregone on 74 percent of the leaseable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 to the local economy by the year 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $356,660 annually would be foregone because 178,330 acres presently open to lease and not held by production could not be leased. Additionally, poten-

tial Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.

Small Partial Wilderness Alternative (144,510 Acres)

Because the projected higher quality and accessible mineral areas are outside the area that would be designated wilderness with this alternative, the major activities that would occur in the WSA as a whole would be the same as described for the No Action/No Wilderness Alternative. The impacts of surface disturbance with this alternative would be slightly less than without wilderness designation. Approximately 333 of 373 acres of projected disturbance would occur in the nondesignated portion of the WSA.

- Impacts on Wilderness Values

Wilderness designation of 144,510 acres would contribute to preservation of the area's wilderness values. Approximately 50 percent (144,510 acres) of the WSA would be designated. In the foreseeable future, this partial wilderness alternative would reduce the potential for surface disturbance that would impair wilderness values in the WSA to about 88 percent of that identified for the No Action/No Wilderness Alternative. Wilderness values would be protected over the long term in the designated area. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change); ORV closure, including closure of about 3.5 miles of ways; and closure to future mineral leasing and location. Naturalness, outstanding opportunities for solitude and primitive recreation (all acres in the designated portion have these values), and special features, including about 55 percent of the WSA's Class A scenery, the Flat Canyon Archaeological District, all seven of the known National Register eligible sites, Desolation Canyon National Historical Landmark, all of the 191 miles of Wild and Scenic River inventory segments, and 50 percent of the habitat in the WSA for wildlife associated with wilderness and for endangered and special status species, would be protected.

In the foreseeable future, loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil, gas, and coal exploration and development, from developing access to State inholdings, and from rangeland projects would occur on up to 40 acres within the designated portion and on up to 333 acres within the nondesignated portion. Special features would be largely preserved because direct disturbance would involve only 0.13 percent (373 acres) of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface disturbance. Some Class A scenery would be reduced in quality in the disturbed and adjacent areas, and some wilderness-dependent species would be displaced in disturbed and adjacent areas during the period of activity.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to as much as 35 percent (101,795 acres) of the WSA. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated area, including vehicular use of 3.5 miles of way, would improve opportunities for naturalness, solitude, and primitive recreation in the WSA.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known, but would be less than with the No Action/No Wilderness Alternative due to limitations on development in the designated area, subject to valid existing rights.

Conclusion: Wilderness values would be preserved overall on the approximately 50 percent (144,510 acres) of the WSA which would be designated. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost, and the quality of Class A scenery directly reduced on 373 acres of the WSA. Opportunities for solitude and primitive recreation, visual qualities, and habitat for wildlife associated with wilderness would be indirectly reduced in quality on up to 101,795 acres of the WSA. All wild and scenic river values would receive additional protection.

- Impacts on Geology and Topography

Topography would be altered by surface disturbance on about 0.13 percent (373 acres) of the WSA. Underground mining of caol would cause subsidence and sur-

face fractures on up to 2.7 percent (8,000 acres) of the WSA.

Conclusion: Topography would be altered by surface disturbance on about 0.1 percent of the WSA. Underground mining of coal would cause subsidence and surface fractures on up to 3 percent (8,725 acres) of the WSA.

- Impacts on Soils

Impacts would be approximately the same as described for the No Action/No Wilderness Alternative.
Conclusion: There would be localized increases in soil erosion on 373 acres. Overall, loss from the WSA would measure less than one percent.

- Impacts on Vegetation Including Special Status Species

Impacts on vegetation would be the same as described for the No Action/No Wilderness Alternative

Conclusion: Approximately 373 acres (0.13 percent) of the vegetation in the WSA would be modified with this alternative. Populations of special status species would not be affected.

- Impacts on Water Resources

Because projected surface-disturbing activities would be only 50 acres less than with the No Action/ No Wilderness Alternative, impacts on water quality would be approximately the same as described for that alternative. Impacts on water use upstream of the WSA would be the same as with the All Wilderness Alternative because the Price River would flow through the designated area.

Conclusion: Sediment and salinity in Jack Creek, Range Creek, the Price River and Rattlesnake, Tusher, and Long Canyons would increase slightly as a result of surface disturbance. Such increases would not create measurable changes in water quality in the Green River or the Colorado River system. Future water diversions and new consumptive uses of water on the Price River in Carbon County upstream of the WSA may be hampered or restricted.

- Impacts on Mineral and Energy Exploration and Production

There would be minimal loss in mineral and energy exploration and production opportunities.

With the exception of the Beckwith Plateau and 1,560 acres of the Peter's Point oil and gas unit, projected mineral development areas would not be designated wilderness. Even with designation, the Peter's Point unit is held by production and would be developed following designation. All of the Little Park Wash coal area would not be designated wilderness and could be developed over the long term. All three of the existing mining claims would be in the nondesignated portion of the WSA.

Conclusion: The Small Partial Wilderness Alternative would not significantly reduce mineral and energy exploration or production from the WSA.
- Impacts on Wildlife Habitat and Populations Including Special Status Species

Because projected activities would be approximately the same as with the No Action/No Wilderness Alternative, impacts on wildlife habitat and populations would be approximately the same as with that alternative. However, most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep, which are sensitive to human presence and surface disturbance) would benefit within the designated area. A portion of the potential bighorn sheep range on Beckwith Plateau would be designated.

Conclusion: Wildlife habitats and populations would be reduced by direct disturbance of 373 acres (0.13 percent) of the WSA. Continued activities over the life of development projects would disturb available habitat and possibly populations of sensitive black bear, cougar, and bighorn sheep on 35 percent (101,795 acres) of the WSA. Populations of special status animals and fish species would be preserved.

- Impacts on Visual Resources

The Small Partial Wilderness Alternative would result in slightly less impact to visual resources than would the No Action/No Wilderness Alternative. Visual resources would be degraded on 373 acres and indirectly on as much as 35 percent (101,795 acres) of the WSA.

Conclusion: Visual resources would be degraded in both directly and indirectly disturbed areas. VRM objectives would not be met on 373 acres.

- Impacts on Cultural Resources

All of Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District located within the WSA would be within the designated wilderness. The historical landmark would benefit, as designation would be consistent with the purpose of the landmark. The archaeological district would be protected from most surface disturbance.

There are 61 recorded sites including all seven National Register eligible sites located within the designated portion. These sites and all unrecorded sites would be protected from surface disturbance and all vehicular access would be eliminated. However, vandalism and/or deterioration due to recreational use such as floatboating and camping might occur. Designation could make stabilization, protection, inventory, interpretation, and scientific study more difficult since vehicle access could not be established and certain cultural resource management procedures could be inappropriate in a wilderness area.

There are 15 recorded sites within the undesignated area. These sites and all unrecorded sites would continue to be protected by existing Federal and State antiquities laws. Minimal surface disturbance is expected and all developments would be preceded by appropriate inventory and mitigation procedures. Inadvertent loss or damage could occur in the disturbed areas. Vandalism which is not currently a problem may increase in the future.

Conclusion: Seventy of the 76 recorded sites, including the Flat Canyon Archaeological District, all National Register eligible sites, and the Desolation Canyon National Historical Landmark, would be protected by wilderness designation. Cultural resource management may be restricted due to wilderness designation. The remaining 15 recorded sites and all unrecorded sites in the undesignated portion would continue to be protected by existing laws.

- Impacts on Recreation Use

As with all other alternatives, total recreation use levels in both the designated and undesignated portions of the WSA would be expected to increase to be about 82,845 annual visitor days by the year 2020. The majority of the increase would be water-based recreation use in the 144,510-acre wilderness area along sections of the Price and Green rivers that do not require a BLM permit. The 144,510 acres, including 3.5 miles of way in the designated portion of the WSA, would be closed to ORV use. Nearly all of this area is unsuitable and/or inaccessible for ORV use at present. In the nondesignated area, ORV use would remain limited to existing roads and trails.

Primitive recreation values within the 144,510 acres designated could be enhanced because of protection from surface-disturbing activities. Only 40 acres of disturbance are anticipated within the designated portion. Up to 333 acres of surface disturbance would occur in the nondesignated area in the form of roads and drill pads. Access to in-held State lands on the Rattlesnake Canyon and Beckwith Plateau areas would increase motorized recreation activities in the general area. This disturbance and increase in use would reduce primitive values present in both the designated and nondesignated portions of the WSA.

Conclusion: The quality of the primitive recreational experience would be directly reduced on 373 acres and indirectly degraded on about 35 percent (101,795 acres) of the WSA. Recreational use would increase and water-based recreation on the Green River would not be affected.

- Impacts on Local Economic Conditions

There would not be a loss of current employment or income as a result of implementation of the Small Partial Wilderness Alternative. Because of restrictions placed on the use of resources with partial wilderness designation, there would be slight losses in Federal revenues currently provided by resources in the WSA (refer to Table 16), as well as loss of potential increases in both local income and Federal revenues that could occur with the No Action/No Wilderness Alternative. Any loss in employment would be small because most of the development projected in the foreseeable future with the No Action/No Wilderness Alternative would be in the nondesignated areas and could proceed with this alternative. Development of oil, gas, and coal would provide approximately 300 jobs in the foreseeable future. This is comparable to a 2.7-percent increase in the present employment levels of Carbon County. Employment in oil and gas exploration and production jobs would continue but would be for a shorter period of time than with the No Action/No Wilderness Alternative because oil and gas production could not occur on 41 percent of the leaseable portion of the WSA. However, the probability of development is less on these areas than in the nondesignated portion of the WSA.

Existing grazing use (6,794 AUMs) and ability to maintain and replace developments would remain as at present.

Recreational use would increase to the same degree as the other alternatives. By the year 2020, there would be an increase in local sales of about $112,265 over current amounts. Overall, local sales from all recreation in the WSA would be about $1,264,265 annually.

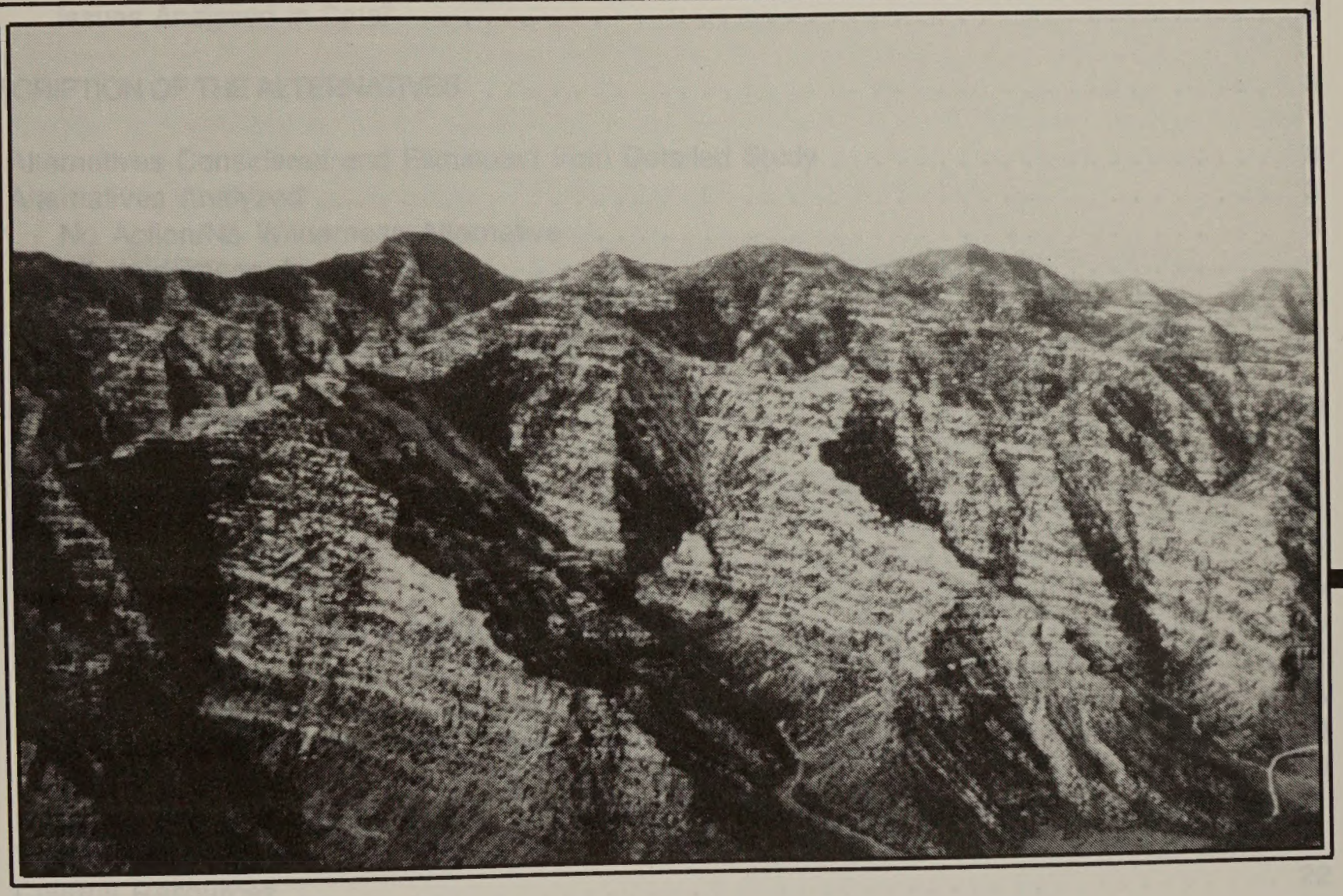
Surface-impacting activities that would be allowed in the WSA would not be expected to reduce the demand for commercial outfitter services now offered in the area due to existing land use planning constraints, the anticipated location of activities outside the Green River corridors, and the type of use (hunting and horseback riding) in the affected areas. ORV use is light in the area that would be designated wilderness and closure to use would not result in a significant decrease in use or related local expenditures.

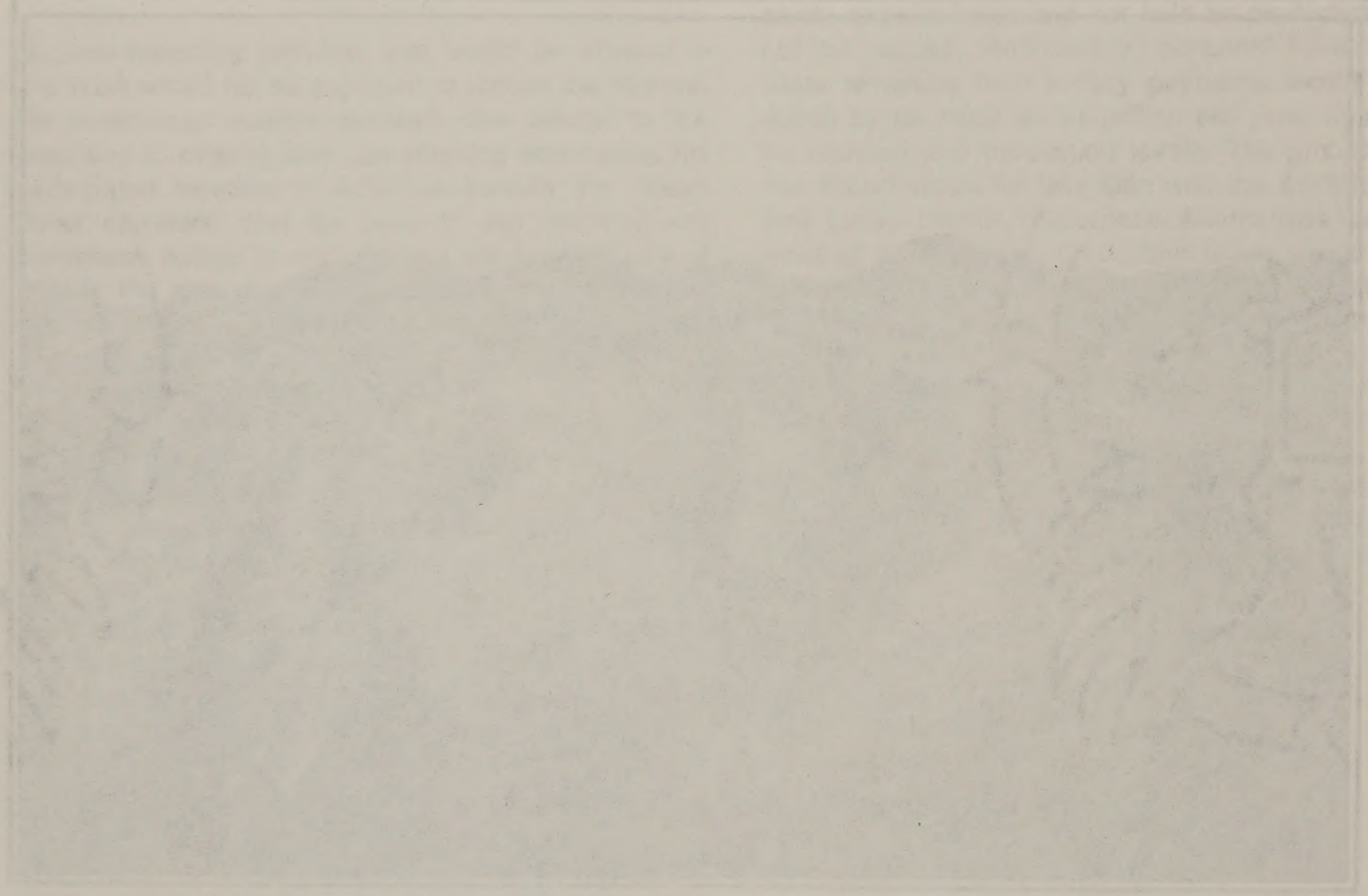
The loss of 17,987 acres of leases that would be phased out of the designated area would cause an eventual loss of up to $35,974 per year to the Federal Treasury as compared to the existing situation. There would also be a potential additional loss of up to $161,246 annually in Federal revenues from the 80,623 acres that could be leased for oil and gas without designation. Present production and royalties would continue from wells that are located in the nondesignated area. However, potential royalties from new lease production and bonus bid revenues from new leases would also be foregone. However, most of the projected production areas would not be affected. Opportunities for coal leasing and production would not be affected because the coal-bearing area would not be designated wilderness with this alternative.

Recreation-related Federal revenues would increase as demand for commercial outfitter services increase to accommodate an additional 4,000 visitor days of commercial river use allowed by the BLM land use plans and additional land-based uses. Land-based use is not expected to increase significantly with this alternative. There are presently 30 water-based commercial outfitters using the WSA.

Conclusion: In the long term, coal mining would provide 300 jobs. This is equivalent to 2.3 percent of the projected Carbon County employment in the year 2010. Employment in oil and gas exploration and development would continue in the nondesignated area and on 1,560 acres of leases held by production in the designated area, but would be for a shorter period of time than with the No Action/No Wilderness Alternative because potential for oil and gas production would be foregone on 41 percent of the leaseable portion of the WSA. Recreation-related local sales could contribute up to $1,264,265 to the local economy by theyear 2020. The WSA would contribute $135,880 annually in local livestock sales and $10,463 in grazing fees. Oil and gas leasing fees of up to $197,220 annually would be foregone because 98,610 acres presently open to lease and not held by production could not be leased. Additionally, potential Federal and State revenues from royalty payments would be reduced by as much as $1 million per year, depending on demand and production levels. The probability of this impact would be less than with the All Wilderness and Large Partial Wilderness Alternatives because most of the projected production areas would not be designated wilderness. Federal revenues from commercial recreation outfitting (currently $55,155 annually) would probably increase as the area becomes better known after designation.

Turtle Canyon WSA





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TURTLE CANYON WSA

(UT-060-067)

INTRODUCTION

General Description of the Area

Turtle Canyon WSA is in Emery County, Utah, and is about 14 miles long, northwest to southeast, and 4 to 6 miles wide. It is managed by BLM's Moab District, Price River Resource Area and includes approximately 33,690 acres of public land. Three State sections totaling 1,928.6 acres are located within the WSA. The communities of Sunnyside and East Carbon City are located about 8 miles northwest of the WSA. The community of Green River is about 24 miles south of the WSA.

The WSA forms a rugged divide between the Little Park Plateau above the Book Cliffs to the southwest and Range Creek Canyon to the northeast. Turtle Canyon runs along the southern boundary of the WSA to its confluence with Range Creek. The Turtle Canyon WSA is separated from the Desolation Canyon WSA by roads adjacent to Range Creek and in Turtle Canyon.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Desolation Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

The climate of the WSA is semiarid with annual average precipitation ranging from 8 to 20 inches, roughly split between winter snow and summer thunderstorms.

The WSA is characterized by severe topographic relief with elevations ranging from about 4,800 feet in Turtle Canyon to over 9,300 feet south of Little Horse Canyon. Vegetation varies among Douglas fir, pinyon pine, juniper, mountain shrub, sagebrush, grass, and rock outcrop. Water is present through much of the WSA. Rock formations exposed at the surface include those between the Green River and Price River formations. Surface features include rugged, irregular ridgelines; numerous peaks; unusual rock pinnacles and balanced rocks; thin-bedded red; buff, brown, and gray rock; blocky sandstone remnants; and steep V-shaped canyons.

Changes for the Final EIS

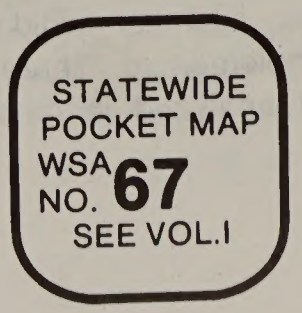
In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the Turtle Canyon WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 15 S., R. 15 E., sec. 33) has been redrawn to correct an error in the Draft EIS maps. This change did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. The BLM Proposed Action in the Draft EIS was the All Wilderness Alternative. The BLM Proposed Action for the Final EIS is the Partial Wilderness Alternative (27,960 acres). Refer to Appendix 11 in Volume I for a summary of the BLM rationale for the Proposed Action.

3. The anticipated surface disturbance presented in the Draft EIS (459 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 459 acres reported in the Draft EIS to 330 acres of surface disturbance for the Final EIS.

4. The Draft EIS identified a 99-acre vegetation treatment project (chaining, burning, and seeding) within the WSA to increase livestock forage production. However, BLM does not anticipate sufficient funding in the foreseeable future to complete this project. As a result, the vegetation treatment estimates have been eliminated in the Final EIS to reflect more realistic funding projections. Estimates of potential increases in livestock forage have been revised accordingly.



TURTLE CANYON WSA

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans), the following issues or impacts specific to the Turtle Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the mineral-related surface disturbance estimate for the WSA has been reduced from 360 acres to 330 acres and the proposed 99 acre chaining, burning, and seeding has been dropped from consideration in the Final EIS, about 1 percent of the WSA would be disturbed and subsequent reclamation would be required. The WSA has a semi-arid climate with an annual precipitation ranging from 8 to 20 inches. Although the soils located on the steeper slopes are susceptible to erosion, most of the soils within the WSA are protected from excessive erosion by extremely gravelly, stony surfaces or dense vegetative cover. Also, approximately 21 percent (7,190 acres) of the WSA is rock outcrop and is not susceptible to erosion. Consequently, major increases in soil erosion are not likely and impacts on soils are not considered significant issues for analysis in the Final EIS.

2. Vegetation Including Special Status Species: Estimates of surface disturbance without wilderness designation have been revised downward from the 459 acres reported in the Draft EIS to 330 acres of surface disturbance in the Final EIS. Given this new scenario, the impacts of direct disturbance of vegetation would be reduced and would not be significant with any of the alternatives (1 percent of the WSA). No threatened or endangered plant species are known to occur within the WSA. Three Category 2 candidate species may occur within the WSA. In any event, BLM would conduct site-specific clearances of potentially disturbed areas and consult with the FWS concerning impacts on special status plant species. Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Therefore, impacts on vegetation are not analyzed in detail for the Turtle Canyon WSA.

3. Water Resources: The public is concerned that wilderness designation would interfere with the development and use of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. There are approximately 10 miles of perennial streams and 10 undeveloped springs in the Turtle Canyon WSA. The only potential uses of the springs and streams in the WSA are the present uses associated with recreation, livestock and wildlife. Most of the streams originate in the WSA.

Springs could be developed following wilderness designation if designed and installed compatibly with wilderness protection guidelines. As explained above, there is little potential for significant increases in erosion that might affect water quality. Therefore, impacts on water uses and quality are not significant issues for the Turtle Canyon WSA.

4. Forest Resources: The forested area is considered nonproductive and noncommercial because slopes are prohibitive to production in most of the WSA, accessibility is very poor, distance to potential mill sites is not favorable, and more suitable stands are available elsewhere. No use of the forest products has occurred in the past, and none is expected in the foreseeable future. For these reasons, impacts on forest resources are not significant issues for analysis in the Final EIS.

5. Livestock: The public is concerned that wilderness designation would interfere with livestock management by placing restrictions on access for maintenance of existing range improvements, moving of livestock, and by preventing future range improvements. However, under the BLM Wilderness Management Policy (BLM Manual 8560) there shall be no curtailments in grazing simply because an area is wilderness. Some restrictions would be placed on predator control and livestock losses could increase in both the wilderness area and on adjacent lands. However, several methods of predator control could be used. One sheep allotment occurs within the WSA, but predator control has not been conducted for several years. Use of motorized vehiclesis limited to existing roads and trails by the Price River MFP and vehicles are not presently used inside the WSA by the livestock operators. There are no present or proposed range improvements in the WSA. One of the five livestock grazing allotments has been retired to provide for bighorn sheep use. For these reasons, impacts on livestock management are not significant issues for analysis in the Final EIS.

6. Visual Resources: As explained above for vegetation, only 330 acres of surface disturbance (about 1 percent of the WSA) are projected for the WSA in the Final EIS. Visual resources are not addressed in the Final EIS as a separate topic, but are addressed in relation to naturalness and special features in the Wilderness Values sections.

7. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles, or vandalism. However, only five cultural resource sites have been recorded in the Turtle Canyon WSA. Terrain, surface features, and ORV designations limit vehicle use to the 8 miles of ways inside the WSA. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, impacts on cultural resources are not significant issues for analysis in the Final EIS.

8. Recreation: The public has expressed concern that wilderness designation would change recreational use from motorized to primitive or, conversely, that without wilderness designation motorized recreation will eliminate or reduce opportunities for primitive recreation. Recreational use of the Turtle Canyon WSA is moderate (estimated 500 visitor days per year) and almost entirely of a primitive nature, and would remain mostly primitive with or without wilderness designation due to the terrain of the WSA and limited access. Affects of potential activities on primitive recreation are discussed in the analysis of impacts on wilderness values.

- Issues Analyzed in Detail

The significant issues for the Turtle Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on leasable mineral exploration and production.

3. Impacts on wildlife habitat and populations including special status species.

4. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, water resources, mineral values, wildlife values, livestock grazing, recreation resources, county land use planning, socioeconomics, and air quality constraints.

See Volume VII-B, for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 67, for responses to specific comments about the Turtle Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during the initial scoping other than those analyzed.

An alternative that would add Federal and State lands on the north and northwestern edges of the WSA was suggested in the public comments. This alternative is not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1).

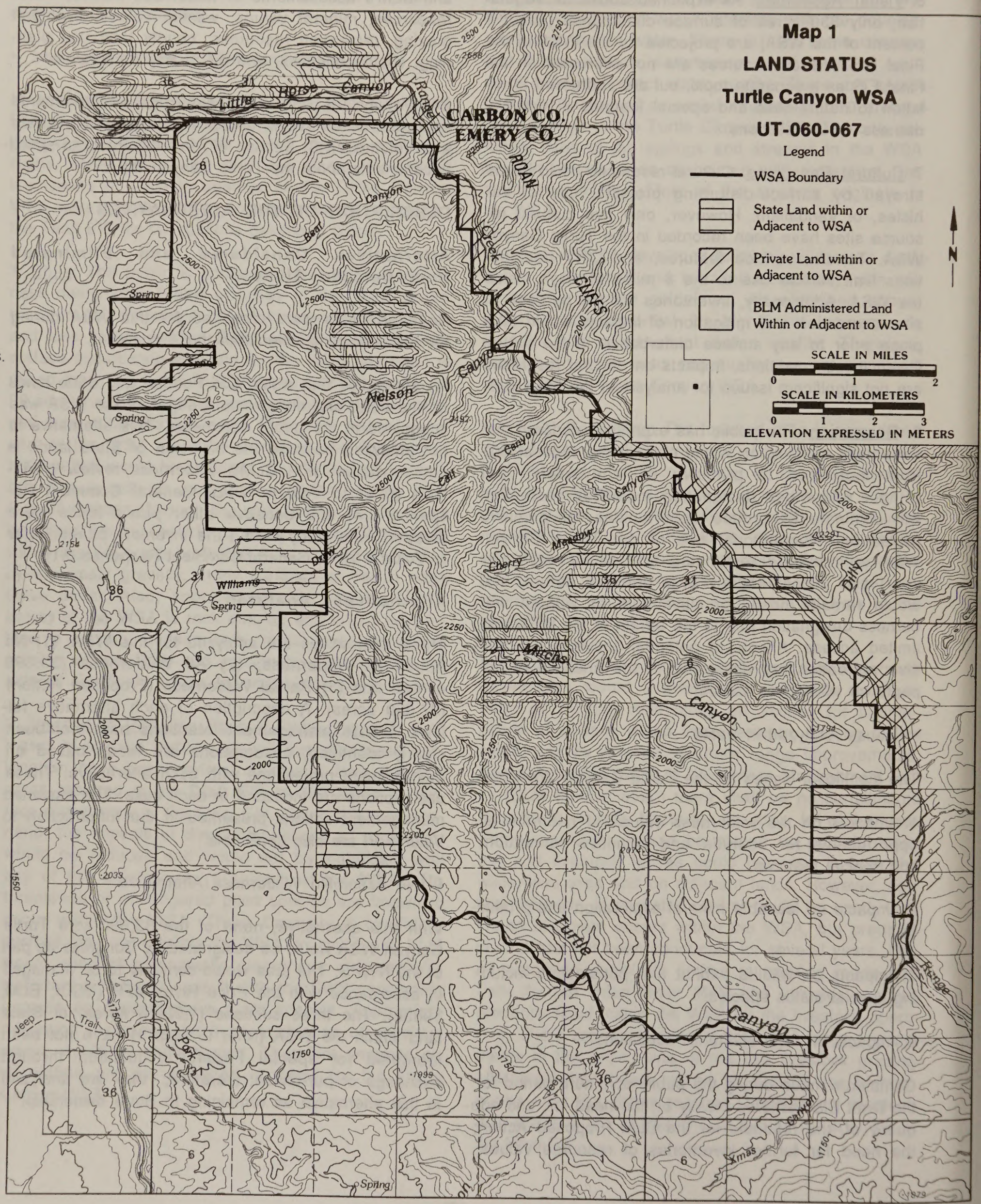
Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (33,690 acres); and (3) Partial Wilderness (Proposed Action) (27,960 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections with each alternative. These assumptions are indicated in each case. The assumed management actions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 33,690-acre Turtle Canyon WSA would be designated by Congress as part of the NWPS. The area would continue to be managed in accordance with the Price River MFP (USDI, BLM, 1983b). The three sections (1,928.6 acres) of State land within the WSA (refer to Map 1) have not been identified for special Federal acquisition through exchange or pur-chase; therefore, they are analyzed in this alternative as remaining in State ownership.

TURTLE CANYON WSA



- Management Conditions and Constraints

All 33,690 acres would remain open to mineral leasing and sale. Due to an oil shale withdrawal in the northwest corner of the WSA, 3,717 acres would remain closed to mineral location, while the remaining 29,973 acres would remain open. Although no mining claims now exist, development work, extraction, and patenting would be allowed on any future valid mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 CFR 3809). Existing and future oil and gas leases could be developed under leasing Category 2 (standard and special stipulations) in the entire WSA without concern for wilderness values. Presently, there is one post-FLPMA oil and gas lease (1,920 acres) located in the WSA. The special stipulations are designed to minimize impacts to watershed and deer winter range. Three hundred ten acres in the WSA are under lease for coal and could be developed. Future leases for coal could also be considered.

The present level of domestic livestock grazing use of the 33,690-acre WSA would continue as authorized in the MFP (169 AUMs).

Use of motorized vehicles would be limited to roads and trails (currently about 8 miles of ways and abandoned jeep trails).

The entire area would continue to be managed under VRM Class II on 33,690 acres.

With this alternative, it would be possible to designate an ONA or ACEC covering about 27,000 acres (similar to the area described for the Partial Wilderness Alternative). Consideration of an ONA would be independent of wilderness values and could be implemented through the normal BLM land use planning pro-cess; therefore, it is not discussed further in this wilderness document.

- Action Scenario

Given BLM management actions described above and the resources described in the Affected Environment, BLM anticipates that implementation of the No Action/No Wilderness Alternative would result in approximately 330 acres of surface disturbance associated with coal, oil, and gas exploration and development within the WSA, including up to 20 miles of access roads. Lands with the highest oil and gas potential are located in the southern and eastern portions of the WSA. Although the actual disturbance attributed to oil and gas activities is estimated at 330 acres (including 10 acres of surface disturbance to gain access to in-held State lands), the area impacted by these activities could be much larger. Nevertheless, oil and gas activities must comply with wildlife and watershed stipulations imposed upon the leases. Development would include roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. It is projected that surface disturbance associated with developed leases would remain over a long period of time.

Employment would average 10 employees for each exploration well drilled. An average of 3 to 6 months would be required to complete drilling operations. Each site would be reclaimed following abandonment. Producing wells would generally require only an average of two employees for periodic maintenance. Maximum employment at one time would be about 40 employees.

In the long term, exploration and development of the coal resource would occur in the western portion of the WSA. Mining within the WSA itself would likely be part of a larger operation with surface facilities located outside of the WSA where the coal could be easily accessed. Actual development operations would be by underground methods. About 10 acres of surface disturbance would occur within the WSA over the life of the mine. This would be associated with exploration drilling and possible construction of ventilation facilities along cliff faces. The surface disturbance resulting from exploration activities would be temporary, while the ventilation shafts would remain in place for the life of the mining operations.

The size of individual coal operations, typical of the intermountain area, differ. The surface facilities, including access roads, would be located outside of the WSA and occupy up to 20 acres. Employees, including supervisory personnel, would number from 20 to 300. Operations would last from 30 to 40 years. The projected amount of recoverable coal in the Turtle Canyon WSA would support a two-million ton per year operation for about 14 years. All disturbed areas would be reclaimed upon abandonment.

No livestock, wildlife habitat, or watershed improvement projects are planned. A proposed ONA or ACEC could be pursued with this alternative.

No disturbance from ORV use is projected because all traffic would continue to be restricted to existing ways due to present management constraints and rugged terrain. Recreational use is expected to increase over the current estimated use of 500 visitor days per year at a rate of 2 to 7 percent annually. As much as 10 percent of all recreational use would continue to be motorized.

- All Wilderness Alternative

With this alternative, all 33,690 acres of the Turtle Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, State lands would remain under existing ownership. There are three State sections (1,928.6 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given with this alternative are for Federal lands only. No private or split-estate lands are located within the WSA.

- Management Conditions and Constraints

After wilderness designation, all 33,690 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Although no mining claims now exist, development work, extraction, and patenting would be allowed to continue on any valid mining claims that may be located prior to wilderness designation. It is projected that such claims would not be located. Any mining development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), with concern for wilderness values. An existing oil and gas lease involving 1,920 acres would be phased out upon expiration unless a finding of oil or gas resources in commercial quantities is shown. No new oil and gas leases would be issued. Development of the existing coal leases prior to expirationis not projected because more favorable resources are located elsewhere.

Present domestic livestock grazing would be allowed to continue as authorized in the Price River MFP. The 169 AUMs in the WSA allocated to livestock would remain available to livestock as presently allotted.

The entire 33,690-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions. About 8 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 13 miles of the WSA boundary follow existing gravel and dirt roads in Little Horse, Range Creek, and Turtle Canyons, and these would remain open to vehicular travel.

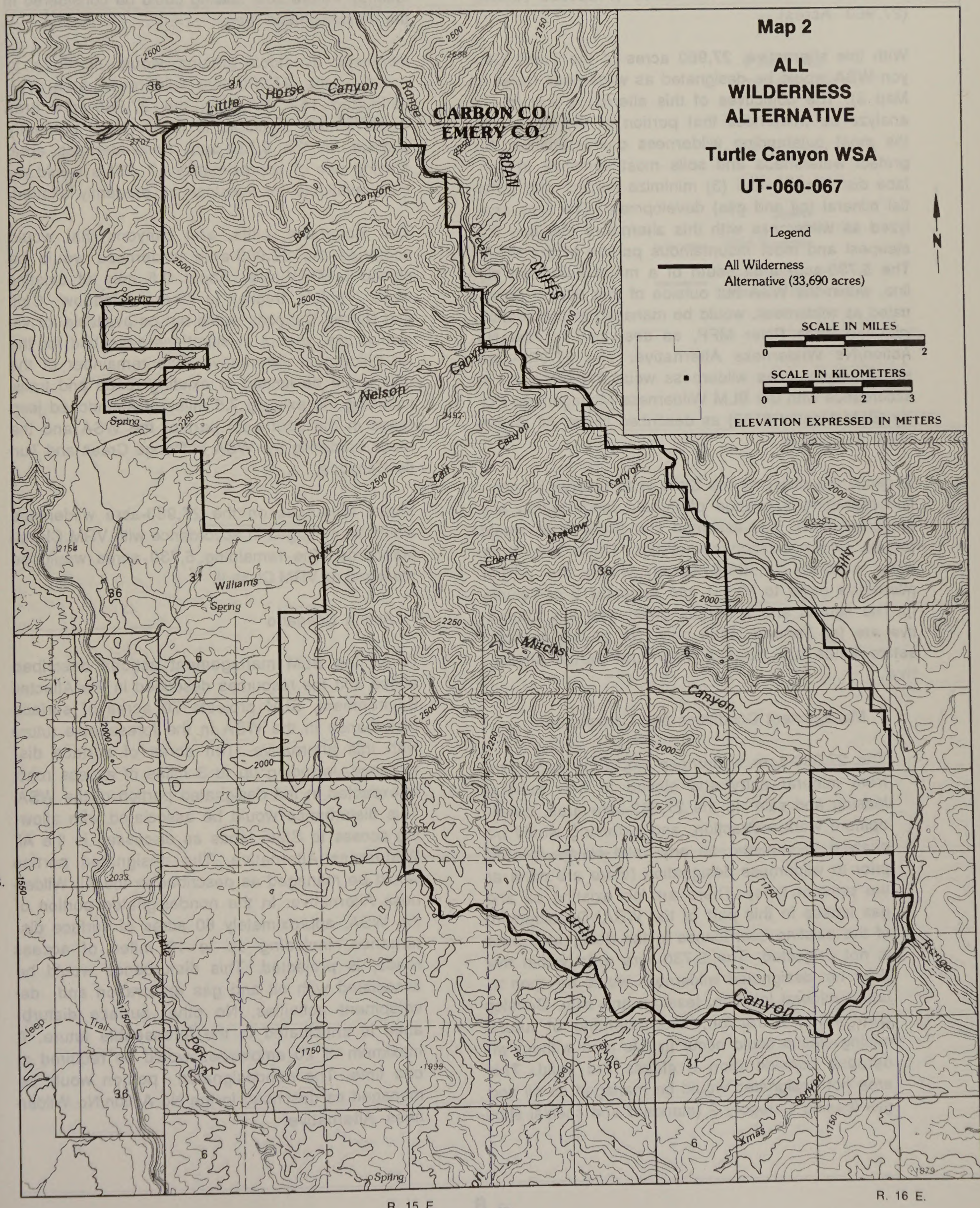
Visual resources on 33,690 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

Given the BLM management actions described above and the resources described in the Affected Environment, BLM anticipates that 10 acres of surface disturbance, including up to 3 miles of access roads, would occur on public lands with this alternative. This disturbance would result from development for access to State lands for oil and gas exploration and development. No leasable mineral exploration or development is projected for public lands in the WSA. No surface disturbances from livestock, wildlife habitat, or watershed improvement projects are anticipated with this alternative.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain. Primitive recreational use is expected to increase over the current estimated recreation use of 450 visitor days per year at a rate of 2 to 7 percent annually. All use would be primitive. Initially, recreational use may decrease slightly because vehicular access would be precluded, but motorized recreational visitor days would quickly be replaced by primitive recreation visitor days.

TURTLE CANYON WSA



• Partial Wilderness Alternative (Proposed Action) (27,960 Acres)

With this alternative, 27,960 acres of the Turtle Canyon WSA would be designated as wilderness (refer to Map 3). The objectives of this alternative are to (1) analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics; (2) protect watersheds and soils most sensitive to surface disturbance; and (3) minimize conflict with potential mineral (oil and gas) development. The area analyzed as wilderness with this alternative includes the steepest and most mountainous portion of the WSA. The 5,730-acre area south of a major east-west cliffline, within the WSA but outside of that portion designated as wilderness, would be managed in accordance with the Price River MFP, as described for the No Action/No Wilderness Alternative. The 27,960-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is assumed that State lands would remain under existing ownership. There are three State sections (1,928.6 acres) within the partial alternative (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given with this alternative are for Federal lands only. No private or split-estate lands are located within the partial alternative.

• Management Conditions and Constraints

The 27,960-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. In the 27,960-acre area, development work, extraction, and patenting would be allowed to continue on any valid claims located prior to wilderness designation (there are none at the present time). There are no existing oil and gas leases in this part of the WSA. Development of the existing coal leases in the designated area is not projected. The 5,730-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur in this area without wilderness consideration if claims are valid. The area not designated would be managed as oil and gas leasing Category 2 (standard and special stipulations). Future coal leasing could be considered in the nondesignated area.

Domestic livestock grazing would continue to occur in the 27,960-acre wilderness area. The estimated 152 AUMs in the 27,960-acre area would remain available to livestock as presently allotted. In the 5,730-acre nonwilderness area, grazing use of approximately 17 AUMs would remain available for livestock as presently allotted.

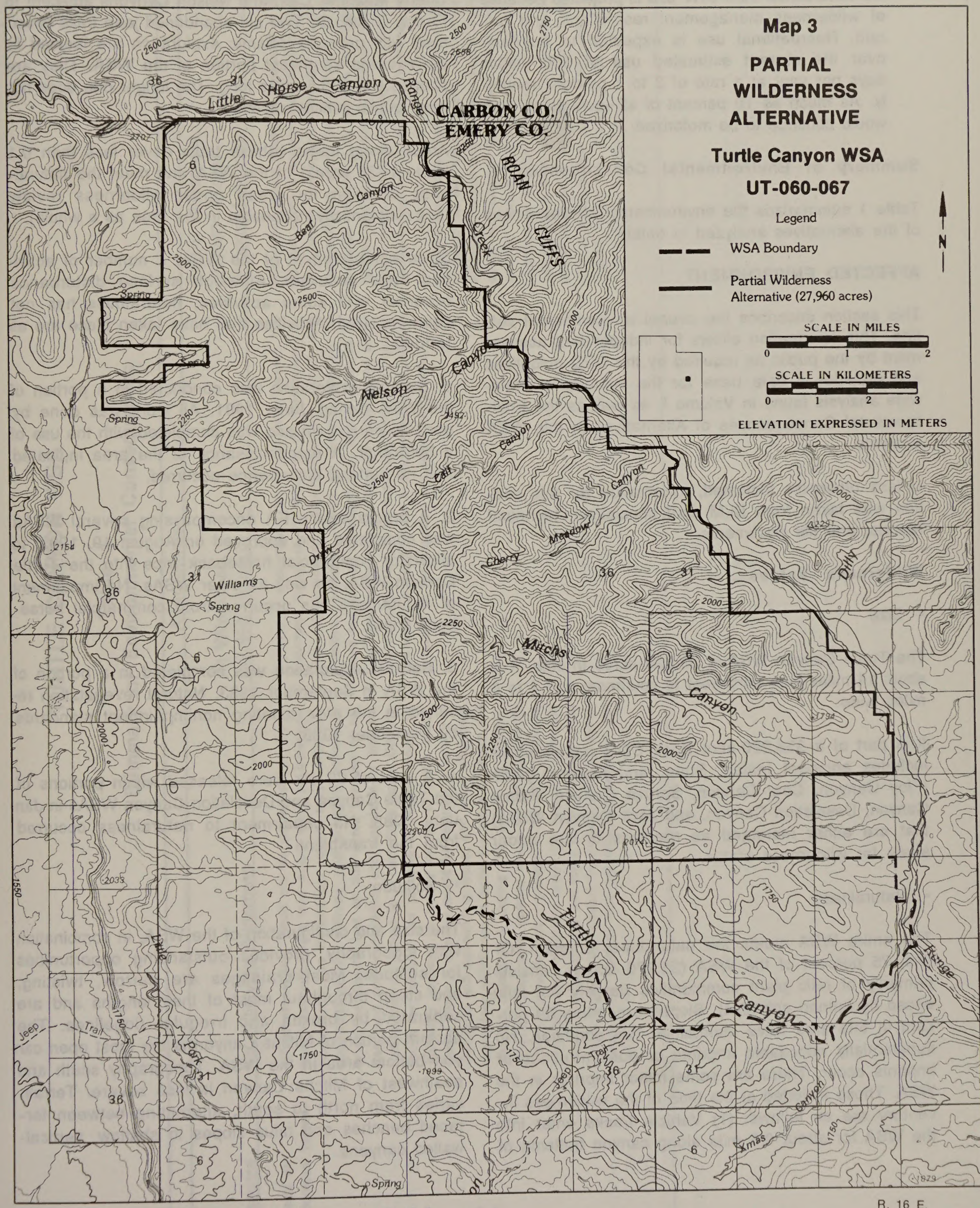
The mountains, cliffs, and canyons that would comprise the 27,960-acre wilderness would be closed to ORV use. About 0.5 mile of existing ways (vehicle tracks) in Cherry Meadow, Calf, and Nelson Canyons would not be available for vehicular use, except in situations described for the All Wilderness Alternative. The remainder of the unit would be limited to existing roads and trails, including the existing 7.5 miles of abandoned jeep roads in the southeast part of the WSA and the roads bordering the WSA in Range Creek and Turtle Canyons.

Visual resources on the 27,960-acre wilderness would be managed in accordance with VRM Class I standards. The remaining 5,730 acres would be managed as VRM Class II.

• Action Scenario

Given the BLM management actions described above and the resources described in the Affected Environment, BLM projects 70 acres of surface disturbance in the WSA in the foreseeable future with this alternative. Ten acres of surface disturbance, including up to 3 miles of access road, is expected in the designated portion of the WSA. This disturbance would be associated with allowing access to State lands as discussed in the All Wilderness Alternative. The designated portion would be managed as described in the All Wilderness Alternative. In the nondesignated portion of the WSA, approximately 60 acres of surface disturbance, including up to 10 miles of access roads, is projected. This disturbance would be associated with oil and gas exploration and development activities. No other surface disturbance is anticipated in the foreseeable future. A maximum of 20 employees would be required at one time. The nondesignated portion would be managed as described in the No Action/No Wilderness Alternative.

TURTLE CANYON WSA



No disturbance from ORV use is projected because of wilderness management restrictions and terrain. Recreational use is expected to increase over the current estimated use of 500 visitor days per year at a rate of 2 to 7 percent annually. As much as 10 percent of all recreational use would continue to be motorized.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of the alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The Turtle Canyon WSA is 33,690 acres in size. It is about 14 miles long northwest to southeast and 4 to 6 miles wide.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Desolation Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

- Naturalness

The entire WSA meets the naturalness criterion. Of this, 75 percent of the WSA (25,270 acres) consists primarily of relic plant communities (largely not influenced by human activities). Slopes exceeding 50 percent in this area have maintained this condition. No substantially noticeable imprints or concentrations of imprints occur. There are some minor imprints in the WSA. Those included at the time of the wilderness inventory are as follows: (1) Vehicle tracks enter into the WSA for about 0.5 mile along canyon bottoms of Cherry Meadow, Calf, and Nelson Canyons adjacent to Range Creek. (2) Two old abandoned jeep trails associated with previous seismic exploration are located in the extreme southeast portion of the WSA. They are about 1.0 and 6.5 miles long. The longer one does not have public vehicle access.

Areas along these vehicle trails cover less than 0.1 percent (30 acres) of the WSA and meet the naturalness criterion for areas under wilderness review (not substantially noticeable in the area as a whole).

Since establishment of the WSA, a number of activities have occurred. Although surface disturbance occurred with some activities, naturalness has not been impaired. Activities that have taken place are as follows:

1. Seismic exploration was conducted in a portion of the WSA during June, 1981. All work was done by portable equipment and was completed with the use of a helicopter. A reconnaissance of the area indicated that no surface disturbance occurred.

2. A programmatic EA encompassing several WSAs was completed and approved on August 19, 1983, to allow for commercial horseback trips into the Turtle Canyon WSA, as well as other WSAs. No impairment of naturalness has occurred from commercial horseback trips.

3. Seismic exploration was completed in a portion of the WSA in September 1983. Natural revegetation resulted in the area meeting nonimpairment standards by December 1988.

4. A total of 96 elk were released within portions of the Turtle Canyon and Desolation Canyon WSAs in January 1988. No impairment to naturalness occurred from the transplant.

- Solitude

The size and configuration of the WSA, in combination with topography, provides outstanding opportunities for solitude. Most drainages are narrow, twisting, and steep throughout most of their lengths and are separated by broken and irregular ridgelines. The eastern portion of Mitchs Canyon is the most open canyon bottom area in the WSA. Topography south and southwest of Mitchs Canyon is less severe. Terrain varies from north to south, alternating between terraced benches and talus slopes to shallow, vertical-walled canyons.

TURTLE CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (33,690 Acres)	Partial Wilderness (27,960 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 330 acres because of oil, gas, and coal exploration and development and for construction of access to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 5,053 acres. Some Class A scenery would be reduced in quality in disturbed and surrounding areas, and some wilderness dependent wildlife would leave the areas of direct and indirect disturbance during the period of activity. Special status plant species would not be significantly affected because only 1 percent of the WSA would be disturbed and mitigation would be required. Vehicular use of 8 miles of ways and about 20 miles of new roads would occasionally detract from the quality of opportunities for solitude and primitive recreation in the WSA.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 10 acres because of construction of access roads to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality 674 acres. Although Class A scenery would be reduced in quality on the disturbed and surrounding areas.	Wilderness values would be preserved in the designated area which is approximately 83 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 70 acres of the WSA because of oil and gas exploration and development and construction of access roads to in-held State lands. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,684 acres. Most of the impact would be in the nondesignated area. Class A scenery would be reduced in quality in the disturbed and surrounding areas and wilderness-dependent wildlife would leave areas of direct and indirect disturbance during the period of activity. Special status plant species would not be significantly affected because only 0.2 percent (70 acres) of the WSA would be disturbed and mitigation would be required. Vehicular use on 7.5 miles of ways and 13 miles of new access roads would occasionally detract fropm the quality of opportunities for solitude and primitive recreation in the WSA.

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (33,690 Acres)	Partial Wilderness (27,960 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims, and mineral development would not be restricted for protection of wilderness values.	Opportunity to recover about 27 million tons of coal and an estimated 10 to 50 million barrels of oil and 60 to 300 billion cubic-feet of natural gas would be foregone. There would not be a significant loss of production of locatable and salable minerals because the probability of development is low even if the area is not designated wilderness.	Oil and gas leasing would not be allowed on 83 percent of the WSa and existing leases would expire before production. Therefore, an unknown but locally significant amount of oil and gas production would be foregone. The highest potential for oil and gas is expected to be within the southern (nondesignated) portion and eastern areas of the WSA. Recovery of about 27 million tons of coal would be foregone. Loss of exploration and development opportunities for other minerals would not be significant because the probability of development is low even if the area is not designated wilderness.
Impacts on Wildlife Habitat and Populations	About 1 percent (330 acres) of the wildlife habitat in the WSA would be disturbed by oil, gas, and coal exploration and development. This would reduce the carrying capacity of the area for big game species and also reduce potential nesting habitat for the peregrine falcon. However, these species still have the potential to increase over present numbers. Although the acreage of disturbance is minimal, the habitat impacted by increased human activity in the area could be much greater due to the 20 miles of access roads that may be needed in mineral exploration and development.	Wildlife species would be protected and provided with additional solitude. Populations of some species, especially game species, would increase. Threatened, endangered, and other special status species would be protected.	About 0.2 percent of the habitat in the WSA would be disturbed. Impacts to wildlife species with this alternative would be very similar to those of the All Wilderness Alternative because of the small amount of disturbance.

TURTLE CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resource	Alternatives		
	No Action/No Wilderness	All Wilderness (33,690 Acres)	Partial Wilderness (27,960 Acres) (Proposed Action)
Impacts on Economic Conditions	Present economic conditions would not be affected. Employment in coal, oil, and gas exploration and development in the WSA would represent about 1.7 percent (340 jobs) of the projected combined Carbon and Emery County employment by the year 2010. There would be minor changes in local economic conditions. The WSA could contribute up to $18,040 annually in local sales related to recreation. Livestock grazing in the WSA would continue to contribute $3,380 in livestock sales and $260 in Federal grazing revenues each year. Oil and gas and coal leasing fees could contribute up to $74,460 annually in Federal and State revenues. In addition, coal royalties from eh WSA would contribute about $4,000,000 per year for about 14 years while gas royalties could bring between $20,000 and $100,000 per year per well.	Present economic conditions would not be affected. The potential for 340 jobs, 1.7 percent of the projected combined Carbon and Emery County employment in the year 2010 would be foregone. Annual local recreation-related sales could contribute up to $18,040 annually to the local economy by the year 2020. Livestock grazing would continue to contribute $3,380 in livestock sales and $260 in Federal revenues annually. Annual oil, gas, and coal leasing fees of up to $74,460 would be foregone as would coal royalty payments of about $4,000,000 annually for 14 years and oil and gas royalties of between $20,000 and $100,000 per well per year.	Present economic conditions would not be affected. Employment for iol and gas exploration and development in the WSA would be about 0.1 percent (20 jobs) of the combined projected Carbon and Emery County employment by the year 2010. Because coal and an unknown portion of the potential oil and gas in the WSA would not be developed, up to 320 fewer jobs would be provided than with the No Action/No Wilderness Alternative. Annual local sales related to recreation could contribute up to $18,040 annually by the year 2020. Livestock grazing would continue to contribute $3,380 in livestock sales and $260 in Federal revenues annually. Annual oil and gas and coal leasing fees of up to $62,900 would be foregone as would coal royalty payments of up to $4,000,000 annually for 14 years and oil and gas royalties of between $20,000 and $100,000 per well per year. The loss of oil and gas rental fees would be less than with the All Wilderness Alternative because 17 percent of the WSA, icluding the area with the highest potential for oil and gas, would not be designated wilderness.

Throughout the WSA, vegetation complements topography, often improving opportunities for solitude. On 76 percent (25,770 acres) of the WSA, tree or large mountain shrub types dominate. The remainder is rock outcrop, grass, and sagebrush riparian communities that include some large tree species, although they do not dominate the type. In general, the rock outcrop type occurs where topography makes its most significant contribution to opportunities for solitude. Tree cover is moderate to heavy in the pinyon-juniper woodland, Douglas fir, and pinyon-juniper woodland/Douglas fir types. Often the canopy is closed. Cover in the mountain shrub type is dense and, in addition to large shrubs such as mountain mahogany, includes most of the tree species found elsewhere in the WSA.

There are no significant off-site influences affecting opportunities for solitude.

Size, configuration, topography, and vegetation contribute to the ability to find a secluded spot. The combination of these elements is such that in much of the WSA open vistas, rather than secluded spots, must be sought. Vistas are found along the ridgetop, particularly along the principal ridge and in the southern portion of the WSA. Overall, the entire WSA provides outstanding opportunities for solitude.

- Primitive and Unconfined Recreation

Outstanding primitive recreation opportunities in the WSA include hiking, climbing, hunting, camping, and sightseeing in conjunction with the WSA's scenic, cultural, geologic, and wildlife features.

Opportunities for fishing in Range Creek adjacent to the WSA are good to outstanding, although opportunities within the WSA are only fair. Horseback activities could occur in the WSA but potentially suitable routes or trails would be limited due to topography. Horseback trips for short distances in the canyon bottoms, along Range Creek, or in Mitchs and Turtle Canyons are possibilities.

Overall, the entire WSA is considered to have outstanding opportunities for primitive, unconfined recreation.

- Special Features

Differences in topographic features, vegetation productivity, variety in wildlife, and wildlife habitat represented in the WSA are highly unusual and seldom represented in an area of its size. There are two animal species (peregrine falcon and bald eagle) listed as endangered that may occasionally use the WSA. There are six animal species and three plant species that are considered special status that may occur within the WSA. The WSA has small populations of cougar, Rocky Mountain bighorn sheep, and black bear, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information. The historical setting is similar to that of Desolation Canyon WSA. The archaeological potential of the area for significant Fremont artifacts has been documented.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. Approximately 75 percent of the WSA is rated Class A for scenic quality. It has approximately 10 miles of perennial streams.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV type of juniper-pinyon woodland. Refer to the Vegetation Including Special Status Species section for more discussion about ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation Units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City/Ogden, Utah, and Provo/Orem, Utah.

Air Quality

The WSA is in a PSD Class II air quality area under the 1977 Clean Air Act Amendments. The nearest Class I area is Arches National Park, 40 miles south. Other nearby Class I areas include Canyonlands National Park (66 miles to the south) and the Colorado portion of Dinosaur National Monument (96 miles to the northeast). Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River-Moab area, the Uintah Basin, and the Wasatch Front. Other local or point sources include powerplants in Castle Valley and U.S. Highway 6-50. Intermittent, localized fugitive dust is the most significant air pollutant in the WSA at this time. Visibility remains good, ranging from 30 to 100 miles from promontories (Aerocomp, Inc., 1983).

TURTLE CANYON WSA

Geology and Topography

The Turtle Canyon WSA is in the Book Cliff-Roan Plateau Section of the Colorado Plateau Physiographic Province. The WSA is positioned between the uplifted San Rafael Swell to the southwest and the Uintah Basin to the north. Sedimentary rocks, exposed at the surface, range in age from the Cretaceous period (130 million years ago) to the Tertiary (25 million years ago) and dip 3 degrees to 14 degrees north to northeast. The exposures represent approximately 4,500 feet of sedimentary strata between the lower Parachute Creek Member of the Green River formation and the Price River formation. Individual rock units are difficult to identify because many of the alternating sandstone and shale beds intertongue and often grade into each other (USDI, USBM, 1988a). Important vertebrate fossils may be found in the Green River formation.

The topographic features of the WSA are a result of: (1) its position between the San Rafael Swell and the Uintah Basin; (2) gradual uplift of the Colorado Plateau; and (3) 40 to 50 million years of erosion. The result has been the formation of one principal, rocky, irregular ridge extending northwest to southeast nearly the length of the WSA and forming a major divide between Little Park/Turtle Canyon and Range Creek. To the southwest, short canyons cut to the face of the ridge, which rises abruptly. To the northeast, five major drainages are incised between the principal ridge and Range Creek, dropping steadily or, in places, abruptly, an average of 3,000 feet of elevation over a distance of 3 to 8 miles. Each of the drainages forks at least once between Range Creek and the principal ridge. Each of these canyons and canyon forks is separated by a ridge similar to the principal ridge. The canyons have been incised across strata resistant to erosion resulting in steep, narrow, V-shaped canyons.

The principal ridge terminates on the south in a formidable line of east/west cliffs formed from the lower red unit of the Wasatch formation. Slopes in the WSA north of this cliff range from 40 to in excess of 100 percent, forming canyons from 1,000 to 3,000 feet in depth. Flat areas are limited to drainage bottoms, ledges, and short narrow stretches on ridge tops. Formations exposed at the surface north of the cliffs are the Green River and Wasatch, primarily Wasatch. The thin-bedded brown, buff, red, and gray sandstones are interbedded with red, maroon and green shales. Balanced rocks, pinnacles, and spires have been blocked out by joints in the more massive Wasatch Sandstone layers. Other features known to exist near the WSA in these same strata include caves and arches, although none are yet known in the WSA.

Topography south of the east/west cliff line changes dramatically with the change in formations exposed at the surface. A thin layer of Flagstaff Limestone marks a transition of topographic and color contrast to the primarily buff and gray sandstones and shales of the North Horn, Tusher, Farrer, and Price River formations. Here massive resistant beds alternate with less resistant beds to form a landscape of benches and talus slopes cut by fan-like canyons. The canyons alternate between more open stretches and steep-walled, 100 to 500 foot deep canyons with changes in resistance to erosion as the drainages rise to the Wasatch cliff line. These canyons are mainly the 4-to-5 mile tributary drainages to Turtle Canyon and the lower reaches of Mitchs Canyon. Surface features of visual interest include vertical cliffs, honeycomb surfaces, sandstone hills, and remnants of reddish-black iron concretions.

Elevations range from 9,342 feet atop a peak south of Little Horse Canyon to 4,800 feet in Turtle Canyon. Most of the more massive, vertical rock outcrops presented at the surface tend to be southwest or south of the WSA's major ridge. Outcrops northeast of the ridge are in monoliths, walls, buttresses, pinnacles, and other remnants projecting out from, or separating, very steep forested slopes.

Soils

About 80 percent of the soil types in the WSA reflect steep to very steep slopes. Presently, most of these soils are retained or protected from excessive erosion by extremely gravelly, stony surfaces or dense vegetation cover. About 21 percent (7,075 acres) of the WSA is rock outcrop, 26 percent (8,759 acres) upland shallow loam, and 32 percent (10,780 acres) is a mountain loam soil dominated either by Douglas fir or mountain shrub vegetation. These steep soils are highly susceptible to erosion when disturbed. Natural erosion is about 1.0 cubic yard per acre per year. Soil losses along roads constructed across these slopes are considerably greater, particularly where underlain by shale or interbedded sandstone and shale.

Soils in those drainage bottoms north of the major east-west cliff are deep upland stony loams reflecting flatter slopes and riparian environments. Shallow shales are found in the major Turtle Canyon drainages

southwest of the WSA. Semidesert, very shallow loams cover the benches and drainages in the southeastern part of the WSA. Present natural erosion results in an average annual loss of about 1.0 cubic yards per acre.

An average soil erosion rate for disturbed soils in the WSA is estimated to be 9.0 cubic yards per acre per year. This assumes surface-disturbing activity would impact soil groups in proportion to the percentage of the WSA in which they are present (a weighted average). It assumes no impacts to rock outcrop areas.

Table 2 describes soil characteristics and land types, and Table 3 describes erosion conditions for the WSA.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Shallow to very deep stony soils on steep mountainsides	80	26,952	1	10
Shallow loamy soils on sloping ridges and structural benches	20	6,738	1	5
Totals	100	33,690		

Source: Hansen, 1985.

Soil salinity class estimates indicate that the area is 45 percent strongly saline, 30 percent moderately saline, and 25 percent slightly saline. The soils produce an average of 64 lb of salt per acre per year.

The seeding suitability is estimated to be fair on approximately 15 percent (5,053 acres) of the WSA. These areas are mostly in the drainage bottoms where soils are over 20 inches deep. The remaining portion of the WSA (85 percent) is classed as unsuitable for seeding due to shallow stony soils, abundant rock outcrop, and steep slopes.

Vegetation Including Special Status Species

Five major vegetation types are located in the WSA. They are pinyon-juniper woodland, Douglas fir, pinyon-juniper woodland/Douglas fir, mountain shrub, and riparian (refer to Table 4). In addition, substantial barren areas are also located in the WSA.

The pinyon-juniper woodland type occurs on dryer slopes, and overall tree cover ranges from 18 to 26 percent. Common understory plants include large shrubs such as birchleaf mountain mahogany and cliffrose, while green Mormon tea, wheatgrass, Salina wildrye, bullgrass, and Indian ricegrass are also common.

The Douglas fir type is very productive with tree cover ranging from 32 to 46 percent. Associated trees include Utah juniper and pinyon pine. Understory consists of curlleaf mountain mahogany, squawbush, Indian ricegrass, bluegrass, squirreltail, penstemon, locoweed, and spurge.

Vegetation cover in the mountain shrub type ranges from 19 to 46 percent with the dominant shrubs being littleleaf mountain mahogany and big sagebrush. In this productive type, other common shrubs and trees

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions: Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed: Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	80	26,952	269,520
Medium	5.0	-	-	-	20	6,738	33,690
Low	1.0	100	33,690	33,690	-	-	-
Very Low	0.1	0	-	-	-	-	-
None	0.0	-	-	-	-	-	-
Totals		100	33,690	33,690[a]	100	33,690	303,210[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (1.0 under present conditions; 9.0 if disturbed).

include snowberry, Utah juniper, pinyon pine, Douglas fir, and aspen. Bluegrass, wheatgrasses, western harrow, lupine, and Indian paintbrush are also common.

The pinyon-juniper woodland/Douglas fir type occurs on gentle slopes and cover ranges from 20 to 33 percent. This type is found in the drainages of Turtle Canyon in the southwest corner of the WSA. Common understory plants include Utah serviceberry, cliffrose, green Mormon tea, squawbush, snowberry, bullgrass, and phlox.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	12,900	38
Douglas fir	7,310	22
Barren	7,190	21
Mountain Shrub	3,430	10
Pinyon-juniper/Douglas fir	2,130	7
Riparian	730	2
Total	33,690	100

Source: USDI, BLM, 1983b.

Two riparian communities constitute the riparian type found in the WSA. Salina wildrye dominates in Mitchs Canyon and at the head of Turtle Canyon. Other common plants include bullgrass, galleta, Utah juniper, pinyon pine, serviceberry, Mormon tea, birchleaf mountain mahogany, rabbitbrush and hymenoxys. Average total cover is 35 percent. A sagebrush type dominates about six miles of stream bottom along Range Creek and in Bear, Nelson, Calf and Cherry Meadow Canyons. The type averages a 41 percent cover including cottonwood, serviceberry, single leaf ash, snowberry, currant, squawbush, woods rose, and rabbitbrush. A diversity of grasses and some sedges are also present.

On the barren areas which consist mostly of rock outcrops, vegetation cover is low, ranging from zero to 24 percent. Juniper and pinyon trees are scattered among the rocks, along with understory of Utah serviceberry, cliffrose, snowberry, bullgrass, galleta, gilia, and hood phlox.

No threatened or endangered plant species have been located within the WSA. Gailardia flava, Hedysarum occidentele var. canone, and Psorathamnus polyadenius var. jonesii are FWS Category 2 candidate species that may occur in the WSA (see Appendix 4 in Volume I). Gailardia flava has been located immediately outside the WSA, and habitat is present on about 6,700 acres within the WSA on alluvial fans and terraces, between 4,200 and 5,400 foot elevations where cottonwood/willow communities are present.

The Turtle Canyon WSA is in the Colorado Plateau Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV type of the WSA is juniper-pinyon woodland.

Water Resources

The Turtle Canyon WSA drains into Range Creek which is a tributary of Green River in the Upper Colorado River hydrologic subregion. The major water source in the area is Range Creek, which (with the exception of about 1 mile) flows outside the WSA along its northeastern edge. Ten springs are found in all of the major tributaries to Range Creek and in the head of one of the forks of Turtle Canyon and a fork of Little Park Wash. These springs may keep flows in the channels for about 1 mile, or may flow in segments alternately reaching the surface and going underground. Mitchs Canyon, where water flows for several miles, is an exception. A total of about 10 miles of perennial stream is present, almost all of which is in the northern 80 percent of the WSA.

The WSA is within Water Right Adjudication Area 91. The water within the area is not fully appropriated (UDNRE, DWR, 1988). Consideration may be given to isolated springs for appropriation but claims may not exceed 0.015 cfs.

The water quality standards for Range Creek and tributaries from the confluence with the Green River to Range Creek Pumping Station are Class 3A (protected for cold water species of game fish and other cold water aquatic life) and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering). Range Creek and tributaries from the confluence with Green River to the headwaters is also classified as antidegradation segments. Basin geology, drainage area, and lack of upstream use result in relatively good water quality. Water is probably safe for human consumption and contact without treatment. Nevertheless, precautions are desirable since water quality data are lacking. The extent or quality of the groundwater resource in the WSA is largely unknown. It is known that aquifers are present that feed the springs in the WSA.

One small pond is the only known developed water source. It is located along an abandoned way in the southeast part of the WSA.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Turtle Canyon WSA is given in Table 5. Appendix 5 in Volume I explains the mineral and energy resource rating system.

Table 5
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 3	c4	10 to 50 million barrels of oil; less than 60 to 300 billion cubic feet of naturalgas
Coal	f 4	c4	55 million metric tons
Uranium	f 2	c1	Less than 500 metric tons of uranium oxide

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

There are no materials listed as strategic or critical known to occur in the WSA (USDoD, 1988).

- Leasable Minerals

There are no active drilling, mining, or exploration activities for leasable minerals in the WSA.

- Oil and Gas

Producible oil and gas are found only where an adequate petroleum source, porous and permeable rock, and a trap to hold the petroleum occur.

Petroleum is evidenced in the vicinity of the WSA by shows of petroleum, primarily gas, found in abandoned wells. No producing wells have been drilled within the WSA, but the Bow Valley well is adjacent to the WSA boundary, and the presumed limits of the gas reservoir extend into the WSA.

Porous rocks known to be favorable for oil and gas production in the region are present within the WSA. Oil and gas potential within the WSA for the Green River and Wasatch formations, found in the Peters Point field about 15 miles north, is low. In the WSA these formations are highly dissected and exposed to the surface with oil shale and tar sand-bearing strata being absent. Structural and stratigraphic conditions under which production occurs in Peters Point field are also absent. Formations that produce elsewhere are present below the surface of the WSA. The Moenkopi produces oil in the Grassy Trail field (about 15 miles west of the WSA), from multiple small traps caused by minor faulting. The Farnham Dome gas field, about 20 miles northwest, produces gas from a small closed structure (a dome) in Navajo Sandstone. Small amounts of carbon dioxide and helium gases were also produced in the 1920s from a closed structure in the Navajo Sandstone of the Woodside field 7 miles southwest of the WSA. The San Arroyo field, the nearest moderately large field, is about 60 miles to the east and produces from small closed structures (traps) in Entrada Sandstone and from a combination of structural and stratigraphic conditions in Dakota Sandstone. Other formations of interest producing in the region include the Morrison and Cedar Mountain. The Moenkopi, Navajo, Dakota, Cedar Mountain, Morrison, and Entrada formations are present at 2,600 to 7,200 feet below the surface in the WSA.

No large structural features are known to occur in those rocks favorable for production identified above. The rocks lie over the top of the Uncompahgre Uplift, which is deeper. About 4 to 5 miles of the 100 to 200 mile uplift may be under the WSA. Recent drill hole data around the WSA suggests that the uplift tapers off at the south of the WSA or is discontinuous under the WSA.

Small structural or stratigraphic features with adequate reservoir capacity could be present and may have some relationship to possible movement along the Uncompahgre Uplift. Some potential for traps may also exist very deep (15,000 to 20,000 feet down) in Paleozoic rocks of the WSA if the Uncompahgre is a thrust fault with traps underneath and along the fault zone. A drill hole 40 miles east of the WSA suggests this possibility. A possibility for traps in buried rubble along the south of the uplift also exists.

The favorability rating assigned for oil and gas in the WSA is based on the presence of fields in the general area, petroleum shows in exploration wells near the WSA, and the presence of tar sand and oil shale deposits north of the WSA. The f3 rating indicates that there could be 10 to 50 million barrels of oil or 60 to 300 billion cubic feet of natural gas in the WSA. The c4 rating indicates

a high level of certainty concerning the favorability rating (SAI, 1982).

With the current land use plan, the entire WSA is open to leasing with standard and special stipulations (Category 2) for watershed and critical deer winter range protection. The oil and gas leasing categories were revised in 1983 to 1984. There is presently one post-FLPMA oil and gas lease in the WSA, covering 1,920 acres.

- Coal

Coal is known to be present and recoverable from the Blackhawk formation under approximately 2,360 acres (7 percent) of the WSA. The coal beds are generally thicker than 4 feet and are under less than 3,000 feet of overburden. The most highly favorable area extends up to 1 mile inside the WSA boundary from the western edge. This area is estimated to contain 55 million tons of in-place coal, of which 27 million tons could be extracted by underground mining (Doelling, 1972).

The underground mining of this resource would require access into the WSA for further developmental drilling, and possible construction of ventilation facilities, although the majority of the mine development activity would be located outside the western boundary of the WSA.

Deeper and thinner coal exists under the eastern sections of the WSA and future advancements in coal recovery technology could result in several more millions of tons of recoverable coal present. These numbers cannot be quantified at this time.

The favorability rating for coal (f4) reflects the presence of coal recoverable in large tonnages under approximately 7 percent (2,360 acres) of the WSA. The certainty rating of c4 is based on production data from nearby mines and existing available data on coal-bearing formations present under the WSA (SAI, 1982). Currently there are 310 acres of leased coal within the WSA.

- Locatable Minerals

There are no mining claims in the WSA nor any known or suspected occurrences of locatable minerals. In the northwest corner of the WSA, a 3,717-acre area (11 percent) is closed to mining claim location by an oil shale withdrawal.

- Uranium

Formations known to be favorable for uranium range in approximate depths of 5,000 to 12,000 feet below the surface. Uranium from these formations is not considered recoverable.

The f2 rating for uranium indicates a potential for less than 500 metric tons of uranium oxide. The certainty rating (c1) reflects the lack of surface occurrences, mines, or known deposits (SAI, 1982). The WSA is well outside of any generally recognized uranium resource area.

- Salable Minerals

Salable minerals present, such as sand and gravel, are of little or no value considering their remote location in the WSA and common occurrence elsewhere.

Wildlife Including Special Status Species

A wide variety of wildlife inhabits the WSA. Springs and intermittent and perennial streams; variety in vegetation, including highly productive mountain and riparian types; rugged terrain, including clifflines; and the extreme variation in elevation all contribute to a diversity of wildlife. Only the more common or distinctive species are discussed here. Major species of interest include Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, blue grouse, ruffed grouse, golden eagle, and prairie falcon.

Twenty-two Rocky Mountain bighorn sheep were reintroduced in 1970 and 1973 on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek about 6 miles east of the WSA. They are reoccupying historical range in and around Desolation Canyon, including the majority of the WSA. One sighting was made on the rim of Turtle Canyon in 1973, as well as additional sightings near the Green River in 1976. Within the WSA, 10,370 acres (31 percent) are bighorn sheep habitat, representing about 8 percent of the total range (129,625 acres) identified for the Range Creek herd. No lambing areas for the herd have been identified at this time. Present population within the WSA is estimated at 3 animals, while the prior stable population is 71. In 1989, the bighorn sheep allotment was retired from domestic sheep grazing in order to provide additional habitat and forage for bighorn sheep. Mule deer winter, crucial winter, and summer range for Herd Unit 27B all occur in the WSA. Winter range

for the herd unit is not considered a limiting factor for herd viability at this time. The WSA includes 8,455 acres of critical winter range, representing 7 percent of the total critical winter range (120,785 acres) for the herd. Present winter population in the WSA is estimated at 138 animals, while carrying capacity is 423. The WSA includes 9,910 acres of summer range, representing about 4 percent of the total summer range (247,750 acres) for the herd. Present summer population in the WSA is about 155 animals, while carrying capacity is 367. Herd concentrations frequently occur along Range Creek and Mitchs Canyon, particularly in the winter.

Elk disappeared from the Range Creek herd along with adjacent Avintaquin and Manti herds in the early 1900s. The Avintaquin and Manti herds were re-established by transplant, and the Range Creek herd is being re-established by movement from adjacent herds. During 1988, 96 elk were released within portions of the Turtle Canyon and Desolation Canyon WSAs by the UDWR. No information is available concerning their distribution, but it is assumed that some of these elk will permanently establish themselves in the Turtle Canyon WSA. The WSA includes 32,705 acres of elk winter range, representing about 10 percent of the total winter range (327,050 acres) for the herd. Up until the latest transplant, the WSA was used for winter range by 7 elk, although carrying capacity is 112. The WSA also includes 985 acres of elk summer range, representing about 1 percent of the total summer range (985,000 acres) identified for the herd. No summer use of the WSA is presently believed to occur, although the WSA could support 10 elk during the summer.

Mountain lion and black bear are both common to the WSA and populations are considered healthy. Mountain lion rely heavily on mule deer for food.

Blue grouse, ruffed grouse, and chukar partridge are the major upland game birds present. Yearlong habitat for blue and ruffed grouse is found from Mitchs Canyon north, and chukar habitat occurs mainly in Turtle Canyon, lower Mitchs Canyon, and Range Creek. Chukar partridge, an exotic species, was introduced in 1951 and 1956 and is common in the vicinity. Crucial habitat for these species does not occur within the WSA.

Species of nesting raptors occurring or potentially occurring throughout the WSA are golden eagle (a BLM sensitive species), prairie falcon, Cooper's hawk, goshawk, American kestrel, redtail hawk, and ferruginous hawk (a candidate species). The bald eagle (endangered) is also thought to use the vicinity of the WSA during winter migration, and the endangered peregrine falcon may also use the area. One raptor nest is known to occur in the WSA; however, an intensive raptor survey has not been conducted in the WSA.

Other common wildlife present include cottontail rabbit, bobcat, coyote, grey fox, a variety of rodents, and some reptiles such as the side-blotched lizard and the midget faded rattlesnake. Common birds include the migratory mourning dove and large numbers of perching species, including the violet green swallow, white throated swift, and pinyon jay.

Fish, including cutthroat and brown trout, are present in Range Creek although the WSA includes only a one mile segment of the creek, which is of lower fish habitat quality (due to increased temperatures) than segments found further upstream.

No threatened or endangered wildlife species were identified in the WSA. However, the WSA is believed to be used by the endangered peregrine falcon and bald eagle (winter). Six sightings of peregrine falcon have occurred in the general vicinity of the WSA, with four of these being within the adjacent Desolation Canyon WSA. About 9,070 acres of habitat were delineated for the WSA, based on general topography and suitable cliff nesting habitat within 0.5 to 1 mile of live water. Nine bald eagles were identified along the Green River in the first bald eagle count completed for the Desolation Canyon area in January 1984. In addition, candidate species that may use the area include the ferruginous hawk, western snowy plover, white-faced ibis, long-billed curlew, and Great Basin Silverspot butterfly (see Appendix 4 in Volume I)).

Habitat improvement projects have not been identified or proposed for wildlife in the WSA.

Forest Resources

Adequate volumes for timber harvest are present in most of the tree-dominated vegetation types identified within the Vegetation Including Special Status Species section. Limited amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees could be produced. However, slopes are prohibitive to production in most of the WSA, accessibility is very poor, and distance to potential mill sites is not favorable. More suitable stands are available elsewhere, and there is no commercial or noncommercial interest

in forest products within the WSA. The forested area is considered nonproductive and noncommercial. No use of the forest products has occurred in the past and none is expected in the foreseeable future.

Livestock and Wild Horses/Burros

The WSA contains portions of 5 grazing allotments involving five permittees. Table 6 summarizes the livestock grazing use data and the allotment acreages and AUMs within the WSA.

There are no range developments in the WSA. Rough terrain and limited access have confined livestock use to drainage bottoms, primarily the more open bottoms close to Range Creek. Some utilization of pinyon-juniper woodland and shrub types has occurred on the gentler slopes in the southern portion of the WSA. No use of the Last Chance allotment by the permittee has occurred since 1975. In 1989 the Big Horn allotment was retired from domestic sheep grazing in order to provide additional habitat and forage for bighorn sheep.

Small tracts of potentially arable land overlap the WSA at canyon bottoms along Range Creek. However, the large majority of higher quality arable or potentially arable land along Range Creek is privately owned or outside the WSA.

Predator control was not conducted during the 1986-1987 period in the grazing allotments that comprise the Turtle Canyon WSA (USDA, APHIS, 1988).

Wild horses or burros are not known to occupy the WSA.

Visual Resources

About 75 percent of the WSA (about 25,300 acres) is rated Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water in most of the canyons, and rich and pleasing color combinations. The remainder of the WSA is Class B scenery where vertical relief is less severe and presence of water less frequent (Roy Mann Associates, Inc., 1977). The sensitivity of groups familiar with the area to potential changes in the landscape was rated high. Class B scenery areas in the WSA are in a foreground/middleground viewing area from Turtle Canyon road. The VRM class adopted for the entire WSA is Class II (refer to Appendix 7 in Volume I for a description of the BLM VRM rating system).

Geology, topography, vegetation, and water characteristics of the WSA combine to create a highly scenic landscape. The WSA is formidable in scale, a 3,000-foot divide comprised of red and tan, narrow, broken

Table 6
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number[b] of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Range Creek	43,899	19,660	300	143	300 Cattle	06/01-06/15 10/01-10/15	1
Little Park	17,842	6,000	242	3	54 Cattle	05/25-10/10	2
Last Chance	13,162	3,450	400	22	500 Sheep	02/01-05/31	1
Patmos	1,536	30	47	1	120 Cattle	06/01-10/25	1
Big Horn[a]	26,786	4,550	650	8	541 Sheep	11/01-04-30	0
Total	103,225	33,690	1,639	177			5

Sources: BLM File Data.

[a]Livestock AUMs retired in 1989 to provide for bighorn sheep use.

[b]Of the 177 AUMs in the WSA, 8 are allocated to bighorn sheep use and 169 allocated to livstock.

rocky ridges, cliffs, and pinnacles. On the north, this view is softened by heavily forested slopes and running water.

Cultural Resources

A total of 5 archaeological sites have been recorded in the WSA (USDI, BLM, 1988b). One of these is a rockshelter containing a Fremont masonry structure. A second site which is considered to be eligible for nomination to the National Register of Historical Places is a rock art panel exhibiting both petroglyphs and pictographs.

Eleven sites in the Range Creek area were recorded during the early 1950s. Three of these sites are located within the boundaries of the WSA. All three sites are Fremont in cultural affiliation; two consist of several pit house structures and one is a structural site located in an alcove. In general the Range Creek sites are considered to be as important as the Mill Creek sites located 25 to 30 miles north which have been identified as a National Register eligible archaeological district. It is from one of the Range Creek sites that the Pillings collection of Fremont figurines (on display at the College of Eastern Utah Museum in Price) was collected. This is one of the more significant collections from a San Rafael Fremont site and has been the subject of professional studies.

A number of abandoned historical buildings are found in Range Creek along the northeast edge of the WSA. All are thought to be on private land, however, historical activity in Range Creek almost certainly included parts of the WSA. The origin of the buildings is unknown and most are no longer in use.

Range Creek was homesteaded during the 1880s or 1890s in several places along the creek. This is the most likely origin of the historical buildings. There are also unconfirmed reports of "moonshine diggings" in the WSA.

Two 160-acre quadrats representing 0.94 percent of the WSA were intensively surveyed as a result of the Central Coal Project (Hauck, 1977). Only one site was recorded. Using these data, an average site density estimate of 72 sites per 23,000 acres was computed. An even lower site density of 39 sites per 23,000 acres was computed using data from the Range Creek Planning Unit of which the WSA is a part (Hauck, 1977). This inventory was not designed specifically for the WSA, thus statistics based on it may be unreliable. However, site densities for the region are apparently much lower than much of the State. Additional significant sites similar to the Fremont sites found in Range Creek may be present in the WSA.

Recreation

Road access to the WSA exists at points near or around its entire perimeter. On the north a road over Horse Canyon and Little Horse Canyon tops the principal ridge of the divide and then drops to a locked gate in Range Creek. The Range Creek road from this gate to another gate above the confluence of Range Creek and Turtle Canyon is accessible only by obtaining a key from the owner of the ranch and guest lodge in Range Creek. The Turtle Canyon road borders the WSA on the south and southwest. On the west, spur roads leading west off the Little Park road also reach the boundary of the WSA.

No developed trails have been located in the WSA. A historical trail reportedly in Nelson Canyon may still be present. An abandoned way nearly crosses the southeast end of the WSA from east to west beginning near the confluence of Range Creek and Turtle Canyon just north of the locked gate. Another short way begins in the east fork of Turtle Canyon, but the segment climbing out of the canyon was never built. It is passable as a foot trail and could be used to access Mitchs Canyon. Numerous hiking routes through the WSA are possible using ridges and drainages. Slopes and dense vegetation can make travel difficult. Some routes require short, near-vertical rock scrambles or technical ascents. No hiking or climbing guides cover the WSA, although interpretive books on the history of the area and archaeology are available.

There are two privately owned lodges in Range Creek near the WSA presently offering services primarily to hunters. Guests at the lodges are known to use the WSA for sightseeing and some hunting. Total capacity of the lodges is about 25 people, and the normal use season could extend up to 5 or 6 months. Presently, no commercial outfitting services are offered, although use of the hunting lodge has been established since 1963.

Many features of the WSA make it attractive for recreation, including scenic, historic, archaeologic, and wildlife settings discussed above. Facilities present, particularly nearby lodges, are desirable features to many current and potential users. Such facilities have, in similar settings, increased access to wilderness lands for a segment of the public.

Individual features of interest to the visitor include remnants of iron concretions, contrast between strata at their contacts, unusual weathering patterns, a wide diversity in ecological sites and vegetation, and a good potential for wildlife sightings.

Range Creek offers trout fishing opportunities, although the better fishing is adjacent to the WSA. Hunting opportunities in the WSA and its vicinity are good; however, the rugged terrain is a major limiting factor. Terrain has limited most use to areas adja-cent to Little Park or Turtle Canyon and to canyon bottoms near Range Creek. About 60 to 100 hunters per year are expected to use the WSA mainly around the boundaries. Estimates are based on UDWR data and known use patterns. Chukar hunting is also known to occur, and opportunities are fair to good. Signs of nongame and game wildlife are commonly encountered in the WSA.

Hiking and climbing are the recreational activities for which the WSA is best suited. Routes between canyon bottoms and ridge tops generally follow natural drainages. Snowfall, trees, or boulders blocking the drainages and slopes make travel slow and arduous, but interesting. Waterfalls must be circumvented or climbed. There are rocky peaks along the ridges of the WSA. None are known to have been climbed. The formidable east-west cliffs could also present tech-nical rock-climbing possibilities. Use at this time is primarily short hiking trips from the Range Creek side of the WSA for sightseeing.

The Price River MFP limits ORV activity in the WSA to existing roads and trails.

Reliable use data, other than for hunting, are not available. Present use levels, other than for hunting, are considered low. The recreational use of the WSA is currently estimated at 500 visitor days annually. No visitor days are related to commercial outfitting. No more than 10 percent (50 visitor days) of this use is from motorized vehicular access on existing ways, while the remaining 90 percent (450 visitor days) is from primitive recreational use.

Land Use Plans

Right-of-way grants for oil and gas exploration have been made for the Turtle Canyon road forming the south boundary of the WSA. Two of these remain in effect.

The WSA is BLM-administered public land except for three State sections (1,928.6 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986 the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. All of the State land is currently under lease for oil, gas, and hydrocarbons. The likelihood of mineral development of these State lands is good due to favorable geologic conditions. None of the State land is currently leased for grazing. No private or split-estate lands are located in the WSA.

Emery County has zoned the general area, including the Turtle Canyon WSA, for mining and grazing (Emery County Board of Commissioners, 1984). Land use objectives are:

1. To promote the conservation of water, land, mineral, and other resources.

2. To prevent the degradation of the natural and social environment.

3. To foster agriculture, mining, and industry within the State.

4. To provide a location for certain types of agricultural, industrial, and other uses which, because of certain characteristics of operation such as odor, noise, etc., are not compatible with urban development.

Permitted uses include grazing, pond construction, minor mines and utility projects, and buildings. Major construction, mining, etc., require county review and approval.

In addition, the Emery County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Federal lands in the WSA are managed by the Price River Resource Area under the existing MFP for the Range Creek Planning Unit. The updated Price River MFP was final in September 1983. Wilderness designation is not addressed in the MFP. However, wilderness designation is part of the BLM multiple use concept and BLM land use planning is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

Socioeconomics

• Demographics

The WSA is located in the northeastern portion of Emery County. However, due to access and population distribution, Carbon County, more than Emery County, would be the area most affected by wilderness designation or nondesignation. Both counties are discussed below.

Carbon County can be summarized as rural with an urban area around the City of Price. Emery County can also be classified as rural with a string of small communities in Castle Valley. Communities closest to the WSA include: Price, Wellington, East Carbon, Sunnyside, and Green River. The City of Price (1980 population of 9,086) is located in Carbon County, 30 air miles northwest of the WSA, and serves both Carbon and Emery Counties as a major service center (USDC, Bureau of the Census, 1981). The adjacent communities of East Carbon and Sunnyside (total 1980 population of 2,553) are located in eastern Carbon County, 8 air miles northwest of the WSA. Green River (population of 1,282), located on the county line between Emery and Grand Counties, lies 24 air miles south of the WSA.

Carbon and Emery Counties comprise 5,916 square miles or 3,781,952 acres. About 73 percent of the counties is managed by the Federal Government, 10 percent by the State, and 17 percent is privately owned.

Table 7 shows the baseline and projected total population data for Emery and Carbon Counties.

Table 7
Baseline and Projected Population and Employment Growth
Carbon and Emery Counties

	1980	1990	2000	2010
Emery County				
Population	11,600	12,000	11,900	14,000
Employment	5,480	4,900	5,500	6,700
Carbon County				
Population	22,400	23,400	23,200	28,000
Employment	9,372	9,400	10,700	13,000

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980 the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800 (less than 1 percent of the State's population of 1.5 million). Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

From 1970 to 1980, the population of Carbon County grew from 15,647 to 22,400, an overall increase of about 43 percent. Carbon County has less than 2 percent of the State population of about 1.5 million (Utah Office of Planning and Budget, 1984). Table 7 presents baseline and projected population data for Carbon County. It is estimated that between 1980 and 1987 the population increased to about 23,100. Population projections indicate that the number of people living in Carbon County in the year 2010 will be about 28,000 for about a 25 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

• Employment

Table 7 shows the baseline and projected total employment for Carbon and Emery Counties to the year 2010. Growth in the affected area, particularly Carbon County, is linked with the coal industry. The region's population increased 62 percent between 1970 and 1980 and Emery County has the highest rate of growth in Utah for the largest share of income earned in the region (USDC, Bureau of the Census, 1981). Between 1981 and 1983, employment in the local coal industry decreased 15 percent (Utah Department of Employment Security, 1981 and 1983). Despite the recent slump the coal industry remains the area's largest employer. Construction and operation of electrical generating plants also provide a large share of employment in the area. Local income and employment attributable to these power plants are reflected in the construction, public utility, and mining sectors. A number of other businesses depend on the mines and powerplants to purchase their products, and many retail and service businesses depend on the workers' local expenditures.

Emery and Carbon Counties are part of the Southeast MCD. Table 8 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), and trade (15 percent). It is projected that by the year 2010 employment in the MCD will increase by about 27 percent and that services

will increase to 18 percent, trade to 17 percent, and government to 15 percent of the total, while the mining, agriculture, and construction sectors will decline (Utah Office of Planning and Budget, 1987).

Table 8
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Economic-related activities in the WSA include mineral exploration and production, livestock production, and recreation. Table 9 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 9
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	0	$3,840
Livestock Grazing	$3,380	$930
Recreational Use	$2,050	260
Total	$5,430	$5,030

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has no mining claims and, therefore, no revenue has been expended in mining claim assessment or development. Geophysical exploration in the WSA has generated some temporary local employment and income. No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Five livestock operators have a total grazing privilege of 169 AUMs within the WSA. If all this forage were utilized, it would account for $3,380 of livestock sales, including $845 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximation of expenditures can be deduced (Dalton, 1982). This study indicates that Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Turtle Canyon WSA is estimated as about 500 visitor days per year which accounts for $2,050 of local expenditures yearly.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 9).

Oil and gas leases in the WSA cover approximately 1,920 acres. Coal leases cover about 310 acres. At $2 and $3 per acre respectively, lease rental fees generate up to $4,770 of Federal revenues annually. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 177 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $260 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM District for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Turtle Canyon WSA.

No Action/No Wilderness Alternative

• Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the BLM Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on all 33,690 acres) withdrawal from location of mining claims on 3,717 acres, and ORV limitations.

In the foreseeable future, disturbance of approximately 330 acres from oil and gas and coal exploration and development would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Most special features, including archaeological and historical values, threatened, endangered, or other special status species, scenic features, and perennial streams would not be affected because the direct disturbance would involve only 1 percent of the WSA. Some Class A scenery would be reduced in quality in disturbed and surrounding areas. Appropriate measures would be taken to protect special status species and cultural features prior to any surface-disturbing activity. Refer to the Wildlife Including Special Status Species section for more information.

During the period of activity, the visual and audible disturbance from mineral exploration and development and from providing access to State in-holdings would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 15 percent (5,053 acres) of the WSA could be so affected in the foreseeable future. Wilderness-dependent wildlife would leave the area of direct and indirect disturbance during the period of activity.

Because future vehicular use would generally be limited by terrain to existing vehicular ways, no additional surface disturbance from ORV activity is anticipated in the future. The continued and increased vehicular use of about 8 miles of existing ways and use of future mineral and State access roads would occasionally detract from opportunities for solitude and primitive recreation.

The gradual increase in visitor use would not be expected to significantly reduce the quality of wilderness values because the additional use would be mostly primitive and the WSA is large enough to incorporate the additional use adequately.

The extent that disturbance would occur on Federal lands and State in-holdings over the long term, and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Losses would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 330 acres of the WSA and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to 5,053 acres. Use of vehicles on 8 miles of ways and about 20 miles of new roads would detract from opportunities for solitude and primitive recreation in the WSA. Class A scenery and wildlife special features would be adversely affected.

• Impacts on Mineral and Energy Resources

Approximately 3,717 acres within the WSA would remain closed to mineral location due to an oil shale withdrawal. The remainder of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. The oil shale withdrawal does not preclude mineral leasing. Therefore, mineral and energy resources would not be affected by implementation of the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Species sensitive to human encroachment or surface disturbance (i.e., black bear, mountain lion, bighorn sheep, and nesting raptors) could be forced from historical habitat by mineral-related surface-disturbing activities on 330 acres.

Present black bear and mountain lion habitat in the WSA would be reduced from 33,690 to 29,110 acres. Habitat for cliff-nesting raptors would be reduced from 33,690 to 32,480 acres over time as development of the area occurred. Although not identified as critical habitat, potentially suitable peregrine falcon

nesting habitat would be reduced from 9,070 to 4,410 acres.

Bighorn sheep populations would be expected to increase from three to 40 animals, even though about 4,520 acres of bighorn sheep range could eventually become unsuitable due to development and human encroachment. Only about 8 percent of the total bighorn sheep range is located in the WSA.

Other big game populations would also be expected to increase over time even though habitat loss would occur. Population increases would be possible because the habitat range is not currently being used at its capacity. For example, the carrying capacity of crucial deer winter range could be reduced from 423 to 363 deer as the suitable range was reduced from 8,455 to 7,245 acres. Winter deer populations could still increase from 188 to 363. The carrying capacity of summer range within the WSA could be reduced from 367 to 325 as 1,140 of the 9,910 acres of summer range in the WSA were rendered unsuitable by mineral development. Summer deer populations could still increase from 155 to 325.

Elk do not occupy the WSA during the summer. Mineral-related surface disturbance would reduce elk winter range in the WSA from 32,700 to 28,040 acres. Carrying capacity would be reduced from 112 to 100, which is still substantially above the present population of seven elk.

Prior to any disturbance, BLM would initiate Section 7 consultation with the FWS concerning threatened or endangered wildlife species, as required by the Endangered Species Act and BLM policy, (refer to Appendix 4 in Volume I). Because necessary measures would be taken to protect these species, the viability of these populations in the WSA would be preserved under the No Action/No Wilderness Alternative.

Conclusion: About 1.0 percent of the wildlife habitat in the WSA would be disturbed. Habitat for black bear, mountain lion, raptors including peregrine falcons, bighorn sheep, elk, and mule deer would be reduced in size. Because of present low numbers, populations could still increase. Vehicle use and activity on 8 miles of existing ways and about 20 miles of new roads would affect species such as bighorn sheep, bear, and cougar that are sensitive to human intrusion.

- Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. Total employment resulting from projected oil and gas and coal exploration and development would not exceed 340 employees at any one period of time. This would represent about 1.2 percent of the projected employment in the Southeast MCD workforce in the year 2010 or 1.7 percent of the combined projected employment in Carbon and Emery Counties in the year 2010. Approximately 300 of the 340 projected jobs would be for coal mining and may represent continuation of jobs for miners as other mines are depleted. In this case there would be only minor increases in local sales in communities such as Green River in Emery County and Price in Carbon County.

There would be no livestock-related economic losses because the existing grazing use (169 AUMs) and ability to maintain, replace, and build new range developments would remain as at present.

Recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 to 7 percent per year over the next 30 years. Because at this rate, recreational use in the area could increase from the current 500 visitor days annually to be between 940 and 4,400 visitor days per year at the end of 30 years and because overall recreation-related local expenditures average $4.10 per visitor day; by the year 2020, recreation-related expenditures of between $3,854 and $18,040 would accrue to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 31,770 acres in the WSA not currently leased for oil and gas and 2,050 acres of coal lands that are currently not leased. If leased they would bring up to $69,690 additional Federal lease fee revenues per year. In addition royalties from oil, gas, and coal production and bonus bids from new leases would be substantial. Assuming production of two million tons of coal per year and a $2 per ton royalty, the coal in the WSA would contribute $4 million per year to the Federal Treasury for about 14 years. Oil and gas royalties per well in this area could average between $20,000 and $100,000 per year based on a price of $2 per MCF of gas and a 12.5 percent royalty. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees

(currently $273 per year) would continue. About 50 percent of these revenues are returned to the local BLM office for use in range improvement projects.

Conclusion: Present economic conditions would not be affected. Employment in coal, oil, and gas exploration and development in the WSA would represent about 1.7 percent (340 jobs) of the projected combined Carbon and Emery County employment by the year 2010. There would be minor changes in local economic conditions. The WSA could contribute up to $18,040 annually in local sales related to recreation. Livestock grazing in the WSA would continue to contribute $3,380 in livestock sales and $260 in Federal grazing revenues each year. Oil and gas and coal leasing fees could contribute up to $74,460 annually in Federal and State revenues. In addition, coal royalties from the WSA would contribute about $4,000,000 per year for about 14 years while gas royalties could bring between $20,000 and $100,000 per year per well.

All Wilderness Alternative (33,690 Acres)

- Impacts on Wilderness Values

Designation and management of all 33,690 acres as wilderness would contribute to the preservation of the wilderness values in the Turtle Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for solitude and primitive recreation would be protected on all 33,690 acres. Resources that could be considered as special features in the WSA, including Class A scenery, archaeological and historical values, endangered and special status species, scenic features, perennial streams, and wildlife associated with wilderness, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 10 acres is anticipated from providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 2 percent (674 acres) of the WSA could be so affected. Special features would not be significantly affected because the direct disturb-ance would be minor involving only 0.03 percent (10 acres) of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural features prior to any surface-disturbing activity. Refer to the Wildlife Including Special Status Species section for more information. Mitigation to protect wilderness values would be applied, but loss of wilderness values could not be avoided if development involving valid existing rights could not be otherwise achieved.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for naturalness, solitude, and primitive recreation.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 10 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 674 acres. Special features would be protected although some Class A scenery would be reduced in quality in the disturbed and surrounding areas.

- Impacts on Mineral and Energy Resources

  - Leasable Minerals

  Approximately 1,920 acres are under post-FLPMA oil and gas lease. However, no exploration or development of oil and gas is presently occurring within the WSA. Existing post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. However, it is not affected that the existing leases would be developed or a showing of commercial quantities made prior to the lease expiration dates. The expired lease would not be reissued and new leasing would not be allowed.

  Therefore, exploration for and development of the potential resource of 10 to 50 million barrels of in-place oil and 60 to 300 billion cubic feet of natural gas, could be foregone under this alternative.

  Due to the availability of coal resources outside of the WSA, coal mining is not projected before

expiration of the existing leases. New leasing would not be allowed following designation. Therefore, potential development of the projected 55 million tons of recoverable coal in the WSA would be foregone with this alternative.

- Locatable Minerals

The entire 33,690-acre WSA would be withdrawn from mining claim location. A 3,717-acre area is presently closed to mining claim location by an oil shale withdrawal. There are no mining claims (as of 1987) within the WSA. Development work, extraction, and patenting would be allowed on future valid claims existing at the time of wilderness designation.

Formations favorable for uranium occur in approximate depths of 5,000 to 12,000 feet below the surface. Uranium from these formations is not expected to be recovered regardless of wilderness designation.

- Salable Minerals

Sand, gravel, building stone, or other salable mineral permits could not be issued. The WSA has a low potential for production of these resources due to low value, abundance of salable minerals outside the WSA, and the remote location of the WSA.

Conclusion: With the All Wilderness Alternative, the opportunity to recover an estimated 10 to 50 million barrels of oil, 60 to 300 billion cubic-feet of natural gas, and 27 million tons of coal would be foregone. Loss of exploration and development opportunities for other minerals would not be significant because the probability of development is low even if the area is not designated wilderness.

- Impacts on Wildlife Habitats and Populations Including Special Status Species

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep which are sensitive to human presence and surface disturbance) would benefit by wilderness designation. It is estimated that 10 acres of surface disturbance could result from mineral exploration and development with this alternative. Thus, little, if any, habitat loss would result to wildlife species. The habitat for nesting raptors (9,070 acres suitable, including peregrine falcon habitat) would be protected.

Big game species (bighorn sheep, deer, and elk) would approach nearer to their carrying capacities under this alternative, and optimum habitat conditions would be maintained for black bear and cougar.

As discussed for the No Action/No Wilderness Alternative, appropriate measures would be taken to protect threatened, endangered, or other special status species that might occur in the WSA from surface disturbance.

Conclusion: Wildlife species would be protected and provided with additional solitude. Populations of some wildlife species, especially game species, would increase. Threatened, endangered, and other special status species and their habitats would be protected.

- Impacts on Local Economic Conditions

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 9), as well as loss of potential increases in employment, income, and Federal revenues that could occur under the No Action/No Wilderness Alternative.

Valid existing oil and gas and coal leases and mining claims could be developed, but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of potentially recoverable oil, gas and coal deposits would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action/No Wilderness Alternative. The potential for 340 jobs, 1.7 percent of the projected combined Carbon and Emery County employment in the year 2010 would be foregone. Mining in the WSA would be part of a larger operation located outside the WSA. Therefore, the loss of employment would be only for the length of time required to mine the 27 million tons of recoverable coal estimated to be within the WSA. Assuming mine production of 2 million tns per year, the life of the mine and related employment would be shrortened by about 14 years.

Livestock use and ranchers' income would continue as at present with $3,380 of livestock sales, including $845 of ranchers' return to labor and investment.

Primitive recreation use is anticipated to increase at a rate of 2 to 7 percent annually. Related expenditures would average $4.10 per visitor day. This would contribute between $3,854 and $18,040 annually to the local economy by the year 2020. Motorized recreational use of the WSA is light and closure to vehicular traffic may initially result in a slight decrease in related local expenditures, but as motorized recreational use is replaced by primitive recreational use, losses would balance out. Overall, the change in recreation expenditures would be distributed locally and regionally and would not be noticeable as local income.

The eventual loss of 1,920 acres now leased for oil and gas and 310 acres leased for coal would result in an eventual loss of up to $4,770 per year of lease fees to the Federal Treasury. There would also be a potential loss of $69,690 annually in Federal revenues from the 31,770 acres of oil and gas and 2,050 acres of coal that could be leased without designation. In addition to these rental fees, the potential royalties from coal or oil production and bonus bid revenues from new leases would also be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increase. There are presently no commercial outfitters using the WSA; however, increased public awareness resulting from designation could lead to commercial recreational use in the WSA.

Conclusion: Present economic conditions would not be affected. The potential for 340 jobs, 1.7 percent of the projected combined Carbon and Emery County employment in the year 2010, would be foregone. Annual local recreation-related sales could contribute up to $18,040 annually to the local economy by the year 2020. Livestock grazing would continue to contribute $3,380 in livestock sales and $260 in Federal revenues annually. Annual oil, gas, and coal leasing fees of up to $74,460 would be foregone as would coal royalty payments of about $4,000,000 annually for 14 years and oil and gas royalties of between $20,000 and $100,000 per well per year.

Partial Wilderness Alternative (Proposed Action) (27,960 Acres)

- Impacts on Wilderness Values

Wilderness designation of 27,960 acres would contribute to preservation of the area's wilderness values. Wilderness values would be preserved over the long term in the designated area which is approximately 83 percent of the WSA. Protection in the designated area would include management under VRM Class I which generally allows for only natural ecological change, ORV closure including closure of 0.5 miles of ways, and closure to future mineral leasing and location. Naturalness and outstanding opportunities for solitude and special features, including Class A scenery, archaeological and historical values, special status species, scenic features, perennial streams, and wildlife associated with wilderness, would be protected.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil and gas exploration and development would occur on up to 60 acres within the nondesignated portion and on up to 10 acres within the designated portion at least until reclamation is complete. Special features would be largely preserved because direct disturbance would involve only 0.2 percent of the WSA. Some Class A scenery would be reduced in quality in the disturbed and surrounding areas. Appropriate measures would be taken to protect special status species and cultural features prior to any surface-disturbing activity. Refer to the Wildlife Including Special Status Species section.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to 5 percent (1,684 acres) of the WSA. Most of this type of impact would be in the nondesignated area. Wilderness-dependent wildlife would leave the area of direct and indirect disturbance during the period of activity.

The gradual increase in visitor use would be largely primitive in nature and would be managed so as to not result in a loss of wilderness values.

Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation in the WSA, although vehicular use of 7.5 miles of ways in the nondesignated area would occa-

sionally detract from these opportunities during the period of activity. Vehicular use of future roads associated with oil and gas exploration and development would also detract from these opportunities in the nondesignated area.

Conclusion: Wilderness values would be preserved in the designated area which is approximately 83 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 70 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,684 acres. Most of the impact would be in the nondesignated area. Some Class A scenery and wildlife associated with wilderness would be disturbed.

- Impacts on Mineral and Energy Resources

  - Leasable Minerals

  Anticipated impacts would be similar to the All Wilderness Alternative, except 5,730 acres that would not be designated wilderness would be available for mineral leasing under Category 2 as discussed for the No Action/No Wilderness Alternative.

The 27,960-acre area that would be designated wilderness would be placed in Category 4 status with no new leasing allowed. Currently, there are no existing oil and gas leases within the designated area. An unknown portion ot the oil and natural gas in the WSA would be foregone. The production of coal from 310 acres of existing leases in the designated portion is not projected (see the All Wilderness Alternative). Additional leases would not be issued for the remaining acres thought to contain minable coal. Recovery of approximately 27 million tons of coal would be foregone.

- Locatable Minerals

The nondesignated area (5,730 acres) would remain open to mining claim location. No claims now exist within the nondesignated WSA (as of 1987), but claims could be located in the future and explored or developed without concern for wilderness values.

The designated area (27,960 acres) would be closed to mining claim location. A 3,717-acre area is presently closed to mining claim location by an oil shale withdrawal. There would not be a significant loss in recovery of locatable minerals because the probability of development is low even if the area is not designated wilderness.

- Salable Minerals

Sand, gravel, or building stone permits could only be issued on the 27,960 acres designated as wilderness. there would not be a significant loss in production of salable minerals because of the low value of the resource, abundance of salable minerals outside the WSA and the remote location of the WSA.

Conclusion: Oil and gas leasing would not be allowed on 83 percent of the WSA and existing leases would expire before production. Therefore, an unknown but locally significant amount of oil and gas production would be foregone. The highest potential for oil and gas is expected to be within the southern (nondesignated portion) and eastern areas of the WSA. Recovery of about 27 million tons of coal would be foregone.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

The impacts on the designated portion of the WSA (27,960 acres) would be the same as discussed for the All Wilderness Alternative because only 10 acres of potential surface disturbance would occur to wildlife habitat.

On the nondesignated portion of the WSA (5,730 acres), impacts to wildlife would be similar to the No Action/No Wilderness Alternative. Approximately 60 acres of surface disturbance could occur on the nondesignated area. This disturbance would not significantly impact wildlife species or their habitat.

Habitats and populations of threatened, endangered, or other special status species would be preserved with this alternative.

Conclusion: Wildlife species would be protected and provided with additional solitude on 83 percent of the WSA. Populations of some species, expecially game species, would increase. Threatened, endangered, and other special status species would be protected by wilderness management in the designated area and by requirements of the Endangered Species Act and BLM policy in the nondesignated area.

• Impacts on Local Economic Conditions

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under partial wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 9), as well as loss of potential increases in income and Federal revenues that could occur under the No Action/No Wilderness Alternative.

Valid existing oil and gas leases and mining claims could be developed, however, designation would preclude new leases and claims from being established in the WSA. New leases and claims could be developed in the 5,730-acre nondesignated portion. Precluding exploration and development of minerals on 83 percent of the WSA would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action/No Wilderness Alternative. Employment for oil and gas exploration and development in the WSA would be about 0.1 percent (20 jobs) of the combined projected Carbon and Emery County employment by the year 2010. Because coal and an unknown portion of the potential oil and gas in the WSA would not be developed, up to 320 fewer jobs would be provided than with the No Action/No Wilderness Alternative. Coal mining in the WSA would be part of a larger operation located outside the WSA. Therefore, the loss of employment would be only for the length of time required to mine the 27 million tons of recoverable coal estimated to be within the WSA. Assuming mine production of 2 million tons per year, the life of the mine and related employment would be shortened by about 14 years.

Livestock use and ranchers' income would continue as at present with $3,540 of livestock sales, including $885 of ranchers' return to labor and investment.

Recreation-related local expenditures would average $4.10 per visitor day and would total between $3,854 and $18,040 annually by the year 2020. Motorized recreational use of the WSA is light and closure to all vehicular traffic on a portion of the WSA may initially result in a slight decrease in related local expenditures, but as motorized recreational use is replaced by primitive recreational use, losses would balance out. Overall, the change in recreation expenditures would be distributed locally and regionally and would not be noticeable as local income.

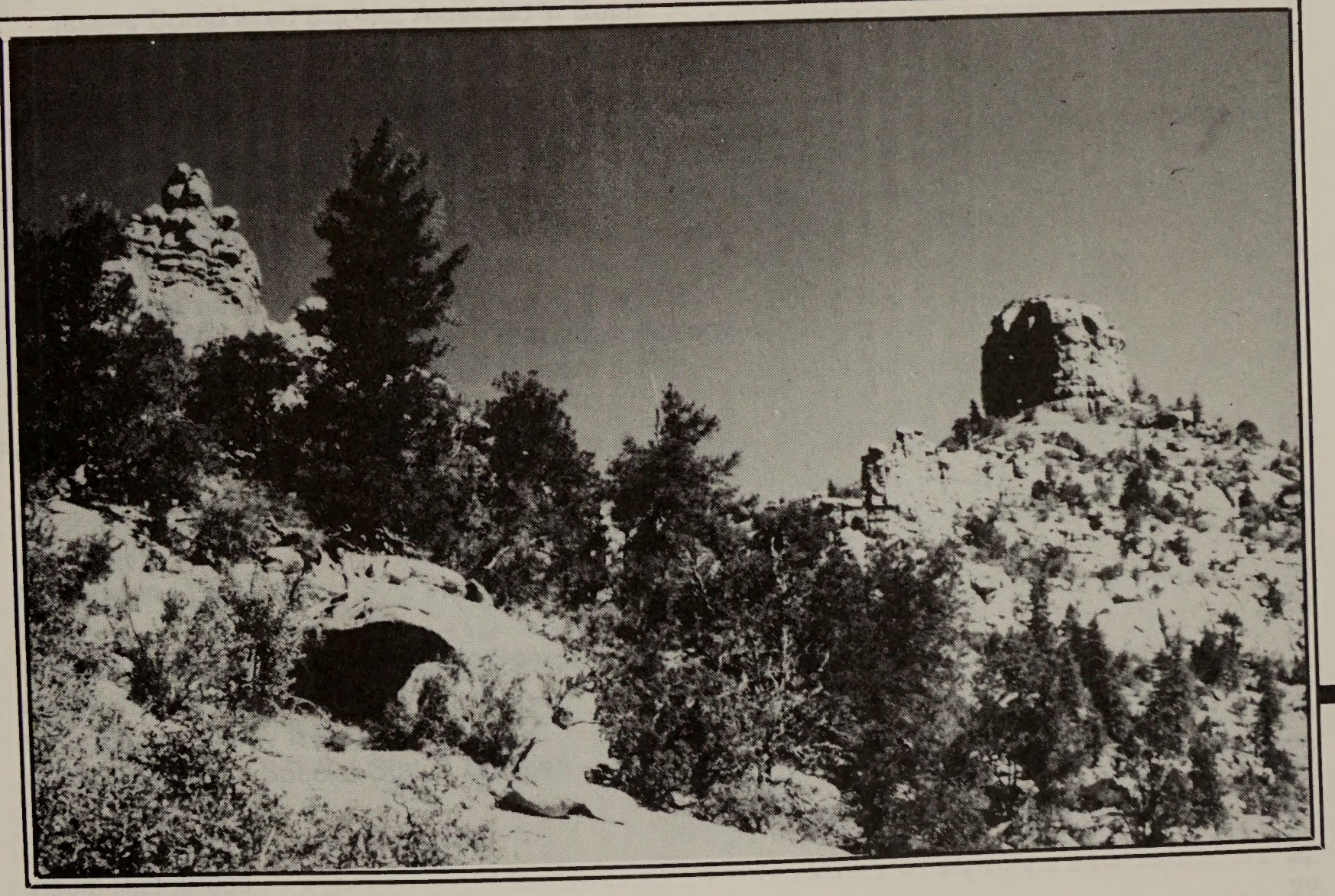
The loss of presently and potentially leased acreage could cause an eventual loss up to $62,900 to the Federal Treasury. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases could also be foregone.

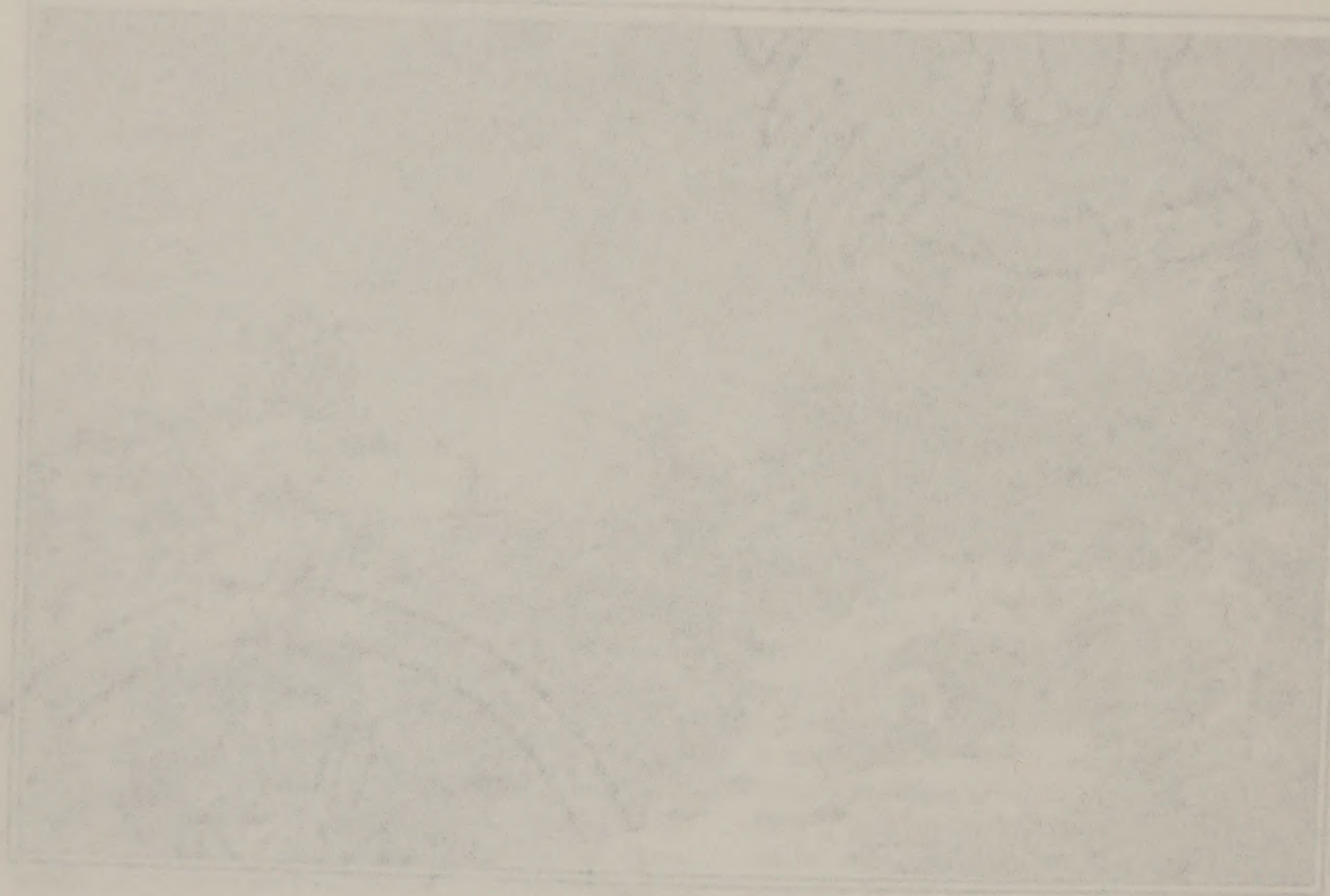
No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increase. There are presently no commercial outfitters using the WSA. However, the increased public awareness that would result from designation could lead to commercial recreational use in the WSA.

Conclusion: Present economic conditions would not be affected. Employment for iol and gas exploration and development in the WSA would be about 0.1 percent (20 jobs) of the combined projected Carbon and Emery County employment by the year 2010. Because coal and an unknown portion of the potential oil and gas in the WSA would not be developed, up to 320 fewer jobs would be provided than with the No Action/No WWilderness Alternative. Annual local sales related to recreation could contribute up to $18,040 annually by the year 2020. Livestock grazing would continue to contribute $3,380 in livestock sales and $260 in Federal revenues annually. Annual oil and gas and coal leasing fees of up to $62,900 would be foregone as would coal royalty payments of up to $4,000,000 annually for 14 years and oil and gas royalties of between $20,000 and $100,000 per well per year. The loss of oil and gas rental fees would be less than with the All Wilderness Alternative because 17 percent of the WSA, icnluding the area with the highest potential for oil and gas, would not be designated wilderness.

Floy Canyon WSA





FLOY CANYON WSA

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FLOY CANYON WSA

(UT-060-068B)

INTRODUCTION

General Description of the Area

Floy Canyon WSA is located in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs in north-central Grand County, Utah. It contains approximately 72,605 acres of BLM-administered lands. Within the WSA boundary are eight sections of State lands totaling 4,508.61 acres and one 160-acre parcel of private land. The WSA is of irregular configuration, roughly 21 miles east to west and 11 miles north to south at its widest point.

The WSA is about 4 miles north of Interstate Highway 70 (I-70) between the towns of Thompson and Green River. Green River is approximately 9 air miles away, and Thompson is approximately 3 air miles away from the WSA. Elevations range from 9,496 feet along the northern part of the WSA to 5,000 feet at the mouth of Floy Canyon in the southern part of the WSA. The WSA has a semiarid high desert climate. Average annual precipitation ranges from eight to 15 inches, and average growing season precipitation is 4 to 7 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F. Vegetation is predominantly pinyon-juniper woodland, with large areas of Douglas fir as well.

Floy Canyon is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Desolation Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 20 S., R. 17 E., secs. 19, 20, 27, 28, and 29) has been redrawn to correct an error in the Draft EIS maps. Also, T. 20 S., R. 17 E., sec. 36 is public land, not State land as indicated in the Draft EIS. These changes did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. The anticipated surface disturbance presented in the Draft EIS (2,355 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 2,355 acres reported in the Draft EIS to 1,077 acres of surface disturbance for the Final EIS.

3. The projected coal mining discussion in the Draft EIS has been eliminated in the Final EIS. It is not projected that coal mining will take place in the WSA in the foreseeable future. Consequently, the associated impacts are not discussed.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Floy Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. The surface disturbance for the WSA is projected to be 1,077 acres in the foreseeable future. Only 1.5 percent of the WSA would be disturbed and subsequent reclamation of these areas would be required. The proposed prescribed burn and seeding on 905 acres will eventually improve soil erosion and fertility. The WSA has a semi-arid climate

STATEWIDE POCKET MAP WSA NO. 68 SEE VOL.I

with an annual precipitation ranging from eight to fifteen inches which reduces the likelihood of accelerated erosion. Although the soils located on the steeper slopes are susceptible to erosion, many of the soils within the WSA are protected from excessive erosion by stony surfaces and dense vegetative cover. Also, approximately 20 percent of the WSA (14,520 acres) is rock outcrop and is not very susceptible to erosion. Watershed protection projects would be possible with any of the alternatives. Consequently, major increases in soil erosion are not likely and impacts on soils are not a significant issue for the Floy Canyon WSA.

2. Water Resources: The public is concerned that wilderness designation would interfere with development of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. There are approximately 8 miles of perennial streams and 82 undeveloped springs and four developed springs in the Floy Canyon WSA. The perennial streams originate in the WSA. Therefore, there are no potential consumptive uses of water upstream of the WSA. The only potential uses of water including the springs in the WSA are the present uses associated with recreation, livestock, and wildlife. Springs could be developed following wilderness designation if designed and installed compatibly with wilderness protection guidelines. As explained above for soils, significant increases in soil erosion that might affect water quality are not expected. Therefore, impacts on water uses and quality are not significant for the Floy Canyon WSA.

3. Forest Resources: The forest resource within the Floy Canyon WSA is considered nonproductive because of inaccessibility, rugged terrain, and slow growth of trees. Little, if any, harvest is occurring and no change is expected in the foreseeable future. Therefore, impacts on forest resources would not be significant in the Floy Canyon WSA.

4. Visual Resources: As already discussed, estimates of surface disturbance have been substantially reduced for the Final EIS. The 1,077 acres of surface disturbance projected to occur in the foreseeable future would affect only about 1.5 percent of the WSA. Disturbance would occur in A and B Scenic Class areas and in VRM Management Class II and IV areas. Impacts on visual resources are considered in the Final EIS as part of the discussion of naturalness and special features in the Wilderness Values section.

5. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles, or vandalism. However, only two cultural resource sites have been recorded in the Floy Canyon WSA. Only 172 acres of mechanical surface disturbance is projected. Visitation is light (300 visitor days per year) and is mostly nonmotorized. Terrain and surface features basically limit vehicle use to the 24 miles of way inside the WSA. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, impacts on cultural resources are not significant issues for the Floy Canyon WSA.

6. Recreation: Recreational use of Floy Canyon WSA is light, probably less than 300 visitor-use days per year. About 90 percent of this use is nonmotorized. Vehicular use is generally restricted to the 24 miles of ways and dry stream beds in canyon bottoms in the WSA. Recreational changes resulting from designation or nondesignation would not be significant due to limited use now occurring and projected to occur in the future in the WSA.

- Issues Analyzed in Detail

The significant issues for the Floy Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on oil and gas exploration and production.

4. Impacts on wildlife habitat and populations including special status species.

5. Impacts on livestock management.

6. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, visual resources, mineral values, wildlife values, cultural resources, recreation values, and socioeconomics.

FLOY CANYON WSA

See Volume VII-B, for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 68, for responses to specific comments about the Floy Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Alternatives that would add Federal and State lands on the northern, western, and southern boundaries of the WSA were suggested in the public comments. These alternatives are not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1).

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (72,605 acres); and (3) Partial Wilderness (Proposed Action) (23,140 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The assumed management actions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 72,605-acre Floy Canyon WSA would be designated by Congress as part of the NWPS. The area would continue to be managed in accordance with the Grand RMP (USDI, BLM, 1983a). The State and private lands within or adjacent to the WSA (refer to Map 1) have not been identified for special Federal acquisition through exchange or purchase; therefore, these lands are analyzed as remaining under existing State and private ownership.

- Management Conditions and Constraints

The existing oil shale withdrawal from mineral location would continue on approximately 900 acres (71,705 acres would remain open to location), while the entire 72,605 acres would remain open to leasing with standard and special lease stipulations and sale. Development work, extraction, and patenting would be allowed on four existing mining claims (about 80 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) without concern for wilderness values. Five existing post-FLPMA oil and gas leases on 11,283 acres and future leases on 61,322 acres could be developed under leasing Category 2 (standard and special stipulations) without concern for wilderness values. The special stipulations would restrict oil and gas activities during the winter to protect critical watershed and elk habitat.

The present level of domestic livestock grazing use of the 72,605-acre WSA would continue as authorized in the Grand RMP (approximately 2,825 AUMs). The existing developments (15 short drift fences, one corral, four developed springs, and two stock ponds) could be maintained in a routine manner with motorized equipment, if needed. Adjustments in season of grazing use and other livestock management techniques are planned, including production of an additional 113 AUMs of forage from a proposed 905-acre burning and seeding project in Floy Canyon and Tom Farrer Valley.

Planned in-stream drop structures would be allowed in Floy and Thompson Canyons. Future introduction of bighorn sheep would be allowed if proposed by the UDWR.

The 72,605 acres, including several traveled ways (about 24 miles), would remain open for vehicular use. New access (rights of way) in the WSA could be issued if needed for oil and gas exploration and development or other approved purposes.

The entire 72,605-acre area would continue to be potentially open to woodland product harvest.

There is no harvest of forest products at the present time, nor is any projected because inaccessibility, terrain limitations, and slow tree growth.

The area would continue to be managed under VRM Class II on 67,525 acres and Class IV on 5,080 acres.

Map 1
LAND STATUS
Floy Canyon WSA
UT-060-068B

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

FLOY CANYON WSA

T. 19 S.

T. 20 S.

R. 17 E.

R. 18 E.

R. 19 E.

- Action Scenario

Given the BLM management actions described above and the resources described in the Affected Environment, BLM projects that implementation of the No Action/No Wilderness Alternative would result in approximately 1,077 acres of surface disturbance in the foreseeable future. About 160 acres of the disturbance would result from oil and gas exploration and development within the WSA including up to 35 miles of access road. Although the actual disturbance is estimated at 160 acres, the area impacted by these activities could be larger. Nevertheless, oil and gas activities would comply with wildlife and watershed stipulations imposed upon the leases. Development would include roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. BLM's land use planning (Grand RMP) stipulates special designs on slopes of 30 percent or greater and no occupancy is allowed on slopes greater than 50 percent. It is assumed that surface disturbance associated with developed leases would remain over a long-term period of time.

Employment would average 10 employees for each exploration well drilled. An average of 3 to 6 months would be required to complete drilling operations. Each site would be reclaimed following abandonment. Producing wells would generally require only an average of two employees for periodic maintenance. It is projected that the total employment at one time would not exceed 40 jobs.

In addition to oil and gas exploration and development activities, it is assumed that up to 10 acres of surface disturbance would result from construction of 5 miles of access road to State inheld lands. These roads would be constructed for mineral exploration on State land and development purposes.

Approximately 905 acres of vegetation treatments (burning and seeding) and proposed instream drop structures, resulting in 2 acres of surface disturbance, would be completed.

The area would remain open to ORV use. No disturbance from ORV use is projected because traffic would continue to be restricted to the existing 24 miles of ways due to rough terrain.

Recreational use is expected to increase over the current estimated use of 300 visitor days per year at a rate of 2 to 7 percent annually. As much as 10 percent of the use would be motorized.

- All Wilderness Alternative

With this alternative, all 72,605 acres of the Floy Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, and provisions of BLM Wilderness Management Guidelines regarding private lands, it is assumed that State and private lands would remain under existing ownership. There are eight State sections (4,508.61 acres) and one tract of private land (160 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). There are no split-estate lands located within the WSA. The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 72,605 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the four existing mining claims (80 acres) and any new mining claims located on the area not withdrawn prior to wilderness designation that may be determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with concern for wilderness values. Five existing post-FLPMA oil and gas leases involving 11,283 acres would be phased out upon expiration unless a finding of oil or gas resources in commercial quantities is shown. New oil and gas leases would not be issued.

Present domestic livestock grazing would be allowed to continue as authorized in the Grand RMP. The estimated 2,825 AUMs in the WSA

Map 2

ALL WILDERNESS ALTERNATIVE
Floy Canyon WSA
UT-060-068B

Legend

All Wilderness Alternative (72,605 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 19 S.

T. 20 S.

R. 17 E.

R. 18 E.

R. 19 E.

FLOY CANYON WSA

would remain available to livestock as presently allotted. After designation, existing livestock facilities, as listed under the No Action/No Wilderness Alternative, could be maintained as in the past, based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that wilderness protection standards are met (refer to Appendix 1). It is assumed that the potential 905-acre vegetation treatment would not be allowed.

New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the Wilderness Act (Eighty-Eighth Congress of the U.S., 1964). Proposed in-stream drop structures in Floy and Thompson Canyons would be carried out using native materials and hand methods.

The entire 72,605-acre area would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 2920 provisions. About 24 miles of existing vehicular ways would not be available for vehicular use except as indicated above. Limited road access to the 160-acre private land in-holding would be allowed, as required. An existing road would be cherry-stemmed for about 2 miles in Floy Canyon. About 16 miles of the WSA boundary follow existing dirt roads and jeep trails that would remain open to vehicular travel.

Visual resources on 72,605 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

A total of 12 acres of surface disturbance is projected for the WSA following wilderness designation. Ten acres of surface disturbance would occur as a result of up to 5 miles of access road construction to in-held State lands for mineral development purposes. An additional 2 acres of temporary surface disturbance would result from installation of in stream drop structures in Floy and Thompson Canyons. The planned 905 acres of vegetation treatments would not be allowed. No additional rangeland, wildlife habitat, watershed projects, or other developments are projected following wilderness designation.

No mineral resource exploration or development is projected from existing leasing or mining claims in the WSA. Implementation of the All Wilderness Alternative would preclude new mineral location and mineral leasing. Therefore, no exploration or development of locatable or leasable minerals, including coal, is projected following wilderness designation.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain.

Primitive recreational use is expected to increase over the current estimated recreation use of 300 visitor days per year at a rate of 2 to 7 percent annually. Motorized use (currently 30 visitor days) would be eliminated. Initially, recreational use may decrease slightly because motorized use would be precluded, but motorized recreation visitor days would be quickly converted to primitive recreation visitor days.

- Partial Wilderness Alternative (Proposed Action)

With this alternative, 23,140 acres of the Floy Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that would minimize or avoid areas of greatest oil and gas development potential. The area analyzed as wilderness includes the northern one-third of the WSA. The southern portion, comprising about 68 percent (49,465 acres) of the area within the WSA but outside of that designated as wilderness, would be managed in accordance with the Grand RMP, as described for the No Action/No Wilderness Alternative. The 23,140-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described for the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is projected that State lands would remain under existing ownership. There are four State sections (2,468.4 acres) within the Partial

Map 3
PARTIAL
WILDERNESS ALTERNATIVE

Floy Canyon WSA
UT-060-068B

Legend

WSA Boundary

Partial Wilderness Alternative (23,140 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 19 S.

T. 20 S.

R. 17 E.

R. 18 E.

R. 19 E.

FLOY CANYON WSA

8

Wilderness Alternative (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given with this alternative are for Federal lands only. No private or split-estate lands are located within the Partial Wilderness Alternative.

- Management Conditions and Constraints

The 23,140-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on any mining claims prior to wilderness designation, provided that they are valid. Two existing post-FLPMA oil and gas leases that cover 6,113 acres would be phased out upon expiration unless a find in commercial quantities of oil or gas is shown. The 49,465-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of four existing mining claims (80 acres) and future mining claims could occur without wilderness consideration. The area not designated wilderness would be managed as oil and gas leasing Category 2 (standard and special stipulations) on the entire 49,465 acres.

Domestic livestock grazing would continue to occur in the 23,140-acre wilderness area. The estimated 890 AUMs in the 23,140-acre area would remain available to livestock as presently allotted, and the existing livestock facilities in the area (drift fences and three developed springs) could be maintained, based on necessity and reasonableness. No new livestock developments other than the potential burning project are planned. It is projected that about 77 percent (700 acres) of the 905-acre vegetation treatments would not be allowed. In the 49,465-acre nonwilderness area, grazing use would continue (currently estimated at 1,935 AUMs) and existing developments (drift fences, two reservoirs, one corral, and one spring) could be maintained as at present. About 23 percent (205 acres) of the projected 905-acre vegetation treatment would be allowed.

In the 23,140-acre wilderness, new water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed only if enhancing to wilderness, if necessary to correct conditions imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the Wilderness Act. In-stream drop structures would be allowed in the wilderness area if carried out using native materials and by hand methods. In the remaining 49,465-acre area, water resource facilities would be allowed without concern for wilderness values if in accordance with the RMP. In-stream drop structures would be allowed in this area.

The entire 23,140-acre wilderness would be closed to ORV use. About 11 miles of existing vehicular ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the unit, including about 13 miles of ways, would remain open to vehicular travel. About 6 miles of dirt roads and jeep trails that border the land in the partial wilderness area would remain open to vehicles. The existing 2 miles of road in Floy Canyon would be in the nondesignated part of the WSA and, therefore, would not be cherry-stemmed.

Visual resources in the 23,140-acre wilderness would be managed in accordance with VRM Class I standards. The nondesignated area would be managed as Class II on 44,385 acres and Class IV on 5,080 acres.

- Action Scenario

Given the BLM management actions described above and the resources described in the Affected Environment, BLM anticipates 4 acres of surface disturbance to occur on the designated portion of public lands with this alternative. Three acres of disturbance would be associated with allowing one mile of access road construction to State lands as discussed in the All Wilderness Alternative. One acre of surface disturbance would result from construction of in-stream drop structures. The designated portion would be managed as described in the All Wilderness Alternative.

In the nondesignated portion of the WSA approximately 313 acres of surface disturbance is projected to occur in the foreseeable future. Approximately 100 acres of disturbance would be associated with oil and gas exploration and development on public land, 7 acres would be associated with allowing access to State lands for oil and gas exploration and development, 1 acre for construction of in-stream drop structures, and the remaining 205 acres would be due to the vegetation

treatments (burning and seeding). Approximately 20 miles of access road construction is projected. No other surface disturbance is anticipated in the foreseeable future. The nondesignated portion would be managed as described in the No Action/ No Wilderness Alternative.

No disturbance from ORV use is projected because of wilderness restrictions and rough terrain.

Recreational use is expected to increase over the current estimated use of 300 visitor days per year at a rate of 2 to 7 percent annually. Initially, recreational use would decrease slightly because vehicular access on 11 miles of ways would be precluded.

Summary of Environmental Consequences

Table 1 summarizes environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

At 72,605 acres, the WSA is of sufficient size to meet the wilderness study criterion for size. The WSA is of irregular configuration and is roughly 21 miles east to west and 11 miles north to south.

Floy Canyon is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Desolation Canyon, Coal Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness status.

- Naturalness

Imprints of human activity in the WSA are associated with mineral exploration, ranching activities, and recreation. The pattern of imprints is limited to accessible areas. Such areas are the lower terrain above the Book Cliffs face in the south and within the canyon bottoms crossing the unit. Although imprints do exist, they are substantially unnoticeable in the area as a whole and the entire WSA is considered to meet the wilderness standards of naturalness.

Human imprints in the WSA include the following: (1) a post-FLPMA rehabilitated vehicle way approximately 2.5 miles in length in the Dry Fork of Floy Canyon; (2) a pre-FLPMA vehicle way approximately 6 miles long in Floy Canyon; (3) five abandoned pre-FLPMA coal mines covering about 5 acres each; (4) an abandoned pre-FLPMA uranium mine covering about 5 acres near Cub Spring in Horse Canyon; (5) an abandoned pre-FLPMA jeep trail system covering approximately 10 miles in the Tom Farrer Valley and Showerbath Spring area; (6) a pre-FLPMA corral and spring located in Floy Canyon; (7) a pre-FLPMA corral and evidence of early logging activities in Thompson Canyon; (8) a pre-FLPMA log cabin located in Right Hand Thompson Canyon; (9) a pre-FLPMA log cabin located in Sego Canyon; (10) a pre-FLPMA vehicle way covering approximately 5 miles in Thompson Canyon; (11) evidence of an old road leading to a coal mine on private property exists within Coal Canyon; (12) a recently rehabilitated pre-FLPMA oil and gas lease drill site; (13) approximately 9 miles of the northwestern boundary road in Right Hand Tusher Canyon; (14) a developed spring including a trough, barrel, and pipe works in Tom Farrer Valley; (15) a developed spring consisting of a 1.5-inch diameter rubber hose and a cement trough in Showerbath Canyon; (16) a 2-mile long cherry-stemmed road in Floy Canyon located in the canyon bottom from the WSA's boundary to the intersection of Dry Fork and Floy Canyon; (17) a developed but primitive spring at the mouth of Horse Canyon; (18) two stockponds; and (19) approximately 15 drift fences.

Since establishment of the WSA, less than 5 acres of the WSA have been disturbed. This disturbance is the result of: (1) helicopter seismic work in Floy Canyon during September 1984. Each seismic charge along a 4-mile stretch of way in Floy Canyon impacted approximately a 3-foot radius circular area, and (2) approximately 2.5 miles of road access in Dry Fork Canyon was constructed on public land to gain access to in-held State lands to conduct drilling operations.

FLOY CANYON WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (72,605 Acres)	Partial Wilderness (23,140 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 1,077 acres because of vegetation treatments oil and gas exploration and development construction of access to in-held State lands, and watershed treatments. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 10,890 acres of the WSA. Special features would generally not be significantly affected. Some Class A scenery would be reduced in quality in disturbed and surrounding areas and some wilderness dependent wildlife species would leave the area during the period of disturbance. Vehicular use of 24 miles of ways and new roads would occasionally detract from opportunities for solitude and primitive recreation.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 12 acres and indirectly reduced in quality on up to an additional 726 acres because of construction of access to in-held State lands. Special features would be preserved.	Wilderness values would be preserved overall in the designated area which is approximately 32 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 317 acres because of mineral exploration and development, construction of access roads to in-held State lands, and instream structures. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 3,630 acres. Almost all of the impact would be in the nondesignated area. Special features would not be significantly affected. Some Class A scenery would be reduced in quality in the disturbed and adjacent areas and some wilderness dependent species would temporarily leave the area. Use of 13 miles of vehicular ways and new roads in the nondesignated portion would detract from opportunities for solitude and primitive recreation.
Impacts on Vegetation	Approximately 1.5 percent (1,077 acres) of the vegetation in the WSA would be modified by this alternative. The Category 2 candidate species that may be located in the WSA would not be significantly affected because protective measures would be required.	Vegetation types and special status plant species would be protected because potential surface disturbance would be reduced from 1,077 acres to 12 acres and the area would be closed to ORV use.	Vegetation types and special status plant species would not be significantly impacted with this alternative because the potential for major disturbance would be eliminated on 32 percent of the WSA and protective measures would be required on the remainder of the area.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (72,605 Acres)	Partial Wilderness (23,140 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims and mineral developments could occur without restriction for the protection of wilderness values.	Recovery of 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of natural gas would be foregone. Loss of potential for recovery of other minerals would not be significant because the probability of development is low even if the area is not designated wilderness.	Partial wilderness designation would preclude or constrain potential exploration and development of an unknown portion of the 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of natural gas may occur in the WSA. Loss of exploration and development opportunities for other mineral and energy resources would not be significant because the probability of development is low even if a portion of the WSA is not designated wilderness.
Impacts on Wildlife Habitat and Populations	Implementation of the land treatment opportunity would benefit some wildlife species and population levels by providing additional forage and ecotones. Surface disturbance on 2 percent of the habitat in the WSA may displace some wildlife species during the lifetime of the projects. Special status species would not be significantly adversely affected because protective measures and mitigation would be required. Ferruginous hawks would benefit from habitat improvement.	Wilderness designation would preclude the proposed land treatment project which would have benefitted some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Special status species would be protected.	Wildlife would benefit from a reduced acreage of surface disturbance when compared to the No Action/ No Wilderness Alternative. Only 0.4 percent of the habitat in the WSA would be disturbed. Approximately 205 acres of vegetation treatment would be allowed in the nondesignated portion, which would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 49,465 acres not designated. Special status species would not be significantly affected because protective measures and mitigation would be required.
Impacts on Livestock Management	With this alternative, there would be no changes in livestock use or management techniques. Surface disturbances resulting from mineral exploration and development would not significantly impact grazing, since forage is currently underused in the WSA. The proposed 905-acre burning and seeding project could be completed to provide an additional 113 AUMs of livestock forage.	No change in livestock authorization would occur with this alternative. Restrictions on the use of 24 miles of ways and predator control would be an inconvenience and would result in increased costs of livestock management for nine livestock permittees. The proposed 905-acre burning and seeding that would produce 113 AUMs would not be allowed.	Restrictions on vehicle use on 11 miles of ways and predator control would be an inconvenience to the three permittees that operate the Showerbath Springs, Floy Canyon, and Thompson Canyon allotments. The cost of livestock management could increase slightly. Approximately 700 acres of vegetation treatment that would produce about 87 AUMs would not occur.

FLOY CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (72,605 Acres)	Partial Wilderness (23,140 Acres) (Proposed Action)
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $10,701 annually to the local economy by the year 2020. The WSA could contribute up to $58,760 annually in local livestock sales and $4,525 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $145,210 to over $100,000 per year in Federal and State revenues. Federal revenues from commercial recreation outfitting (currently $160 annually) would continue.	Present economic conditions would not be affected. The potential for 40 jobs, 1 percent of the projected Grand County employment in the year 2010, would be foregone. Recreation-related local sales could contribute up to $10,701 annually to the local economy by the year 2020. Annual local sales and Federal revenues related to livestock grazing could be reduced by $2,260 and $174 respectively because the proposed vegetion treatment would not be possible. Annual Federal and State revenues from oil and gas leasing fees and royalty payments could be reduced by $145,210 to over $100,000 as compared to the No Action/No Wilderness Alternative. Federal revenues from commercial recreation outfitting would probably increase if the area received recognition from designation.	Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1 percent (40 jobs) by the year 2010, but the duration of the increase would be shorter than with the No Action/No Wilderness Alternative because development would not occur on 32 percent of the WSA. Recreation-related local sales could contribute up to $10,701 annually to the local economy by the year 2020. Annual local sales and Federal revenuesrelated to livestock grazing could be reduced by $1,740 and $174 respectively because only a portion of the proposed vegetation treatment would be possible. Annual Federal and State revenues from potential oil and gas leasing fees could be reduced by $46,380 as compared to the No Action/No Wilderness Alternative. Annual royalty payments on oil and gas production would not be reduced, but total royalties from the oil and gas field would be reduced because development and production would be foregone on 32 percent of the WSA. Federal revenues from commercial recreation outfitting would probably increase if the area receives recognition from wilderness designation.

FLOY CANYON WSA

Drilling began in December 1981; the well was abandoned in 1982; and the road reclamation work was completed during 1983. Because these areas have been reclaimed to a substantially unnoticeable condition, the entire WSA meets the Wilderness Act Criteria for naturalness.

- Solitude

The size, configuration, and topographic characteristics of the WSA enhance opportunities for solitude. Canyons ranging from 500 to 3,000 feet deep are separated by ridges and peaks in the north and benches or plateaus in the south.

The Floy Canyon WSA contains over 50 miles of canyon bottom. The bottoms vary considerably in width from about 10 feet to 0.50 mile. Lines of sight along the bottoms rarely exceed 0.50 mile and are usually considerably less. Canyons in the north half of the unit become more V-shaped from south to north. Canyons in the south and west are more distinctly terraced with vertical walls separating talus slopes. The vertical walls range from 100 to 1,000 feet. Topography by itself, in most of the unit, provides outstanding opportunities for solitude due to screening.

In about 75 percent (54,450 acres) of the WSA (mostly in the north), vegetation augments solitude opportunities by providing additional screening. Significant cover created by large trees and large shrub species is present within the canyons and on the ridges, especially on northern exposures and in higher elevations. The canopy of trees in the pinyon-juniper/Douglas fir type creates closed or nearly closed areas. The tree canopy in Douglas fir, Ponderosa pine, Gambel's oak, and aspen types is closed. While tree canopy is more open in the pinyon-juniper type, it combines with large brush species to provide fairly continuous cover. The remaining 25 percent (18,155 acres) of the WSA (lower south and southwest) is dominated by sheer-faced cliffs, rock outcrop, and smaller shrub species.

Roads and traveled ways negatively affect opportunities for solitude when vehicular use on them occurs. The majority of use along the travel routes occurs in the fall. Vegetation along the travel routes is sagebrush and Gambel's oak. Average height of these species is 5 feet. The ability to find seclusion is possible because of the side slopes and thick tree cover. Sights and sounds of vehicular traffic within the unit is limited to immediate exposure or when viewed from higher elevation points.

A road between Coal Canyon and the Right Hand Tusher makes up the southwestern boundary of the WSA. Travel along this route is also associated with recreation and ranching. Opportunities for solitude in some points adjacent to this road, where the road runs within 0.50 mile of a talus slope and steep sheer-faced cliff to the north, is less than outstanding due to limited distance. In other portions between the road and cliff or plateau top, the rugged topography of huge boulders and long fingered ridges allows for seclusion.

The ridge tops and high benches of the WSA offer extensive overlooks of the rugged terrain and impressive vertical relief within the area. Views can be seen of mountain ranges outside the WSA to the south, northwest, and west, 50 to 100 miles away. The San Rafael Reef, a prominent feature to the west, can be seen from many points in the WSA. Expansive views enhance the feeling of solitude within the WSA.

The deeply incised, branching drainages within the WSA allow dispersion of recreational use and provide for outstanding solitude. In all, approximately 95 percent (68,975 acres) of the WSA meets the requirements for outstanding opportunities for solitude. The remaining areas that do not meet the standard, lack the vegetation and topographic screening necessary to eliminate outside sights and sounds.

- Primitive and Unconfined Recreation

The WSA's extensive canyon systems, ridges, abundant springs, wildlife trails, and old travel routes provide outstanding opportunities for a variety of primitive and unconfined recreational activities. Hiking, backpacking, horseback riding, winter sports, hunting, wildlife observation, sightseeing, and photography are some of the opportunities available.

Foot trails largely comprised of old mining and game routes suitable for hiking and horsepacking exist within all of the unit's canyon drainages. Included are routes from the west side of Ute Canyon to Tom Farrer Valley into Cub Valley or Horse Canyon, and from the east side of Ute Canyon into Showerbath Canyon. Possible routes exist from Showerbath Canyon to Floy Canyon, and from Floy Canyon to Thompson Canyon, Renegade Canyon or the Right Hand of Thompson Canyon. Springs can be found in the mouth of Horse Canyon, the upper part of Middle Horse and Crescent Canyons, and in Floy, Dry Fork, Left and Right Hand Threeforks, Thompson, Right Hand Thompson, Renegade, Showerbath, Ute, Right Hand Tusher,

and Sego Canyons. These springs are a good source of drinking water for recreationists in the area.

The western and southern areas of the WSA are comprised of plateaus and ridges with steep-faced cliffs. Route finding is difficult and challenging. Water is limited outside of canyon drainages. Old mining routes in several canyons in the south part of the WSA add access to the higher plateaus.

Hunting opportunities for both big and small game are unique in the Book Cliffs. Black bear, mountain lion, deer, elk, rabbit, and chukar hunting opportunities are excellent. The area has limited vehicular access and most hunting is done on foot or horseback.

From the south to the north, interesting colors and rock formations are present, adding interesting scenic quality to the unit. Along the southern portion, the sheer-walled character of the plateau's face is interrupted by a collapsed area where a field of hoo-doos appear. Tall pedestals of less resistant soils hold the huge rock slabs of a more resistant nature. A finely carved barrel-shaped chute also exists within the drainage's route. Several other places in the unit's southern half expose such character. The northern terrain is a colorful mix of interesting pinnacles and rock figures. Outstanding sightseeing and photography values are provided by these features. Waterfalls and a mix of vegetation add interest to the winding canyon bottoms, especially in the north portion of the unit.

The many drainages and the dissected terrain provide hundreds of potential hiking routes up canyon bottoms and along ridge tops. Opportunities for hiking, backpacking, and hunting are considered outstanding throughout the WSA.

In conclusion, the entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

- Special Features

The WSA contains supplemental scenic, geologic, and cultural values. The northern part of the WSA, notably Sego Canyon, Thompson Canyon (and its associated canyons), Floy Canyon (and its associated canyons), Showerbath Canyon, Ute Canyon, and the head of Horse Canyon (and its associated canyons) contain scenic areas. Rock outcroppings, pinnacles and chimneys, soil colors, dense and varied mixtures of vegetation, and waterfalls and stream systems enhance the visual character of the area.

Even in the southern portions of the unit there are unusual formations such as rock pedestals and dramatic and textured cliff faces. An unusual strata exposed in the northern portions of the WSA along the Book Cliffs is the conglomerate Wasatch Formation. The dark-brown cobblestone layer, ranging from 5 to 20 feet thick, is related to discontinuous and ancient stream channeling.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are three animal species (black-footed ferret, peregrine falcon and bald eagle) listed as endangered that may occur in the WSA. There are six other animal species and one plant species that are considered special status species that may occur in the WSA. The WSA has populations of cougar, elk, and black bear which are wildlife species associated with wilderness. Also, Rocky Mountain bighorn sheep may occasionally enter the WSA (refer to the Vegetation and Wildlife Including Special Status Species sections for additional information). Approximately 93 percent (67,525 acres) of the WSA is rated Class A for scenic quality. The WSA has approximately 8 miles of perennial streams.

Cultural values, such as historic log cabins and related trails, exist within the unit. Outside and adjacent to the southern boundary, there are several homesteads and ancient Indian writings exist.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland, mountain mahogany-oak scrub, Douglas fir forest, and saltbush-greasewood. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Affected Environment, Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

FLOY CANYON WSA

Air Quality

The WSA has a PSD Class II air quality classification, as per the 1977 Clean Air Act amendments. The nearest Class I area is Arches National Park, about 12 air miles southeast. Canyonlands National Park, another Class I area, is about 40 air miles to the south. No significant sources of air pollution are close enough to affect the WSA. Visibility from higher elevations of the WSA averages 30 to 100 miles and is important because of scenic vistas from the WSA across the Book Cliffs.

Geology and Topography

The Floy Canyon WSA is in the Book Cliffs, a physiographic feature which runs from east of Grand Junction, Colorado, to northwest of Green River, Utah. It is part of the Uinta Basin section of the Colorado Plateau Physiographic Province. Floy Canyon WSA is entirely in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by many drainages.

Surface exposures in the area consist of sedimentary rocks of Cretaceous and Tertiary Age. Along the southeastern side of the WSA the Mancos Shale and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River formations. In the northwestern part of the WSA, the oil-shale rich Parachute Creek Member of the Green River Formation crops out in an irregular band (specifically, the Mahogany oil-shale bed). All strata in the vicinity of the WSA dip gently northward to the Uinta Basin.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Cedar Mountain, Entrada, and Navajo. The Morrison and Chinle formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth, but indications are that ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation. Important vertebrate fossils may be found within the Chinle, Morrison, Cedar Mountain, and Green River formations.

Differential erosion of the layers of sandstones and shales has created the distinctive "banded" appearance characteristic of the Book Cliffs. In the higher elevations towards the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Elevations range from 9,496 feet along the northern part of the WSA to 5,000 feet at the mouth of Floy Canyon in the southern end of the WSA. The 400-foot-high face of the lower Book Cliffs, visible for miles from I-70, occurs just south of the WSA. The 1,000-foot cliff of the upper Book Cliff escarpment forms the southern boundary of the WSA.

Soils

Refer to Table 2 for soil characteristics and land types and Table 3 for erosion conditions in the WSA.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	20	14,521	0.0	0
Shallow and deep loamy soils on sloping cuestas and structural benches	10	7,261	1.0	5
Shallow and deep stony soils on steep canyon sides	20	14,521	1.0	10
Moderately deep and deep loamy soils on steep mountainsides	30	21,781	1.0	20
Deep loamy soils and gently sloping alluvial fans and floodplains	20	14,521	0.1	1
Totals	100	72,605		

Source: Hansen, 1985.

The Floy Canyon WSA is characterized by steep canyons. About 30 percent (21,781 acres) of the area is composed of moderately deep and deep loamy soils on steep canyon sides and mountain sides. About 20 percent (14,521 acres) is composed of shallow and deep stony soils on steep canyon sides. About 20 percent (14,521 acres) is deep loamy soils on gently sloping alluvial fans and along drainages and canyon floors. About 10 percent (7,261 acres) are shallow loamy

FLOY CANYON WSA

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	30	21,781	435,620
High	10.0	-	-	-	20	14,521	145,210
Medium	5.0	-	-	-	10	7,261	36,305
Low	1.0	60	43,563	43,563	20	14,521	14,521
Very Low	0.1	20	14,521	1,452	-	-	-
None	0.0	20	14,521	-	20	14,521	-
Totals		100	72,605	45,015[a]	100	72,605	631,656[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.62 under present conditions; 8.70 if disturbed).

soils on sloping benches. About 20 percent (14,521 acres) of the area is composed of rock outcrop occurring as cliffs and ledges. Under present conditions, average soil loss from erosion is estimated at about 0.62 cubic yard per acre per year. Total annual soil loss for the entire WSA is approximately 45,015 cubic yards.

No agricultural activity takes place within the WSA. There are fields that have been farmed just outside the WSA in Thompson Canyon and producing farm fields within 2 miles of the western boundary (along the Green River). The great majority of the WSA is too steep and rocky to be farmed. Possibilities for agricultural development in the canyons are severely limited due to elevation, erodibility of soils, and potential for flash floods.

Soil salinity class estimates indicate that the area is 60 percent strongly saline and 40 percent slightly saline. Soils produce an average of 97 lbs of salt per acre per year. The seeding suitability is estimated to be fair on approximately 20 percent of the WSA which has deep loamy soils on gentle slopes. The remaining 80 percent are classed as unsuitable for seeding due to shallow stony soils, abundant rock outcrop, and steep slopes.

Vegetation Including Special Status Species

Existing vegetation is predominantly pinyon-juniper woodland of varying density. The WSA is very broken topographically with many ridgelines showing different vegetation aspects on either side due to directional exposure (e.g., north-facing, south-facing, etc.).

Table 4 lists the existing vegetation types within the WSA. In the upper elevations, mountain shrub vegetation types are found. High desert plant communities occupy the lower elevations. Major plant species found throughout the WSA include Douglas fir, aspen, western wheatgrass, Gambel's oak, mountain mahogany, big sagebrush, serviceberry, pinyon pine, Utah juniper, salina wildrye, galleta grass, and shadscale. Cottonwood and willow dominated riparian areas are associated with the WSA's springs and intermittent and perennial streams. Intermixed with the vegetation types listed in Table 4, riparian vegetation occurs in less than 5 percent of the WSA.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir	26,495	37
Pinyon-juniper woodland	30,080	41
Grassland	9,4400	13
Shadscale	6,590	9
Total	72,605	100

Source: USDI, BLM, 1983a

There are no known threatened or endangered plant species within the WSA. One Category 2 candidate species, Physaria acutifolia var. purpurea, may occur in the WSA (see Appendix 4 in Volume I). This species generally grows in pinyon-juniper, sagebrush, ponderosa pine, Douglas fir and limber communities between 7,000 and 9,500 feet in elevation (Welsh, et al., 1987)

FLOY CANYON WSA

The WSA is located in the Colorado Plateau Physiographic Province Ecoregion as shown on the Bailey Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA are listed on Table 5.

Table 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Douglas fir forest	7,680	11
Mt. Mahogany-oak scrub	18,480	25
Juniper-pinyon woodland	44,525	61
Saltbush-greasewood	1,920	3
Total	72,605	100

Source: USDI, USGS, 1978.

Water Resources

The Floy Canyon WSA is a subbasin in the Green River drainage which is in the Upper Colorado River hydrologic subregion. The major drainages in the WSA are Tusher, Coal, Horse, Floy, Dry, Crescent, Thompson, and Sego Canyons. All drainages flow in a southerly to southwesterly direction out of the Book Cliffs to the Green River. Tusher Canyon borders the northwest boundary of the WSA and Sego Canyon borders the WSA boundary on the east. Floy Wash is the only perennial water course (approximately 8 miles) in the WSA; all others are intermittent. Floy Wash headwaters are located on the west side of the drainage divide of the Green and Colorado Rivers in the northeast corner of the WSA.

A water inventory of the WSA has revealed four developed springs and 82 undeveloped springs. There are no water wells in the WSA.

The WSA is within Water Right Adjudication area 92. The water within the area is not fully appropriated. Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed time applications may exceed 0.015 cfs in this area (UDNRE, DWR, 1988).

Since the waters from this WSA drain into the Green River, the water quality standard for it applies to Floy Wash. The water quality standards for the Green River and tributaries, from the confluence with the Colorado River to state line are as follows: Class 1C (protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health); Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3B (protected for warm water species of game fish and other warm water aquatic life), and Class 4 (protected for agricultural uses, including irrigation or crops and stock watering).

Since the highly saline Mancos Shale is exposed only in the lower reaches of the WSA, surface water quality, for the most part, is acceptable for recreation, wildlife, livestock, and agricultural uses.

Three of the major drainages in the WSA (i.e., Floy, Dry, and Thompson) have been identified as areas damaged by floods and contribute to sediment damage. These areas have been identified for potential watershed treatments (in-stream drop structures) to minimize downstream damage.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Floy Canyon WSA is given in Table 6. Appendix 5 in Volume I explains the mineral and energy resource rating system.

Table 6
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 3	c3	10 to 50 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Oil Shale	f 2	c4	Small tonnage with less than 15 barrels of shale oil/tons of shale
Coal	f 3	c4	143 million metric tons
Uranium/Vanadium	f 2	c2	Less than 500 metric tons of uranium oxide

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

The WSA could contain deposits of vanadium that is currently listed as a strategic and critical material (USDoD, 1988).

- Leasable Minerals

There are no active drilling, mining, or exploration activities for leasable minerals inside the WSA.

• Oil and Gas

The WSA is along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small to moderate sized shallow fields producing from the Jurassic, Entrada and Morrison Formations, and the Cretaceous Cedar Mountain and Dakota formations. Numerous fields, some shut-in or abandoned, occur in an area surrounding the WSA. Approximately seven holes have been drilled for oil and gas exploration within 3 miles of the WSA. One gas producer occurs on the boundary of the WSA and five dry holes have been drilled on or near the WSA boundary.

Leasing and drilling activity in the vicinity of the WSA has been high. Some of the fields on the perimeter of the WSA include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields in the vicinity of the WSA are located 10 to 15 miles to the northeast. San Arroyo, the largest, has produced more than 89 billion cubic feet of gas. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 billion cubic feet of gas). Small structural traps are responsible for the production. The nearest oil and gas field is Blaze Canyon located a few miles to the south of the WSA. The estimated recoverable oil from Blaze Canyon is about 100,000 barrels (SAI, 1982).

A structural lineament has been identified east of the WSA running on a northwest-southeast trend. This has been identified as an area of high oil and gas potential in Paleozoic rocks resulting from an ancient Uncompahgre fault zone. It is believed that the region south of this fault has the best potential for a large oil and gas discovery. This fault runs through the WSA.

Although the WSA was initially rated as f2 in favorability for oil and gas, the SAI noted that assignment of a favorability rating is difficult. After further review by BLM geologists, the area has been rated as f3 favorability. The f3 rating indicates that between 10 to 50 million barrels of oil or 60 to 300 billion cubic feet of gas may be recoverable.

The Floy Canyon WSA is given a moderate certainty rating, c3, that oil and gas resources exist (SAI, 1982). The rating is a result of the proximity of other fields to the WSA. Several such fields occur in a concave, west-facing area about 10 miles east of the WSA.

The area of the WSA was included in the "Moab District Oil and Gas Environmental Analysis Report" (USDI, BLM, 1975b), which established oil and gas leasing categories to protect certain resource values. With this category system, all of the WSA was classified as open with standard stipulations (Category 1). However, in the Grand RMP the category was changed to Category 2 (standard and special stipulations) with special stipulations restricting winter activity to protect critical watershed and elk habitat.

There are presently five post-FLPMA oil and gas leases in the WSA, covering 11,283 acres.

• Oil Shale

The WSA has potential for oil shale (SAI, 1982). This is because oil shale is present in the Mahogany zone of the Parachute Creek Member of the Green River Formation. This unit extends into the northern part of the WSA. The Mahogany zone has been under development for shale oil production in the Grand Junction, Colorado, area, but extraction appears economically questionable at this time. The WSA has a low favorability of f2 and high certainty of c4 for oil shale (SAI, 1982). The rating indicates a potential for thin beds of oil shale, with a yield of less than 15 gallons of oil per ton of shale. However, upon BLM field examination, it was determined that oil shale is only present in small amounts beneath the steep, north-south trending ridges of the northernmost portion of the WSA (No oil shale production is anticipated in the foreseeable future; therefore, no impact analyses will be discussed for oil shale production in the Final EIS). About 900 acres of the WSA are under an oil shale withdrawal.

• Coal

Almost all of the WSA is within the Sego coal field (SAI, 1982). The coal is present in several discrete strata in the Cretaceous Mesa Verde Group. Reserves for the entire Sego field in beds 4 feet thick and greater total an estimated 294 million tons, or less than 5 percent of Utah's total coal. Active coal mining began in 1912 and the last activity was in the early 1950s in the

Sego field. Most of the 2.7 million tons of coal produced came from the Ballard Mine near Thompson and Sego Canyons located southeast of the WSA. Coal in the Thompson area is reported to be high volatile bituminous with over 11,000 British thermal units (BTUs) per pound. Hundreds of coal sections have been measured in and around the WSA. Gross coal seam thickness thus measured range from less than 1 foot to 8 feet shale splits and bony coal zones are common. Many of the individual coal beds thin rapidly over short distances. Individual coal beds are lenticular, generally less than 5 feet thick and degraded by partings and splits of shale (USDI, USBM, 1988). Most of the coal reserves attributed to the Sego field are located along the southeast side of the WSA (SAI, 1982).

A KRCRA of approximately 25,540 acres has been identified within the southern portion of the WSA. Renewed interest in development of coal resources present in Thompson Canyon (private land) has recently been expressed by two companies. The coal resource has not been made available for leasing; therefore, there are no coal leases within the WSA. The potential for the coal to be developed in the foreseeable future is questionable due to its varying quality with better, more accessible coal found in the vicinity but outside of the WSA.

The rating of f3 favorability with a high certainty of c4 for coal indicates that an estimated 143 million metric tons could exist within the area (SAI, 1982). Of this, up to 71 million tons might be considered recoverable.

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA. There are presently four mining claims that cover approximately 80 acres. The 900 acres in the WSA under oil shale withdrawal are closed to mining claim location.

- Uranium

The favorability for uranium in the WSA is rated f2 with a low certainty (C2) of its occurrence (SAI, 1982). The WSA has potential for less than 500 metric tons of uranium oxide mill concentrate in a geologic environment only marginally favorable for the resource to occur. The certainty of uranium occurrence is based on the scattered occurrences in nearby areas. The nearest uranium deposits are about 10 miles south along an outcrop of the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, another major uranium-producing zone regionally, lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. There are no uranium claims in the WSA.

- Gold

Although gold may be present in microscopic amounts in a few places in the WSA, gold was not rated by SAI. Four placer mining claims covering 640 acres are present in the WSA. None of the claims have been mined.

- Salable Minerals

The only possible salable minerals in the WSA are building stone, and sand and gravel. Potential markets are very small and there are available sources of supply closer than those found in this WSA. No interest has been expressed in the development of salable minerals in the WSA and none is anticipated in the future.

Wildlife Including Special Status Species

The Floy Canyon WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, cougar, coyote, bobcat, blue grouse, ruffed grouse, chukar, and numerous species of raptors, songbirds, small mammals, reptiles, and amphibians can be found throughout the area.

The major habitat types of the WSA include pinyon-juniper woodland and steep hillsides, Douglas fir hillsides, mountain brush hillsides, sagebrush, and aspen parks, aspen, willow, and cottonwood riparian bottoms, and associated intermittent streams.

The Floy Canyon WSA supports moderate to high populations of big game species. Mule deer are the most common species. Deer can be found in the area yearround, mostly in the riparian areas and high sagebrush parks. Elk can also be found yearlong in the high sagebrush parks and aspen communities. There are approximately 80 elk in the WSA. The elk move freely between the Uintah-Ouray Indian Reservation and the WSA. Black bear and cougar are yearlong

residents. Rocky Mountain bighorn sheep occasionally may drift into the WSA. Approximately 1,000 acres of the WSA have been identified as crucial winter habitat for deer and elk.

Mourning doves are common in the WSA during the summer-fall period. Nesting is common in sagebrush communities and pinyon-juniper woodlands. Chukar partridge (an exotic species) may be found year-round along canyon bottoms where rocky slopes, water, and cheatgrass are abundant. Grouse are also found year-round in the WSA. Blue grouse and ruffed grouse can be found at the higher elevations in the Douglas fir and aspen habitat type and along the riparian areas. Sage grouse are most common at the higher elevations where sagebrush parks are present.

A few migratory ducks and shorebirds may be found on or near springs and streams. The most common birds in the WSA are blue jay, pinyon jay, white-crowned sparrow, junco, swift, swallow, kingbird, kinglet, nuthatch, and magpie. Raptors common in the area are golden eagle (a BLM sensitive species), red-tailed hawk, kestrel, great-horned owl, goshawk, Copper's hawk, and sharp-shinned hawk.

Several species of reptiles and amphibians are found in the WSA. The most common are horned lizard, Great Basin sagebrush lizard, sideblotched lizard, whiptail lizard, gopher snake, striped whipsnake, and midget-faded rattlesnake. Amphibians are most common in the riparian habitat type. Red-spotted toads, Great Basin spadefoot toad, canyon tree frog, and the Utah tiger salamander may be found in the WSA.

The FWS has identified the WSA as having potential habitat for one endangered species (black-footed ferret) and five FWS candidate species (ferruginous hawk, long-billed curlew, southern spotted owl, Great Basin Silverspot butterfly, and western yellow-billed cuckoo) (see Appendix 4 in Volume I. However, it has not been confirmed that these species are actually present in the WSA. The area may also be within the overall range of the endangered peregrine falcon and bald eagle. If present, most of these species would be associated with riparian and wet meadow areas or cliff faces and deep canyons, except for the ferruginous hawk. The ferruginous hawk inhabits pinyon-juniper woodland areas where there are ecotones or edges that provide opportunities for nesting, cover and hunting activities.

The WSA is favorable for wildlife because of its rugged terrain, water availability, vegetation diversity, and lack of human intrusions. Three species present are sensitive to human intrusion: black bear, cougar, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species.

There are no existing habitat improvements in the WSA, nor are any planned. The UDWR has considered transplanting bighorn sheep into the WSA.

Forest Resources

Minimal forest production has taken place within the WSA. Douglas fir was harvested in upper Thompson Canyon in the 1920s and the timber used in neighboring Sego Canyon for coal mining activities. Even though timber species are present, the area is considered nonproductive because of inaccessibility, rugged terrain, and slow growth of trees. Pinyon-juniper woodland in the area is generally incapable of yielding 20 cubic feet per acre of commercial wood per year. The area may be used to provide firewood or posts and could yield Christmas trees for local use. The 56,575 acres of pinyon-juniper woodland and Douglas fir could supply 8,802 cords of firewood; however, there is no demand for these products from the WSA and none is expected in the foreseeable future.

Livestock and Wild Horses/Burros

The WSA contains portions of nine grazing allotments involving nine operators. Refer to Table 7 for livestock grazing use data for the WSA.

Range developments within the WSA consist of 15 short drift fences, 1 corral, 4 developed springs, and 2 stock ponds. The potential exists for 905 acres of controlled burns in Tom Farrer Valley and Floy Canyon. An increase of 113 AUMs could be expected from this project.

Some of the approximately 24 miles of vehicular ways in the WSA (particularly the route in Floy Canyon) are used occasionally by livestock operators.

APHIS conducts predator control in BLM grazing allotments that comprise the WSA. A total of 10 coyotes were taken in the allotments in and surrounding the WSA during the 1986-1987 period. (USDA, APHIS, 1988). Nine of the coyotes were taken from aircraft and one by calling.

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Table 7
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Lone Cone	7,020	3,835	210	120	20 Cattle	03/01-03/31	1
Coal Canyon	3,930	2,238	401	233	35 Cattle	03/02-05/03	1
Tusher Wash	12,560	5,100	944	380	250 Cattle	03/01-05/31	1
Horse Canyon	37,615	13,538	1,008	302	250 Cattle	03/01-05/31	1
Showerbath Spring	41,290	30,434	601	443	89 Cattle	05/01-10/24	1
Floy Creek	22,085	6,110	1,208	326	1,105 Sheep	11/15-04/30	1
Floy Canyon	13,952	13,952	750	750	41 Cattle	05/21-11/02	1
Crescent Canyon	22,011	9,785	998	429	1,000 Sheep	11/16-03/25	1
Thompson Canyon	12,280	11,860	500	455	89 Cattle	05/20-11/30	1
Totals	172,743	96,852	6,620	3,438			9

Source: BLM File Data.

The WSA comprises between 9 and 100 percent of the area of any one allotment. It is not known what proportion of the predators were actually taken within the WSA. The combined, confirmed livestock losses for 1986-1987 in these allotments were four sheep.

Wild horses or burros are not known to use the WSA.

Visual Resources

The WSA has a landscape typical of the Book Cliffs. The steep slopes contain sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give an appearance of steps to the slopes noticeable some miles away. In the area of the Roan Cliffs in the northern half of the WSA, rock outcrops are reddish brown in color, as the name implies. Landforms are more dissected in the Roan Cliffs.

The WSA is classified as having 67,525 acres (93 percent) of Class A scenery and 5,080 acres (7 percent) of Class B scenery (Roy Mann Associates, Inc., 1977). Class A scenery contains the most outstanding characteristics of the physiographic region. Class B scenery combines some outstanding features and some features common to the region.

The WSA contains both medium (74 percent) and high (26 percent) sensitivity levels relative to the degree of user interest in visual resources and concern for changes in the existing landscape character. Based on these factors, 93 percent (67,525 acres) of the WSA is within a VRM Class II area and 7 percent (5,080 acres) is within a Class IV area. Additional information on BLM's VRM system can be found in Appendix 7 of Volume 1.

Cultural Resources

Known historic and prehistoric remains represent a portion of the scientific and recreation values of Floy Canyon. The old Spanish Trail was a primary travel and trade route between New Mexico and California in the mid-19th century. The Gunnison Crossing on the trail is just to the west of the WSA. Early outlaw history touched the vicinity with the activities of Butch Cassidy and the Wild Bunch around the turn of the century.

Evidence of early coal mining activities exists at Crescent Butte. Five other old mines are scattered through the WSA. Two log cabins are located in the WSA, one in right hand Thompson Canyon and one adjacent to Sego Canyon. Both are probably older than 50 years.

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Evidence of early logging is visible in upper Thompson Canyon, with the remains of old stumps on the hillside and some timber on the ground that has been partially shaped by an ax. The Thompson Canyon vehicular route is thought to have been constructed in the 1920s to bring out timber. A cattle trail continues up past the logging site to the head of the drainage. This trail reportedly had an octagon rifle barrel stuck into the top of a large rock as a landmark part way up the route. Also, a stock trail was constructed from the old homestead in Thompson Canyon up to Deer Point. Little evidence of this trail remains. As a result of the Central Coal Project (Hauck, 1977), approximately 860 acres (1.2 percent of the unit) were intensively surveyed within the boundaries of the WSA and two sites were recorded. Both sites are small, prehistoric lithic scatters located on ridge tops. Using these data an average site density estimate of 54 sites per 23,000 acres was computed. This inventory was not designed specifically for the unit, thus, statistics based on them may be unreliable. However, potential for finding additional sites is considered to be moderate. Many of these sites would probably be small lithic scatters, but significant Fremont sites may also be present. No sites listed or nominated to the National Register of Historic Places are within the WSA.

Cultures represented in the region include the Paleo-Indian, Desert Archaic, Fremont, Anasazi, Ute, and historic European.

The earliest human occupation of the region was by the Paleo-Indian big game hunters. They dated from about 5,500 to 10,000 B.C. and followed migrating herds of giant Pleistocene animals such as mammoths and bison antiguous. Over half the Paleo-Indian points found in Utah are from the Moab vicinity, and research may yield more in the WSA.

Archaic peoples are better represented in the region and possibly were more numerous. Evidence from their broad range of foraging pursuits is found in non-ceramic open campsites and caves and rockshelters. Cave excavations at locations not in the Floy Canyon WSA show a long occupation from about 6,060 B.C. to A.D. 500, depending on interpretation.

The Formative or sedentary agricultural culture which followed took two forms: the Anasazi and the Fremont. The WSA occurs in the border area between these two groups, but large numbers of Fremont ceramics at the Turner-Look site, located about 15 miles to the east, suggest their dominance in the area. Both Fremont and Anasazi cultures had ended in the area by about 1,300 A.D.

Evidence for the Ute nomadic foragers follows the end of the Formative cultures in the area. Sites consist of caves and open camps, as well as wickiup pole and brush structures.

European influence in the region dates from the Dominguez-Escalante Expedition of 1776, followed by Mexican traders on the Old Spanish Trail and French fur trappers in the 1810 through 1840 era. The latter are represented by an inscription by Antoine Robidoux, dating to 1837, located in Westwater Canyon to the east. American explorers crossed the region south of the WSA in the 1850s just before the first Anglo-American settlement was also attempted at Moab. Permanent American settlement occurred in the late 1870s and early 1880s with ranching spreading to the WSA by that time. Use of the WSA was made mostly from ranches based at Cisco, Thompson, and Green River.

Recreation

While sightseeing, backpacking, winter sports, horseback riding and photography are potential recreation pursuits, hunting is by far the most prevalent recreation activity in the WSA. The area has limited opportunity for vehicular access and most hunting is done on foot or horseback.

In the Grand RMP, the entire WSA is designated as open to ORV use under 43 CFR 8340. Currently, recreational ORV use is essentially nonexistent because of the WSA's distance from population centers and the presence of more attractive ORV use areas accessible from population centers. The rugged terrain presents a natural barrier to ORV use. Some of the approximately 24 miles of ways are used to a limited degree for hunting access into the area.

Although visitor use data have not been compiled, current recreation use of the WSA, including hunting use, is estimated at approximately 300 visitor days per year. As much as 10 percent (30 visitor days per year) is from vehicular access to the WSA while the remaining 90 percent (270 visitor days) is attributed to primitive recreation. The low use can be partly attributed to the lack of access and to the low, non-local public awareness of the area. About 50 of the total visitor days are attributed to commercial outfitting services.

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Land Use Plans

The WSA is BLM-administered public land except for eight State sections (4,508.61 acres) and one tract of private land (160 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. Of the 4,508.61 acres of in-held State land, 2,471.8 acres are under lease for oil, gas, and hydrocarbons; 2,590.8 acres area leased for grazing; 640 acres are leased for coal; and 674.1 acres are leased for metalliferous ores.

Additionally, the WSA is contiguous for about 5 miles with the Uintah and Ouray Indian Reservation at the north end. There are no existing or proposed rights-of-way within the WSA nor are there any split-estate lands.

Access to the WSA is currently from I-70 by means of a graded dirt county road (Floy Canyon road). This road is cherry-stemmed for about 2 miles into the WSA. The WSA can be reached within 30 minutes to 1 hour from I-70. Roads below the Book Cliffs are well maintained for oil field operations; above the cliffline they are sometimes impassable after wet weather or heavy snow.

The WSA is part of a group of seven contiguous or adjacent BLM WSAs: Jack Canyon, Turtle Canyon, Desolation Canyon, Coal Canyon, Spruce Canyon, and Flume Canyon.

The WSA is managed in accordance with the Grand RMP. The RMP acknowledges the wilderness review but does not address wilderness designation or nondesignation. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative. Actions planned in the Grand RMP are included in the description of the No Action/No Wilderness Alternative.

The Grand County Master Plan (University of Utah, BCD, 1979) recognizes mineral potential in the Book Cliffs area but does not make site-specific land use recommendations pertaining to the Floy Canyon WSA. Wilderness is not specifically mentioned in the plan. The plan generally emphasizes continuation of present uses and maximizing mineral development.

In addition, the Grand County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is in north-central Grand County. The socioeconomic effects of wilderness designation or nondesignation would be spread among communities in Grand County and eastern Emery County, Utah, with some spill over into western Mesa County, Colorado.

Grand County can be characterized as rural and sparsely populated. From 1970 to 1980, the population of Grand County grew from 6,600 to 8,250, an overall increase of about 23 percent. Table 8 presents baseline and projected population data for Grand County. It is estimated that between 1980 and 1987, population decreased to about 7,250. Population projections for the county indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab, which is approximately 4-road miles from the WSA.

Table 8
Baseline and Projected Population and Employment Growth
Grand County

	1980	1990	2000	2010
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900

Source: Utah Office of Planning and Budget, 1987.

About 80 percent of the county is owned by the Federal Government, 15.5 percent by the State, and 4.5 percent by private landowners. The land in Grand County comprises about 4.5 percent of the State, or about 3,615 square miles.

Mesa County had a 1981 population of 87,100. Grand Valley, which is in the midwestern part of Mesa County, contains 83 percent of the county's population. Grand Junction (1980 population of 28,194) serves

as a major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981).

The communities nearest to the WSA are Thompson (population 200), about 30 miles southwest, and Cisco (population 45), about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado, is about 40 miles east of the Harley Dome exit on I-70, and Green River and Moab, Utah, are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

- Employment

Table 8 shows the baseline and projected total employment for Grand County to the year 2010. Grand County is part of the Southeast MCD. Table 9 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trading (15 percent), and services (8 percent).

Table 9
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

It is projected that by the year 2010, employment in the MCD will increase by 27 percent and that services will increase to 18 percent and trade to 17 percent of the total, while government will decline to 15 percent and mining to less than 20 percent of the total MCD employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent by the year 2010 (Utah Office of Planning and Budget, 1987).

In Colorado, Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the decrease in oil shale activities, the local economy still shows some signs of growth.

- Sales and Revenues

Economic-related activities in the WSA include mineral exploration, livestock production, and recreation. Table 10 summarizes local income and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 10
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$4000	None
Oil and Gas Leases	0	$22,566
Livestock Grazing	$56,500	$4,351
Recreational Use	$ 1,230	$ 160
Total	$58,130	$27,077

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has four mining claims that appear current in assessment work. Regulations require a $100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

Oil and gas exploration conducted in the WSA has generated some temporary local employment and income (estimated at less than 8-work years in the past 10 years).

Nine livestock operators have a total grazing privilege of 2,825 AUMs within the WSA. If all this forage were utilized, it would account for $56,500 of livestock sales, including $14,125 of ranchers' returns to labor and investment.

Woodland product harvest, if any, has been small and is insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's recreational use and related local expenditures are associated with hunting. Local expenditures for recreational use in the WSA are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from

recreational use in the WSA is unknown. However, an approximation of expenditures can be deduced (Dalton, 1982). This study indicates that Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Floy Canyon WSA is estimated at about 300 visitor days per year, therefore, local expenditures attributed to use of the WSA are estimated at $1,230 annually.

The WSA generates revenues to the Federal Treasury from three sources: mineral leases, livestock grazing fees, and commercial recreation permits. Within the WSA, about 11,283 acres are leased for oil and gas. At $2 per acre, this would generate up to $22,566 annually. Half of these monies would be allocated to the State of Utah, which then reallocates these revenues to various funds, the majority of which are related to local energy development. Based on the 2,825 AUMs of forage that could be consumed by livestock in the WSA and a grazing fee of $1.54, the WSA annually accounts for as much as $4,351 grazing fee revenues to the Treasury. Half of these monies are allocated back to the local BLM district for the construction of rangeland improvements. The WSA generates about $160 in commercial recreation permit fees annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Floy Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy. Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on 67,525 acres).

In the foreseeable future, disturbance of approximately 1,077 acres from oil and gas exploration and development, from access to State in-holdings, and from vegetation treatments would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Such imprints as benched roads and driil pads on steep, rocky slopes would be irreversible. Special features, including geological, historical and archaeological features, special status species, and perennial streams, would not be significantly affected because the disturbance would involve only about 1.5 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Some Class A scenery would be reduced in quality in the disturbed areas. Also, some wildlife associated with wilderness would leave the area during the period of activity. Proposed vegetation treatments would eventually benefit wildlife associated with wilderness because of increased forage production and an addition of ecotones.

During the period of activity, the visual and audible disturbance from mineral exploration and development, vegetation treatments, and road building and use would reduce opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 15 percent (10,890 acres) of the WSA would be indirectly affected in the foreseeable future. Again wildlife associated with wilderness may leave the area of indirect impacts during the period of activity. Hunting is the most popular activity and would be highly influenced by impacts to wildlife and their habitat.

Because future vehicular use would generally be limited by terrain to existing vehicular ways, no additional disturbance from ORV activity is anticipated in the future. The continued and increased use of 24 miles of existing ways and use of future access roads would occasionally detract from opportunities for solitude and primitive recreation.

The gradual increase in visitor use would not be expected to significantly reduce the quality of wilderness values because the additional use would be largely primitive in nature and the WSA is large enough to incorporate the additional use adequately.

The extent that disturbance would occur over the long term and, therefore, the long term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be lost on 1,077 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 10,890 acres. Some Class A scenery would be reduced in quality and wildlife associated with wilderness may leave disturbed and surrounding areas.

- Impacts on Vegetation Including Special Status Species

No major changes in vegetation types would result from the 170 acres of potential mineral-related disturbances (less than 1 percent of the WSA). Disturbance in the form of roads and drill pads could, however, alter the composition of the riparian community (less than 5 percent of the WSA) if development occurred there. This is unlikely because of requirements to protect riparian vegetation. The vegetation on 905 acres would be changed from a shrub dominated community to one of grasses and forbs. BLM would require site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I).

Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, any special status species that may occur within the WSA would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 1.5 percent (1,077 acres) of the vegetation in the WSA would be modified by this alternative. Impacts on special status plant species that may be located in the WSA would not be significant.

- Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. About 900 acres would continue to be closed to locatable minerals due to the oil shale withdrawal. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

- Impacts on Wildlife Habitats and Populations Including Special Status Species

The WSA provides habitat for several species sensitive to human encroachment (1,000 acres crucial winter habitat for deer and elk). These species would be adversely affected by surface disturbance of up to 170 acres for mineral exploration and production. The effect on wildlife by such disturbance (approximately 0.2 percent of the WSA affected) would depend upon future locations of necessary roads, drill pads, etc. Reclamation would result in habitat restoration in the long term. Mobile animals, including elk, bear, deer, and mountain lion, would leave the area of disturbance. Local populations would be reduced during the time of disturbance, and these animals might or might not return after activities ceased. This is especially true if year-round access were developed and human occupation to the area were to increase. Oil and gas leasing categories would provide special stipulations to protect certain wildlife species (Elk winter range).

There are no Federally designated critical habitats that could be affected.

Potential bighorn sheep transplants could occur with this alternative without consideration given to wilderness resources.

The potential vegetation treatment of 905 acres could occur with this alternative. Although the treatment is proposed for livestock forage improvement, some wildlife species would also benefit from additional forage and ecotones.

Special status species, if present, could be inadvertently impacted, but they generally would be protected as a result of provisions in the Endangered Species Act. Ferruginous hawk habitat would improve if the vegetation treatment proposed is completed because additional ecotones would be provided.

Conclusion: Implementation of the vegetation treatments would benefit some wildlife species and population levels by providing additional forage and ecotones. Surface disturbance caused by the vegetation

treatments and possible oil and gas exploration/ development may displace or reduce populations of some wildlife species during the lifetime of these projects. No significant adverse impacts would occur to threatened, endangered, or other special status species. Ferruginous hawks would benefit from habitat improvement.

- Impacts on Livestock Management

Few, if any, changes in livestock use or management techniques are expected with this alternative. Domestic livestock grazing would continue as authorized. The estimated 2,825 AUMs currently allocated within nine allotments are used by livestock of nine permittees.

The possible 170-acre disturbance from mineral exploration and development could reduce livestock forage by 0.2 percent until rehabilitation is complete. This would not affect current livestock operations because the forage in the WSA is currently under utilized.

There is presently little use of motorized vehicles for managing livestock, but what use is occurring could continue or accelerate. Existing rangeland improvements, including 15 short-gap fences, one corral, four developed springs, and two stock ponds, could be maintained without concern for wilderness values. New rangeland developments, such as the 905-acre burning-and-seeding project, could be carried out without concern for wilderness values. The planned burning would result in an increase of 113 AUMs of livestock forage.

Conclusion: There would be no changes in livestock use or management techniques. Surface disturbances resulting from mineral exploration and development would not impact grazing since forage is currently underused in the WSA. The proposed 905-acre burning and seeding project could be completed to provide an additional 113 AUMs of livestock forage.

- Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil and gas in the WSA were developed, it would lead to increased employment and income for Grand County. Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one period of time. This would represent about 0.1 percent of the projected employment in the Southeast MCD workforce in the year 2010 and only 1.0 percent of the projected Grand County employment in the year 2010. There would be minor increases in local sales in communities such as Green River (in Emery County) and Thompson.

There would be no livestock-related economic losses because the existing grazing use (2,825 AUMs available) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed vegetation treatment that would produce 113 AUMs of new allocated forage could lead to an additional $2,260 of livestock sales, including $565 of ranchers' returns to labor and investment.

Recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 to 7 percent per year over the next 30 years. Recreational use in 30 years could thus increase from the current 300 visitor days to between 570 and 2,610 visitor days per year. Since the recreation-related local expenditures average $4.10 per visitor day, recreation-related annual expenditures of between $2,337 and $10,701 would accrue to the local economy.

Existing Federal and State revenues would not be reduced by this alternative. The existing $22,566 in Federal lease revenues would continue. In addition, there are 61,322 acres in the WSA open to oil and gas leasing that are currently not leased. If leased, they would bring up to $122,644 additional Federal lease fee revenues per year in addition to possible new royalties from lease production. Depending on the number of production wells, royalties could range from about $20,000 to well over $100,000 per year depending on production levels. Half of the Federal revenues would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently up to $4,351 per year) would continue. The additional 113 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative could increase Federal revenues by $174 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects. Federal revenues provided by commercial recreation use (currently $160 annually) would continue.

Conclusion: Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0

percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $10,701 annually to the local economy by the year 2020. The WSA could contribute up to $58,760 annually in local livestock sales and $4,525 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $145,210 to over $850,000 per year in Federal and State revenues. Federal revenues from commercial recreation outfitting (currently $160 annually) would continue.

All Wilderness Alternative (72,605 Acres)

- Impacts on Wilderness Values

Designation and management of all 72,605 acres as wilderness would contribute to the preservation of the wilderness values in the Floy Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and outstanding opportunities for primitive recreation would be protected on all 72,605 acres. Solitude would be protected on approximately 68,975 acres that meet and 3,630 acres that do not meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including Class A scenery, geological, historical, and archaeological features, special status species, perennial streams, and wildlife associated with wilderness, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 12 acres is anticipated from providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be indirectly reduced on adjacent portions of the WSA. Less than 1 percent (726 acres) of the WSA would be indirectly affected. Special features would not be significantly affected because the disturbance would be minor. Appropriate measures would be taken to protect special status species prior to any surface-disturbing activity. Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. All in all, the disturbance would not probably be substantially noticeable in the area as a whole. The vegetation treatments that would eventually benefit wildlife special features associated with wilderness would be foregone.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for naturalness, solitude, and primitive recreation.

Over the long term, there would be no potential for loss of wilderness values due to development of leases and mining claims, except on State in-holdings.

The gradual increase in visitor use would be primitive in nature and would be managed so as to not result in loss of wilderness values. The WSA is immediately adjacent to two other BLM WSAs and the primitive area portion of the Uintah and Ouray Indian Reservations. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness, if the adjacent WSAs also were designated as wilderness.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 12 acres and indirectly reduced in quality on up to an additional 726 acres. Special features would be preserved.

- Impacts on Vegetation Including Special Status Species

The projected 905 acres of vegetation treatments would not be allowed. Only 12 acres of surface disturbance is projected; therefore, vegetation types would not be significantly affected. Wilderness designation would provide additional protection for threatened, endangered, and other special status plant species.

Conclusion: Implementation of the All Wilderness Alternative would protect vegetation types and special status plant species in the WSA.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

    Wilderness designation would result in closure of the area to future oil and gas leasing. Existing post-FLPMA leases (11,283 acres) could be

developed subject to the stipulations issued at the time of leasing. However, it is unlikely that the existing leases would be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued. Assuming that the oil and gas leases expire prior to development or a showing of commercial quantities, recovery of a potential 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of gas would be foregone. Due to the moderate favorability and certainty (f3/c3) of oil and gas within the WSA, loss would be likely to occur.

- Locatable Minerals

The area would be withdrawn from mining claim location. There is potential for less than 500 tons of uranium oxide and vanadium (which is considered a strategic mineral). It is unlikely that any recoverable gold or silver is in the area.

About 80 acres of the WSA are covered with placer claims. Placer and lode claims can be filed up until wilderness designation. Development work, extraction, and patenting would be allowed to continue under unnecessary or undue degradation guidelines on valid mining claims after wilderness designation. Because formations favorable for uranium occur at depths of 4,000 to 10,000 feet below the surface, it is unlikely that these deposits would be mined even if the WSA is not designated as wilderness.

- Salable Minerals

Exploration or development is not anticipated. Because of low potential of the deposit, and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: With the All Wilderness Alternative, the WSA's recoverable oil and gas resource would be foregone. Loss of production of other minerals would not be significant.

- Impacts on Wildlife Habitats and Populations Including Special Status Species

Wildlife would benefit from preservation of solitude and reduction of potential mineral-related surface disturbance from 170 acres with the No Action/No Wilderness Alternative to 10 acres with wilderness designation. Crucial habitat for elk, black bear, deer, and mountain lion would receive the most protection from surface disturbance with this alternative. Potential bighorn sheep transplants would be allowed. Future wildlife developments might be limited; none are currently planned.

The benefits of the 905-acre vegetation treatment planned for livestock would be foregone with this alternative.

The three endangered and five candidate species, if present in the WSA, would have the added protection of wilderness management, with limitations on disturbance.

Conclusion: Wilderness designation would preclude the proposed vegetation treatment project which would have benefited some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat resulting from reduction in mineral-related surface disturbances. Threatened, endangered, and other special status species would be protected.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized. The approximately 2,825 AUMs currently allocated in the WSA would remain available for cattle forage. The area would be closed to vehicular travel except for approximately 2 miles of the cherry-stemmed travel route within Floy Canyon, which would remain available for vehicular access.

Restriction on vehicle use on over 24 miles of ways would be an inconvenience, especially to the permittees in the Showerbath Springs, Floy Canyon, and Thompson Canyon allotments, and would result in increased costs of livestock management.

Restrictions on predator control methods would lead to slightly higher predator populations and increased loss of sheep in the two allotments where sheep are permitted. Overall, wilderness designation could result in inconvenience and increased costs for the nine permittees in the WSA.

Existing rangeland developments (15 short-gap fences, one corral, four spring developments, and two stock ponds) would be maintained as in the past, based on practical necessity and reasonableness. New rangeland developments would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management

of these resources. The only project currently planned, a 905-acre vegetation treatment, would not be allowed, and the 113 AUMs of forage that would result from the treatment would be foregone.

Conclusion: No change in livestock grazing level would occur with the All Wilderness Alternative. Restrictions on the use of 24 miles of existing ways and predator control would be an inconvenience and would result in increased costs of livestock management for nine livestock permittees. The proposed 905-acre burning and seeding that would produce 113 AUMs would not be allowed.

- Impacts on Local Economic Conditions

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources with wilderness designation, there could be losses in Federal revenues currently provided by resource uses in the WSA (refer to Table 10), as well as loss of potential increases in local income and Federal revenues that otherwise could occur.

In 30 years, annual recreation-related local expenditures could increase to be as much as $10,701 (average of $4.10 per visitor day). Motorized recreational use of the WSA is light and closure of the wilderness to vehicular traffic may initially result in a slight decrease in related local expenditures, but as motorized recreational use is replaced by primitive recreational use, losses would balance out. Overall, the change in recreation expenditures would be distributed locally and regionally and would not be noticeable in the local economy.

Expenditures associated with recreation in the WSA would be well distributed among businesses in Green River and Moab, Utah, with some spill over into western Mesa County, Colorado. However, the resulting local expenditures would be regionally insignificant. Recreation expenditures would also be locally insignificant to any single business in the affected area except outfitters.

Exploration and development of potentially recoverable oil and gas would be forgone. This would not alter existing economic conditions, but could alter future economic conditions from those that could otherwise occur under the No Action/No Wilderness Alternative. The potential for 40 jobs, 1 percent of the Grand County employment projected for the year 2020, would be foregone.

The eventual loss of 11,283 acres now leased for oil and gas would result in a loss of up to $22,566 per year of lease fees to the Federal Treasury. There would also be a potential loss of $122,644 annually in Federal revenues from the 61,322 acres that could be leased without designation. In addition to these rental fees, potential royalties and bonus bid revenues of $20,000 to over $100,000 annually would also be foregone. The potential for Federal revenues from commercial outfitting services (currently $160 annually) would increase with the recognition the area would receive from designation.

Any local income related to assessment of future mining claims also would be lost. This would not be a significant impact because development of locatable minerals is unlikely and there are presently only four claims in the WSA.

Livestock use and ranchers' income would continue as at present with $56,500 of livestock sales, including $14,125 of ranchers' return to labor and investment. The 905-acre proposed vegetation treatment for livestock would be foregone along with any resulting increase in ranchers' income. If this project was implemented and the additional forage used, ranchers' returns to labor and investment could have increased by $565 and livestock sales could have increased by $2,260.

As the proposed vegetation treatment would not be developed and used, an estimated annual $174 of Federal grazing revenues from 113 increased AUMs would be foregone.

Conclusion: Present economic conditions would not be affected. The potential for 40 jobs, 1 percent of the Grand County employment in the year 2010, would be foregone. Recreation-related local sales could continue up to $10,701 annually to the local economy by the year 2020. Annual local sales and Federal revenues related to livestock grazing could be reduced by $2,260 and $174, respectively. Potential annual Federal and State revenues from oil and gas leasing fees and royalty payments could be reduced by $145,210 to over $250,000 as compared to the No Action/No Wilderness Alternative. The potential for Federal revenues from commercial recreation outfitting services would increase.

Partial Wilderness Alternative (Proposed Action) (23,140 Acres)

- Impacts on Wilderness Values

Wilderness designation of 23,140 acres would contribute to preservation of the area's wilderness values. In the foreseeable future in the WSA as a whole, impacts to wilderness values resulting from disturbance would be about one-third of that identified for the No Action/No Wilderness Alternative. This Partial Wilderness Alternative would reduce the potential for surface-disturbing activities that could impair wilderness values over the long term in the designated area. Wilderness values would be preserved over the long term in the designated area. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure including closure of 11 miles of ways, and closure to future mineral leasing and location. Naturalness and outstanding opportunities for solitude and primitive recreation (all acres meet the standards) and special features, including about 32 percent of the WSA's scenic, wildlife, and cultural values and most of the perennial water, would be given the additional protection provided by wilderness designation.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from mineral exploration and development, from providing access to State in-holdings, and from in-stream drop structures would occur on up to 4 acres within the designated portion and on up to 313 acres within the nondesignated portion. Special features would be largely unaffected because disturbance would involve only 0.4 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Some Class A scenery would be reduced in quality in the disturbed and surrounding areas and some wilderness-dependent species may leave the area during the period of activity. Some species would eventually benefit from the vegetation treatments.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to 5 percent (3,630 acres) of the WSA. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation although vehicular use of 13 miles of existing ways and future access roads in the nondesignated area would detract from these opportunities during the period of activity.

The gradual increase in visitor use would be mostly primitive in nature and would be managed so as to not result in loss of wilderness values.

The extent that disturbance would occur over the long term, and therefore the long-term loss of wilderness values that would occur is not accurately known. Loss would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights.

Conclusion: Wilderness values would be preserved in the designated area which is approximately 32 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 317 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 3,630 acres. Almost all of the impact would be in the nondesignated area. Some Class A scenery would be reduced in quality, and some wildlife associated with wilderness would be disturbed, but not significantly.

- Impacts on Vegetation Including Special Status Species

With this alternative, vegetation would be protected on the 23,140 acres that would be designated wilderness, except on the 4 acres that could be disturbed from mineral exploration and development and installation of an in-stream drop structure. In the area that would not be designated, approximately 213 acres could be disturbed by oil and gas exploration and development, a proposed vegetation treatment, and an in-stream drop structure. Overall, if full development were to occur, only 0.4 percent of the WSA would be temporarily disturbed. No major change in vegetation types would occur. Special status plant species that may exist in the WSA would be protected by the requirements of the Endangered Species Act and BLM policy as described for the No Action/No Wilderness Alternative.

Conclusion: Vegetation including special status species would not be significantly impacted with this alternative.

• Impacts on Mineral and Energy Exploration and Production

• Leasable Minerals

Within the designated portion of the WSA, existing leases (6,113 acres of post-FLPMA leases) could be affected. It is anticipated that these leases would expire without development. The designated wilderness area would be closed to future leasing and no new leases would be issued. Leasable minerals not under lease at the time of wilderness designation would be foregone. Because, oil and gas potential exists in the designated portion, implementation of the Partial Wilderness Alternative could result in the loss of oil and gas resource development opportunity for an unknown portion of the 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of natural gas that may occur in the WSA.

The nondesignated portion of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values as discussed in the No Action/No Wilderness Alternative. Therefore, mineral and energy resources located in the nondesignated portion would not be affected by implementation of the Partial Wilderness Alternative.

• Locatable Minerals

No mining claims are currently located within the designated portion of the WSA. In the designated portion, development work, extraction, and patenting could occur on any future valid claims located prior to wilderness designation under the unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to mineral location (USDI, BLM, 1981a). BLM does not project exploration or development in the designated portion because locatable mineral resources are not sufficient to assume development.

Four mining claims (80 acres) are located in the nondesignated portion of the WSA. The nondesignated portion of the WSA would remain open to mineral location as discussed in the No Action/No Wilderness Alternative. Because locatable minerals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is not assumed that development would occur in the foreseeable future. Therefore, implementation of this alternative would not prevent recovery of significant amounts of locatable minerals.

• Salable Minerals

No exploration or development is anticipated in either the designated or nondesignated portions of the WSA. Because of low potential of the deposit and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Partial wilderness designation would preclude or constrain potential exploration and development of oil and gas in the designated portion of the WSA. Loss of exploration and development opportunities for other mineral and energy resources would not be significant because the probability of development is low even without partial wilderness designation.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from preservation of solitude and the reduction of potential mineral-related disturbance from 170 acres with the No Action/No Wilderness Alternative to 110 acres with this alternative.

Approximately 300 acres within the designated area are considered crucial winter habitat for deer and elk. In the designated area, 4 acres would be disturbed by oil and gas exploration and development and an installation of an in-stream drop structure. This disturbance would have only a short-term impact on wildlife species while work was ongoing. Thus, with this alternative, wildlife species would benefit through protection of crucial habitat within the designated area and provision of solitude on 32 percent of the WSA.

Within the nondesignated area (49,465 acres), approximately 700 acres are considered crucial winter habitat for deer and elk. Up to 107 acres of mineral-related surface disturbance could occur in this portion of the WSA, and at least some of the disturbance could occur within crucial habitat. Noise and increased access due to development of roads could, in combination with loss of habitat, cause deer, elk, bear, and cougar to leave the area at least for the duration of the activities. Populations of some species would be reduced while 205 acres of vegetation

treatment could benefit other wildlife species through provision of additional forage and ecotones.

In the designated area, the one endangered and five Category 1 and 2 candidate species, if present, would receive the added protection from wilderness restrictions, while in the nondesignated area these species would not have this added protection. The Endangered Species Act and BLM policy would provide protective provisions for such species in all areas.

Conclusion: Approximately 205 acres of vegetation treatment would be allowed in the nondesignated portion of the WSA, which would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 49,465 acres not designated wilderness. Threatened, endangered, or other special status species would not be significantly affected.

- Impacts on Livestock Management

In both the designated and nondesignated portions of the WSA, grazing use would continue as authorized in the Grazing Preference Statement. Of the estimated 2,825 AUMs presently allocated in the WSA, 890 would be within the designated portion and 1,935 within the nondesignated portion. In the designated portion, development of future roads or other livestock management facilities for use with the 890 AUMs would be restricted to preserve wilderness values. Approximately 4 miles of vehicular ways in Floy Canyon, 2 miles in Thompson Canyon, and 5 miles in the Ute Canyon area where vehicular access would be restricted. Since vehicular use to manage cattle is currently taking place in this area, an ORV closure within the designated wilderness (which includes the above-mentioned vehicular ways) would affect existing livestock management practices in the area. Approximately 700 acres of planned vegetation treatments in Tom Farrer Valley and Floy Canyon would not occur and the potential for approximately 87 additional livestock AUMs would be foregone.

In the 49,465-acre nonwilderness area, about 205 acres of vegetation treatment in Floy Canyon would be allowed. As many as 27 additional livestock AUMs could be provided. Approximately 13 miles of existing vehicular ways could be used for livestock management, and new roads and rangeland improvements could be developed without wilderness considerations. None are planned.

Conclusion: Restrictions on vehicle use on 11 miles of ways would be an inconvenience to the permittees in the Showerbath Springs, Floy Canyon, and Thompson Canyon allotments. Seven hundred acres of vegetation treatment that would produce 87 additional AUMs would not occur.

- Impacts on Local Economic Conditions

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be losses in Federal revenues currently provided by resource uses in the WSA (refer to Table 10), as well as loss of potential increases in local income and Federal revenues that could otherwise occur with the No Action/No Wilderness Alternative.

Precluding exploration and development of potentially recoverable oil and gas deposits would not alter existing economic conditions, but could alter future economic conditions derived from mineral resources in the designated portion.

Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one time. This would represent about 0.1 percent of the projected employment in the Southeast MCD workforce in the year 2010 and only 1.0 percent of the projected Grand County employment in the year 2010. There would be minor increases in local sales in communities such as Green River (in Emery County) and Thompson. The impacts would be the same as with the No Action/No Wilderness Alternative, but the duration of the impacts would be shorter because development would not occur on 32 percent of the WSA.

Livestock use and ranchers' income would continue as at present with up to $56,500 of livestock sales including $14,125 of ranchers' return to labor and investment. Proposed developments for livestock would not be totally foregone as potential vegetation treatment on 205 of the 905 acres proposed in the WSA would be located outside of the designated wilderness area and could be completed. If these treatments were to be implemented, 26 additional AUMs would be generated and ranchers' returns to labor and investment would increase by $130, as well as $520 of associated sales. However, potential for 87 AUMs, $1,740 in livestock sales and $435 in ranchers returns to labor and investment would be foregone.

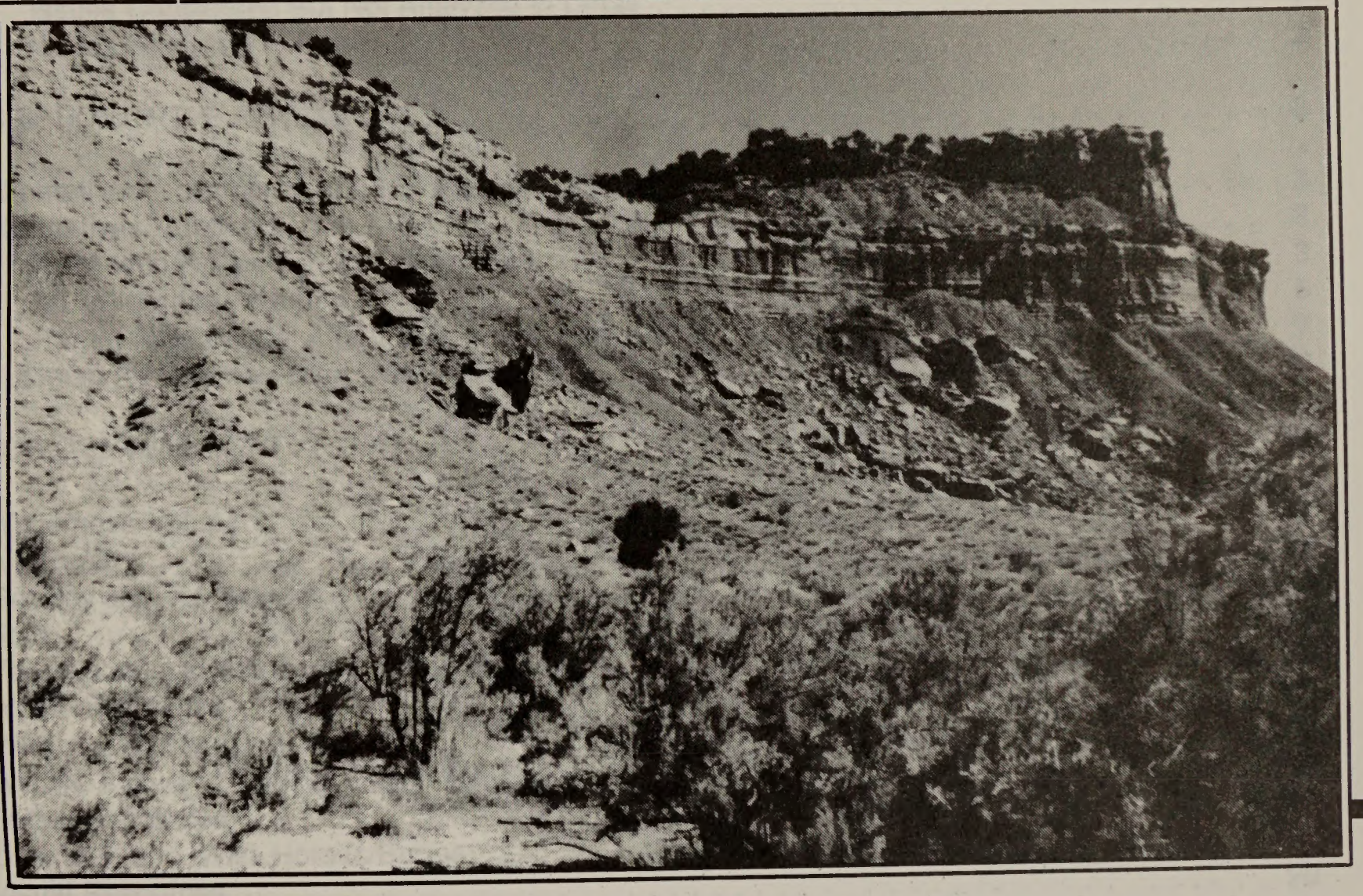
Local expenditures related to recreational use would average $4.10 per visitor day and could total as much as $10,701 annually in 30 years. Although motorized recreational use of the WSA is light, closure of the wilderness portion of the WSA to ORV use may initially result in a slight decrease in related local expenditures. As motorized recreational use is replaced by primitive recreational use, losses would balance out. Overall, the change in recreation expenditures would be distributed locally and regionally, and would not be noticeable as local income.

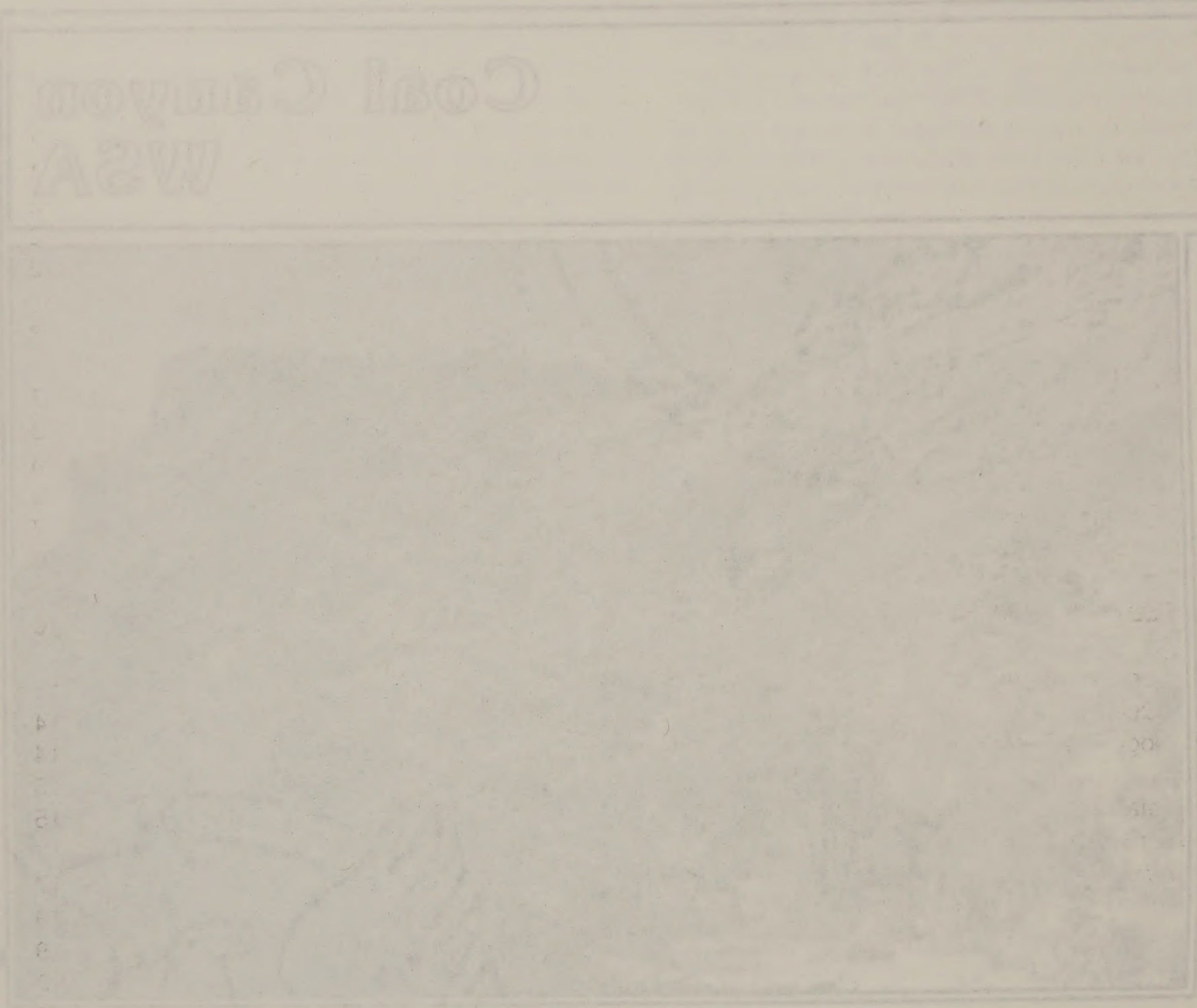
In the designated part of the WSA, the loss of up to 6,113 acres now leased for oil and gas would cause an eventual loss of up to $12,226 per year of lease fees to the Federal Treasury, unless development in that area occurs on leases held by production or unit agreement. There would also be a potential loss of up to $34,054 annually in Federal revenues from the 17,027 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS could be foregone.

Recreation-related Federal revenues (currently $160 annually) would increase if the demand for commercial outfitter services increases.

Conclusion: Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010, but the duration of the increase would be shorter than with the No Action/No Wilderness Alternative because development would not occur on 32 percent of the WSA. Recreation-related local sales could contribute up to $10,701 annually to the local economy by the year 2020. Potential annual local sales and Federal revenues related to livestock grazing could be reduced by $1,740 and $134, respectively. Annual Federal and State revenues from oil and gas leasing fees could be reduced by $46,280 as compared to the No Action/No Wilderness Alternative. Annual royalty payments on oil and gas production would not be reduced, but total royalties from the oil and gas field would be reduced because development and production would be foregone on 32 percent of the WSA. Federal revenues from commercial recreation use would likely increase.

Coal Canyon WSA





COAL CANYON WSA

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COAL CANYON WSA

(UT-060-100C2)

INTRODUCTION

General Description of the Area

Coal Canyon WSA is located in the Book Cliffs region of north-central Grand County. It contains 61,430 acres of BLM-administered public lands, including a 17,615-acre area that was added to the WSA following a remand decision by the Interior Board of Land Appeals (IBLA). The WSA is roughly 16 miles east to west and 12 miles north to south.

The WSA is about 10 miles northwest of Interstate Highway 70 (I-70). The nearest towns are the small communities of Thompson and Cisco, Utah (about 10 miles south and 15 miles southeast, respectively, of the WSA), and Mack, Colorado (about 20 miles southeast). Coal Canyon WSA is adjoined by BLM's Floy Canyon WSA on the west and Spruce Canyon WSA on the east.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Desolation Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness study.

Existing vegetation is predominantly pinyon-juniper woodland with high desert plant communities along the southern portion of the WSA. Other prominent vegetation includes Douglas fir, sagebrush, riparian, and mountain shrub. Average annual precipitation ranges from 12 to 17 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F.

Coal Canyon WSA is located in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by many drainages including Cottonwood, Sageros, Horse, Spring, Coal and Dry Canyons. Elevations range from 8,900 feet along Cottonwood Point in the northwestern part of the WSA to 5,200 feet at the mouth of Coal Canyon in the eastern end of the WSA. The 400-foot face of the lower Book Cliffs, visible for miles from I-70, is located just south of the WSA. The 1,000-foot cliff of the upper Book Cliffs escarpment forms the eastern portion of the southern boundary of the WSA.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the Coal Canyon WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 19 S., R. 21 E., sec. 29) has been redrawn to correct an error in the Draft EIS maps. This change did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. No Partial Wilderness Alternative was identified in the Draft EIS. However, in response to public comments received, a Partial Wilderness Alternative has been analyzed for the Final EIS. With the Partial Wilderness Alternative, 20,774 acres would be designated wilderness and 40,656 acres in the WSA would not be designated wilderness (refer to Map 3.)

3. The BLM Proposed Action in the Draft EIS was the No Action/No Wilderness Alternative. The BLM Proposed Action for the Final EIS is the Partial Wilderness Alternative (20,774 acres). Refer to Appendix 11 in Volume I for the rationale for the Proposed Action.

4. The anticipated surface disturbance presented in the Draft EIS (1,216 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 1,216 acres reported in the Draft EIS to 526 acres of surface disturbance for the Final EIS.

STATEWIDE
POCKET MAP
WSA
NO. 69
SEE VOL.I

COAL CANYON WSA

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Coal Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: Soil disturbance estimates have been revised downward from 1,216 acres analyzed in the Draft EIS to 526 acres in the Final EIS. About 346 acres of the projected disturbance would result from vegetation treatments (burning and seeding) which would be reclaimed. Soil erosion would likely be reduced over the long term on treated areas. Further, this disturbance would take place in those portions of the WSA where reclamation potential is the highest. Some of the proposed watershed protection projects would be possible with all of the alternatives. Given this new scenario, the impacts of direct disturbance of soil would affect about 1 percent of the WSA and mitigation would be required. Therefore, impacts on soils are not significant issues for analysis in the Final EIS.

2. Water Resources: The public is concerned that wilderness designation would interfere with the development of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. Approximately 8 miles of perennial streams are along the northeast border of the WSA. There are at least 22 undeveloped springs in the Coal Canyon WSA. Therefore, there are no potential consumptive uses of water upstream of the WSA. The only potential uses of water including the springs in the WSA are the present uses associated with recreation, livestock, and wildlife. Springs could be developed following wilderness designation if designed and installed compatibly with wilderness protection guidelines. As explained above for soils, significant increases in soil erosion that might affect water quality are not expected. Therefore, impacts on water uses and quality are not significant for the Coal Canyon WSA.

3. Forest Resources: The forest resources in the WSA consist of approximately 52,143 acres of pinyon pine and juniper trees and 6,030 acres of Douglas fir trees. However, no woodland or timber harvest has occurred in the WSA, and none is anticipated in the foreseeable future due mainly to more accessible and productive areas located elsewhere. Therefore, impacts on forest resources are not significant issues for analysis in the Final EIS.

4. Visual Resources: As already discussed, estimates of surface disturbance have been substantially reduced for the Final EIS. The 526 acres of surface disturbance projected to occur in the foreseeable future would affect only about 1 percent of the WSA. Disturbance would occur in Scenic Class A areas and in VRM Management Class II areas. Impacts on visual resources are considered in the Final EIS as part of the discussion of naturalness and special features in the Wilderness Values section.

5. Cultural Resources: Few archaeological or historical sites are known to occur in the WSA (a limited survey resulted in discovery of two small lithic scatters). Because surface-disturbing activities (less than 1 percent of the WSA) could potentially disturb or destroy sites not now known to occur in the WSA, inventories for the purpose of site recordation and mitigations of impacts would take place prior to any surface disturbance. All sites would continue to receive protection under existing law. Given these conditions, impacts on cultural resources are not significant issues for analysis in the Coal Canyon WSA.

6. Recreation: Recreational use of the Coal Canyon is light, about 500 visitor-use days per year. Primary use is by hunters and sightseers. Recreational changes resulting from designation or nondesignation would not be significant due to limited use now occurring and projected to occur in the future in the WSA.

- Issues Analyzed in Detail

The significant uses for the Coal Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on leasable mineral exploration and production.

3. Impacts on vegetation including special status species.

4. Impacts on wildlife habitat and populations including special status species.

5. Impacts on livestock management.

6. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, visual resources, and mineral values.

See Volume VII-B, for responses to general comments applicable to all WSAs and/or the statewide analysis and Volume VII-C, Section 69, for responses to specific comments about the Coal Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

An alternative that would add 3,570 acres of Federal, State, and private lands on the southeast and south-central borders of the WSA was suggested in the public comments. This alternative is not analyzed because the inclusion of State and private lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1). Other citizen-proposed alternatives are comparable to the All Wilderness Alternative of 61,430 acres.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (61,430 acres); and (3) Partial Wilderness (Proposed Action) (20,774 acres). A description of BLM's management practices with each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections with each alternative. These assumptions are indicated in each case. The analysis assumptions discussed in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 61,430-acre Coal Canyon WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, it is projected that the area would continue to be managed in accordance with the Grand RMP (USDI, BLM, 1983a). Five sections (3,116.36 acres) of State lands within the WSA (refer to Map 1) have not been identified in the RMP for special Federal acquisition through exchange or purchase. No private or split-estate lands are located in the WSA. The figures and acreages given are for Federal lands only.

- Management Conditions and Constraints

All 61,430 acres would remain open to mineral location. Four mining claims covering 80 acres are located in the WSA. Development work, extraction, and patenting would be allowed on the existing claims and any future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), without consideration for wilderness values.

Oil and gas leases could be developed on 1,400 acres under Category 1 (standard stipulations) and on 60,030 acres under Category 2 (standard and special stipulations) without concern for wilderness values. The special stipulations would restrict the use to protect watershed and wildlife. Currently, there are nine oil and gas leases in the WSA covering 5,430 acres. Of these, seven (3,610 acres) are pre-FLPMA leases and two (1,820 acres) are post-FLPMA leases.

Domestic livestock grazing use of the Coal Canyon WSA would continue as authorized (approximately 2,562 AUMs). Existing range developments (short-gap fences) could be used and maintained, and new range developments (a proposed 346-acre vegetation treatment) could be implemented without wilderness considerations.

In-stream drop structures are planned for Horse and Cottonwood Canyons to improve water quality and reduce sediment yield. Gully plugs, contour furrows, and retention dams are planned in the Sagers and Cisco watersheds to help reduce downstream salinity.

The entire WSA would be open to ORV use. Eight miles of way and 7 miles of cherry-stemmed road would remain open to vehicle use.

There is no harvest of forest products at the present time, nor is any projected in the foreseeable future due to access problems.

COAL CANYON WSA

Map 1
LAND STATUS
Coal Canyon WSA
UT-060-100C2

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 18 S

T. 19 S

T. 20

R. 21 E.

R. 22 E.

COAL CANYON WSA

The 61,430-acre WSA would continue to be managed under VRM Class II.

- Action Scenario

It is projected that implementation of the No Action/No Wilderness Alternative would result in approximately 526 acres of surface disturbance in the foreseeable future.

About 160 acres of surface disturbance would result from exploration and development of the oil and gas resource located in the WSA, including up to 50 miles of access roads. It is projected that future seismic work would locate traps that could be drilled and developed. If the initial wells are producers, additional wells would be drilled on 640- or 160-acre centers. Development would include roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. BLM's land use planning (Grand RMP) stipulates special designs on slopes of 30 percent or greater and no occupancy is allowed on slopes greater than 50 percent. It is projected that surface disturbance associated with developed leases would remain over the long term. Employment would average 10 employees for each exploration well drilled. An average of 3 to 6 months would be required to complete drilling operations at each site. A maximum of 40 employees would be required at one time. Each site would be reclaimed following abandonment. Producing wells would generally require only two employees for periodic maintenance.

In addition to oil and gas exploration and development activities, it is projected that up to 10 acres of surface disturbance would result from up to 5 miles of access road construction to in-held State-of-Utah lands. These roads would be constructed for mineral exploration and development purposes on the State lands.

About 346 acres of disturbance would result from planned vegetation treatments (burning and seeding of sagebrush parks in canyon bottoms) to improve livestock forage and distribution. Approximately 43 AUMs of additional forage would be produced. These treatments would also improve wildlife habitat. About 1 week would be necessary to complete this project. No additional rangeland or wildlife habitat projects are projected.

About 10 acres of land would be disturbed from watershed improvement activities. These would include in-stream drop structures in Horse and Cottonwood Canyons. Gully plugs, contour furrows, and retention dams in the Sagers and Cisco watersheds. These structures would help improve water quality and reduce downstream salinity.

No disturbance from ORV use is projected because all traffic would continue to be limited to the 8 miles of existing ways due to rugged terrain.

Recreational use is expected to increase over the current estimated use of 500 visitor days per year at a rate of 2 to 7 percent annually. As much as 10 percent of this use would continue to be from vehicular access.

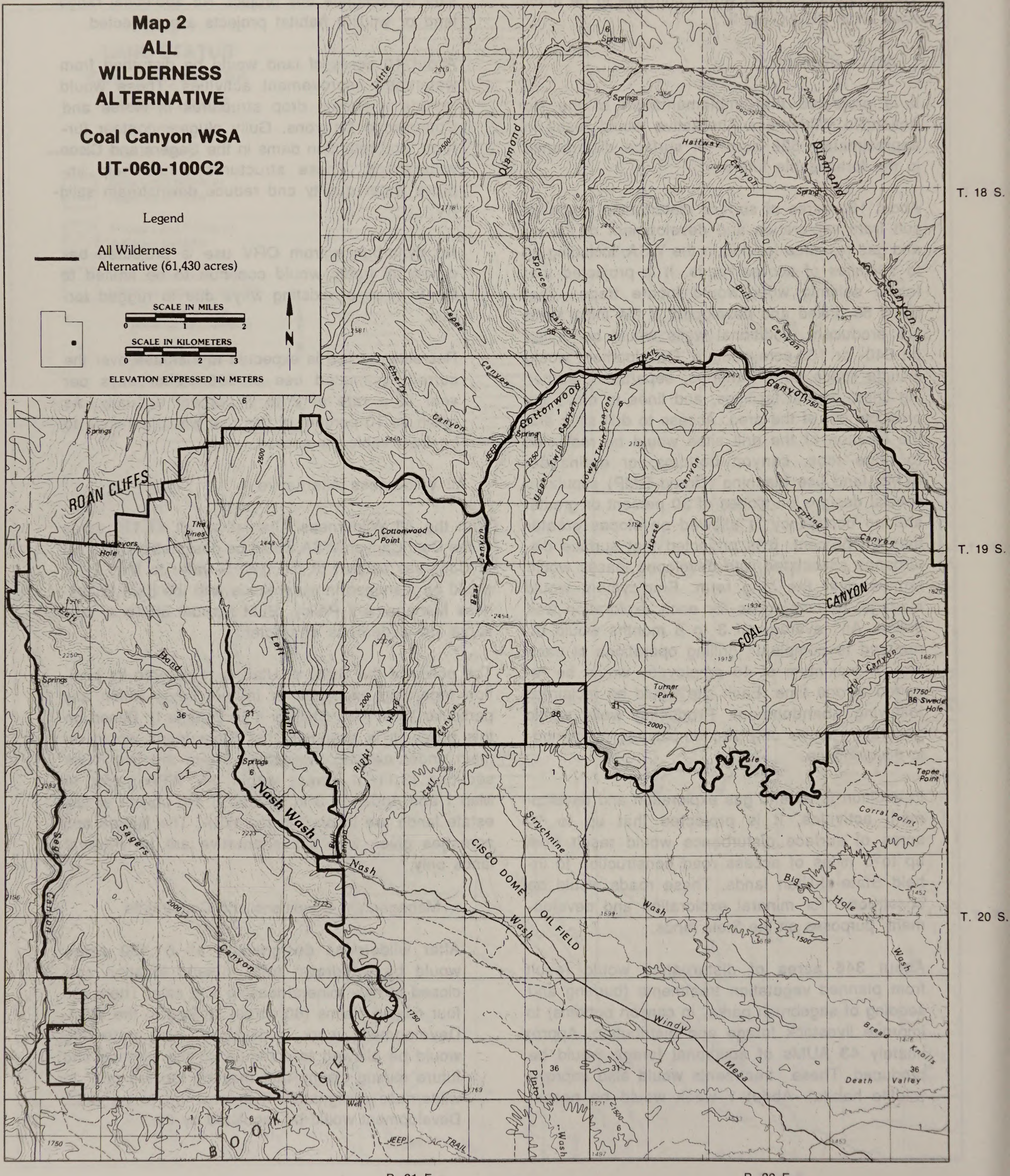
- All Wilderness Alternative

With the All Wilderness Alternative, all 61,430 acres of the Coal Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State of Utah is to reserve its position regarding exchange of in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy, it is assumed that State lands would remain under existing ownership. There are five State sections (3,116.4 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). No private or split-estate lands are located in the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 61,430 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. There are four mining claims (80 acres) located in the WSA. Development work, extraction, and patenting would be allowed to continue on the existing and future mining claims that may be located prior to wilderness designation if determined to be valid. Development would be regulated by the


Map 2
ALL
WILDERNESS
ALTERNATIVE
Coal Canyon WSA
UT-060-100C2
Legend
All Wilderness Alternative (61,430 acres)
SCALE IN MILES
0 1 2
SCALE IN KILOMETERS
0 1 2 3
N
ELEVATION EXPRESSED IN METERS
Little
Diamond
Springs
Halfway Canyon
Diamond
Spring
Spruce Canyon
Tepee
Cherry Canyon
Canyon
Bull Canyon
Canyon
TRAIL
Canyon
Cottonwood
Spring
JEEP
Upper Twin Canyon
Lower Twin Canyon
Canyon
Horse
Spring Canyon
CANYON
COAL
Dry Canyon
Swede Hole
Turner Park
Cottonwood Point
Bear Canyon
ROAN CLIFFS
The Pines
Hole
Left
Hand
Springs
Left
Hand
Hand
Right
Canyon
Calf
Nash Wash
Bull Canyon
Nash
Sagers
Canyon
Sego
Canyon
CISCO DOME
OIL FIELD
Strychnine
Wash
Wash
Big Hole
Wash
Tepee Point
Corral Point
Windy
Mesa
Bread Knolls
Death Valley
Pinto
Wash
Well
JEEP
TRAIL
B O O K
C L I F F S
T. 18 S.
T. 19 S.
T. 20 S.
R. 21 E.
R. 22 E.

unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness val-ues. Existing post-FLPMA oil and gas leases on 1,820 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. New oil and gas leases would not be issued. The 3,610 acres of pre-FLPMA leases could be developed per the stipulations attached at the time of lease issuance.

Present domestic livestock grazing would continue as authorized. The estimated 2,562 AUMs in the WSA would remain available to livestock as presently allotted. After designation, existing rangeland developments (short-gap fences) could be maintained in the same manner as in the past based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. The planned vegetation treatment (burning-and-seeding) project on 346 acres would not be allowed.

The planned in-stream drop structures and gully plugs would be allowed, if designed to blend with the wilderness environment and constructed of natural materials by hand methods. The contour furrows and retention dams would not be allowed.

The entire 61,430-acre WSA would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Four vehicular ways totaling 8 miles would be closed. About 14 miles of road or jeep trail border the WSA and two cherry-stemmed roads (5 miles in Nash Wash and 2 miles in Bear Canyon) would remain open to vehicle use.

Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 55 acres would be disturbed following wilderness designation of the Coal Canyon WSA. About 40 acres would be disturbed as a result of oil and gas exploration and development on existing pre-FLPMA oil and gas leases, including up to 15 miles of access needs. Development would be similar in nature to that discussed in the No Action/No Wilderness Alternative except on a much smaller scale. Employment assumptions are the same per well as with the No Action/No Wilderness Alternative. However, maximum employment at one time would be about 10 employees. About 10 acres would be disturbed as a result of access road construction to in-held State lands as described in the No Action/No Wilderness Alternative. About 5 acres would be disturbed from construction of watershed improvement activities, including in-stream drop structures in Horse and Cottonwood Canyons. Gully plugs would also be allowed in the Sagers and Cisco watersheds. These structures would be designed to blend with the wilderness environment and constructed with natural materials found on site and by hand methods. However, the proposed contour furrowing and retention dams would not be allowed.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain.

Primitive-type recreational use is expected to increase over the current estimated primitive use of 450 visitor days per year at a rate of 2 to 7 percent annually. Initially, recreational use may decrease slightly because vehicular access would be precluded, but motorized recreational visitor days would be replaced by primitive recreation visitor days. Commercial outfitting may increase with wilderness designation.

- Partial Wilderness Alternative (Proposed Action) (20,774 Acres)

With this alternative, 20,774 acres of the Coal Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that has the greatest wilderness values and would minimize or avoid areas of greatest mineral development potential. The area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative. The area analyzed as wilderness includes the northwestern one-third of the WSA. The remaining area (40,656 acres) within the WSA but outside of that designated as wilderness, would be managed in accordance with the Grand RMP,

COAL CANYON WSA

Map 3

PARTIAL WILDERNESS ALTERNATIVE
Coal Canyon WSA
UT-060-100C2

Legend

WSA Boundary

Partial Wilderness Alternative (20,774 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

N

ELEVATION EXPRESSED IN METERS

T. 18 S.

T. 19 S.

T. 20 S.

R. 21 E.

R. 22 E.

as described for the No Action/No Wilderness Alternative.

Because the policy of the State of Utah is to reserve its position regarding exchange of in-held lands within any particular WSA, it is assumed that the State lands would remain under existing ownership. There is one State section (640 acres) in the portion of the WSA that would be designated wilderness (refer to Map 1 and Appendix 3 in Volume I). No private or split-estate lands are located in either the designated or nondesignated portions of the WSA. The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

The 20,774-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. However, development work, extraction, and patenting would be allowed to continue on any new mining claims located prior to wilderness designation, provided that they are valid. Development would be regulated by the unnecessary or undue degradation guidelines (48 CFR 3809) with consideration given to wilderness values. Existing post-FLPMA oil and gas leases that cover 1,820 acres would be phased out upon expiration unless a find in commercial quantities of oil or gas is shown. Pre-FLPMA leases (2,335 acres) could be explored and developed per the stipulations issued at the time of leasing. The 40,656-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of existing mining claims (80 acres) and future mining claims could occur without wilderness considerations. The nondesignated area would be managed as oil and gas leasing Category 1 (standard stipulations) on 1,400 acres and Category 2 (standard and special stipulations) on 39,256 acres.

Domestic livestock grazing would continue to occur in the 20,774-acre wilderness area. The 488 AUMs would remain available to livestock as presently allotted, and the existing livestock facilities in the area (short-gap fences) could be maintained, based on necessity and reasonableness. In the 40,656-acre nonwilderness area, grazing use would be allowed as currently authorized. Use is estimated at 2,074 AUMs. Existing developments (short-gap fences) could be maintained as at present. New rangeland developments could be allowed in this area without concern for wilderness values. The 346-acre proposed vegetation treatment (burning and seeding) would be located in the nondesignated area and would be allowed.

In the 20,774-acre wilderness, in-stream drop structures would be allowed as described for the All Wilderness Alternative. In the 40,656-acre nonwilderness area, in-stream drop structures, gully plugs, contour furrows, and retention dams would be allowed as described for the No Action/No Wilderness Alternative.

The entire 20,774-acre wilderness would be closed to ORV use. About 2.5 miles of existing vehicular ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. About 1.5 miles of cherry-stemmed road and 8 miles of dirt road and jeep trail that border the partial wilderness area would remain open to vehicles. The remainder of the unit, including about 5.5 miles of way, would remain open to vehicular travel. The 5.5 miles of cherry-stemmed road in the nondesignated portion would remain open to vehicular use. The nondesignated area would be open to ORV use.

Visual resources in the wilderness area would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The nondesignated area would be managed as Class II.

- Action Scenario

BLM projects that implementation of the Partial Wilderness Alternative would result in a total of 458 acres of surface disturbance. It is projected that 22 acres would be disturbed in the designated portion of the WSA and that 436 acres of disturbance would occur in the nondesignated portion.

In the designated portion, 2 acres would be disturbed as a result of about 1 mile of access road construction to in-held State land in the Cottonwood Point area for mineral development purposes. About 20 acres would be disturbed due to oil and gas exploration and development on pre-FLPMA leases as described for the All Wilderness Alternative. A maximum of 10 employees would be required at one time. No locatable or salable mineral exploration or development on public land

is projected in the designated area. No rangeland or wildlife projects are projected.

In the nondesignated portion, 436 acres of surface disturbance is projected. About 120 acres of disturbance would result from oil and gas development as described in the No Action/No Wilderness Alternative, including up to 40 miles of access roads. A maximum of 30 employees would be required at one time. About 300 acres of the projected vegetation treatment would also be allowed. Placement of in-stream drop structures, retention dams, gully plugs and contour furrowing would be allowed and would disturb 8 acres. Eight acres of surface disturbance would result from up to 4 miles of access-road construction to inheld State lands for mineral development purposes.

No disturbance from ORV use is projected because of wilderness management restrictions and rugged terrain.

Recreational use is expected to increase over the current estimated use of 500 visitor days per year at a rate of 2 to 7 percent annually. As much as 10 percent would continue to be from motorized access to the WSA.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

At 61,430 acres, the WSA is of sufficient size to meet the wilderness criterion for size. The WSA is approximately 12 miles long north to south and 16 miles wide east to west. The WSA is between Spruce Canyon and Floy Canyon WSAs.

It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy Canyon, Desolation Canyon, Spruce Canyon, Flume Canyon, Turtle Canyon, and Jack Canyon WSAs) that are either managed as roadless or are under study for wilderness study.

- Naturalness

Human imprints within the Coal Canyon WSA are mainly in or near the central part of the WSA. For the most part, they are capable of being reclaimed to a relatively natural condition. These imprints consist of a dry drill hole site, which has been plugged and abandoned, covering 5 acres; a shut-in drill hole site (capable of production) covering 5 acres; a shut-in drill hole site (capable of production) covering 5 acres at the end of a cherry-stemmed road; and two other dry holes, each covering 5 acres. In each case, the 5 acres include the cleared work area and drill pad. Access routes are associated with each drill site. About 8 miles of ways are within the WSA.

Grazing has occurred on ridges and in canyon bottoms, but not on the steep side slopes. Mineral exploration (primarily oil and gas) has taken place in side canyons off Diamond and Cottonwood Canyons. The areas involved, either directly or indirectly in grazing and mineral exploration total about 30,715 acres (50 percent of the WSA). The remainder of the WSA (30,715 acres or 50 percent) can be considered pristine. Considered as a whole, the intrusions are substantially unnoticeable and the entire WSA essentially meets the criteria for naturalness.

- Solitude

The large size and blocky configuration of the WSA contribute to a feeling of vastness, and the rugged topography and isolated nature provide outstanding opportunities for the visitor to find solitude.

The rugged topography provides screening sufficient to obscure sights and sounds of others within the WSA. The vertical separation between the ridge tops and canyon bottoms (up to 1,000 feet) enhances seclusion and feelings of isolation. This characteristic is more pronounced in the northwestern portion of the WSA.

COAL CANYON WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (61,430 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 526 acres because of vegetation treatments oil and gas exploration and development, construction of access to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 15,357 acres of the WSA. Some special features would not be affected. Class A scenery would be reduced in quality in disturbed and surrounding areas and some wilderness dependent wildlife species would leave the area during the period of disturbance. Vehicular use of 8 miles of ways and up to 55 miles of new roads would detract from opportunities for solitude and primitive recreation.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 55 acres and indirectly reduced in quality on up to an additional 1,843 acres because of oil and gas exploration and development on pre-FLPMA leases and construction of access to in-held State lands. Special features would generally be preserved, although Class A scenery would be reduced in quality in the disturbed and surrounding areas.	Wilderness values would be preserved overall in the designated area which is approximately 34 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 458 acres because of mineral exploration and development, construction of access roads to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 12,286 acres. Almost all of the impact would be in the nondesignated area. Some special features would not be affected. Class A scenery would be reduced in quality in the disturbed and adjacent areas and some wilderness dependent species would temporarily leave the area. Use of 8 miles of vehicular ways and up to 45 miles of new roads mostly in the nondesignated portion would detract from opportunities for solitude and primitive recreation.
Impacts on Vegetation	Approximately 0.85 percent (526 acres) of the vegetation in the WSA would be modified with this alternative. The Category 2 candidate species that may be located in the WSA would not be significantly affected because protective measures would be required.	Vegetation types and special status plant species would be protected because potential surface disturbance would be reduced from 526 acres to 55 acres and the area would be closed to ORV use.	Approximately 0.75 percent (458 acres) of the vegetation in the WSA would be modified. Vegetation types and special status plant species would not be significantly affected with this alternative because the potential for major disturbance would be reduced on 32 percent of the WSA. In addition, protective measures would be required on the remainder of the area.

COAL CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (61,430 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Development	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims, and mineral developments could occur without restriction for the protection of wilderness values.	The portion of the projected 10 to 50 million barrels of oil and 60 to 300 billion cubic-feet of natural gas in pre-FLPMA lease sin the WSA could be produced. Recovery of an unknown but locally significant amount of oil and gas would be foregone because only 6 percnt (3,610 acres) of the WSA could be developed for oil and gas. Loss of potential for recovery of other minerals would not be significant because the probability of development is low even if the area is not designated wilderness.	Partial wilderness designation would preclude or constrain potential exploration and development of an unknown portion of 10 to 50 million barrels of oil and 60 to 300 billion cubic-feet of natural gas that may occur in the WSA because only 70 percent of the WSA could be developed for oil and gas.Loss of exploration and development opportunities for other mineral and energy resources would not be significant because the probability of development is low even if a portion of the WSA is not designated wilderness.
Impacts on Wildlife Habitat and Populations	Implementation of the land treatment would benefit some wildlife species and population levels by providing additional forage and ecotones. Surface disturbance on 0.85 percent (526 acreS) of the habitat in the WSA may displace or reduce populations of some wildlife species during the lifetime of the projects. Crucial winter range would be disturbed. Special status species would not be significantly adversely affected because protective measures and mitigation would be requires.	Only about 0.09 percent (55 acres) of the habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed land treatment project which would have benefitted some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Special status species would be protected.	Wildlife would benefit from a reduced acreage of surface disturbance when compared to the No Action/No Wilderness Alternative. Only 0.75 percent (458 acres) of the habitat in the WSA would be disturbed. Approximately 300 acres of vegetation treatment would be allowed in the nondesignated portion, which would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 40,656 acres not designated. Crucial deer and elk winter range would be disturbed. Special status species would not be significantly affected because protective measures and mitigation would be required.

COAL CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (61,430 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Livestock Management	With this alternative, there would be no changes in livestock use or management techniques. Surface disturbances resulting from mineral exploration and development would reduce forage production by about 7 AUMs per year. This would not significantly impact grazing. The proposed 346-acre burning and seeding project could be completed to provide an additional 43 AUMs of livestock forage and to improve livestock distribution.	No change in livestock authorization would occur with this alternative. Restrictions on predator control would result in slightly increased costs of livestock management for two livestock permittees on sheep allotments. The proposed 346-acre burning and seeding that would produce 43 AUMs would not be allowed.	Livestock management practices and grazing levels would not be significantly affected. Only 6 AUMs of potential forage would be foregone because 46 acres of proposed vegetation treatment would not be allowed.
Impacts on Economic Conditions	Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $17,835 annually to the local economy by the year 2020. The WSA could contribute up to $52,100 annually in local livestock and $4,011 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $122,860 to over $250,000 per year in Federal and State revenues. Federal revenues from commercial recreation outfitting (currently $50 annually) would continue.	Present economic conditions would not be affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percnt of the projected Grand County employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Annual local sales and Federal revenues related to livestock grazing could be reduced by $860 and $66 respectively as compared to the No Action/No Wilderness Alternative because proposed vegetation treatments would not be possible. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $115,640. Annual royalty payments on pre-FLPMA leases would not be reduced, but potential royalties of up to $100,000 per year from wells on 94 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $17,835 annually to the local economy by the year 2020. Federal revenues from commercial recreation outfitting would probably increase if the area receives recognition from wilderness designation.	Present economic conditions would not be affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 30 percent of the area. Annual local sales and Federal revenues related to livestock grazing could be reduced by $120 and $9 respectively as compared to the No Action/No Wilderness Alternative. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $36,878. Annual royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced but potential royalties of up to $100,000 per year from potential wells on 30 percent of the WSA would be foregone. Recreation-related local sales would be about the same as with the No Action/No Wilderness Alternative. Federal revenues from commercial recreation outfitting would probably increase if the area receives recognition from wilderness designation.

The effectiveness of vegetation screening is less on steep slopes because there are wide bands of rock outcrop. Areas of Douglas fir forest in higher elevations provide better screening. Areas of mountain shrub provide dense thickets, but screening potential is largely determined by overall vegetation height. Canyon bottoms vegetated with sage generally do not provide cover from lines of sight from slopes and ridge tops above.

Sights and sounds from outside the WSA include drilling along boundary roads, pipeline development, and use of motorized equipment along the perimeter of the WSA. Given the size and topography of the WSA, the affect of these activities on wilderness values is insignificant.

There is good potential that vistas toward the southeast, as viewed from Diamond Ridge and other high points, would be adequate to give a visitor the feeling of vastness.

The deeply incised, branching drainages within the WSA provide many travel routes that allow dispersion of recreational use.

All in all, the entire WSA meets the requirements for outstanding opportunities for solitude.

- Primitive and Unconfined Recreation

The many drainages and the dissected terrain provide several potential hiking routes up canyon bottoms and along ridge tops. Opportunities for hiking and backpacking are considered outstanding throughout the WSA, as are opportunities for hunting. Logical travel routes are along the headwaters of the various drainages at the northern end of the WSA.

The entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

- Special Features

Ecologic, geologic, scenic, wildlife, and potential archaeologic values are special features in the WSA. The WSA covers part of an area of critical watershed and provides habitat for animals that shy away from areas of human occupation.

One animal species (black-footed ferret) listed as endangered may inhabit the WSA. There are six animal species and one plant species that are considered sensitive that may occur in the WSA. The WSA has year-round populations of elk, cougar and black bear, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.

The WSA has approximately eight miles of perennial streams. Some erosional features of scenic interest occurring in the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches. The area has potential for important vertebrate fossils.

The entire WSA is rated Class A for scenic quality.

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types of juniper-pinyon woodland, mountain mahogany-oak scrub, saltbush-greasewood, and Douglas fir forest. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour drive from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA and surrounding area have been designated Class II air quality under the PSD regulations. The nearest Class I area is Arches National Park, about 30 miles south. Canyonlands National Park, another Class I area, lies about 60 miles southwest. No significant sources of air pollution are close enough to affect the WSA and overall air quality is good. Visibility from higher elevations of the WSA is important because of scenic vistas from the WSA across the Book Cliffs and Cisco Desert. Median visual range is about 123 miles (Aerocomp, Inc. 1984).

Geology and Topography

The WSA is in the Book Cliffs, a physiographic feature which runs from east of Grand Junction, Colorado, to northwest of Green River, Utah. It is part of the Uinta Basin section of the Colorado Plateau Physiographic Province.

COAL CANYON WSA

The WSA is along the south-facing Book Cliffs escarpment, with part extending northward towards the Roan Cliffs. Elevations range from 5,200 feet at the mouth of Coal Canyon in the eastern end of the WSA to 8,900 feet along Cottonwood Point in the northwestern part of the WSA. The tract is underlain by sedimentary rocks of Triassic, Jurassic, Cretaceous, and Tertiary age. At the base of the tract along its southeastern side, the Mancos Shales and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River formations. In the northwestern part of the WSA, the oil-shale rich Parachute Creek Member of the Green River Formation crops out in an irregular band. All strata in the vicinity of the WSA dip gently northward to the Uinta Basin. Important vertebrate fossils may be found within the Chinle, Morrison, Cedar Mountain, and Green River formations.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Cedar Mountain, Entrada, and Navajo. The Morrison and Chinle formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth, but indications are that ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation.

Differential erosion of the layers of sandstones and shales has created the distinctive banded appearance characteristic of the Book Cliffs. In the higher elevations toward the Roan Plateau, slopes lose the steep appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Soils

The Coal Canyon WSA contains five general soil mapping units running in broad bands southwest to northeast across the WSA. About 40 percent (24,572 acres) of the area is composed of shallow and deep stony soils on steep sides of canyons. The overall soil characteristics are shown on Table 2. Erosion throughout the WSA is critical because of steep slopes and a tendency towards erosion due to flash flooding. Erosion is generally natural in origin, occurring from both wind and water. Table 3 indicates erosion condition for the WSA.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	20	12,286	0.0	0
Shallow loamy soils on sloping cuestas and structural benches	10	6,143	1.0	5
Shallow and deep stony soils on steep canyon and mountainsides	40	24,572	1.0	10
Moderately deep and deep loamy soils on steep mountainsides	10	6,143	1	20
Very deep loamy soils on sloping alluvial fans and floodplains	20	12,286	0.1	1
Totals	100	61,430		

Source: Hansen, 1985.

About 60 percent (36,858 acres) of the soils in the WSA are considered strongly saline and 40 percent are considered slightly saline. Annual salt production from soils in the WSA is estimated to be 90 lb per acre.

Fair seeding suitability occurs on approximately 20 percent (12,286 acres) of the WSA. On these areas, soils are moderately deep to deep on alluvial fans and terraces in canyon bottoms or drainages. The remaining portion of the WSA has steep slopes, shallow and/or stony soils, and rock outcrops which make successful seeding difficult.

Vegetation Including Special Status Species

Existing vegetation is predominantly pinyon-juniper woodland of varying density, with high desert plant communities found along the lower elevations in the southern portion of the WSA. Mountain shrub communities are found along ridgelines towards the Roan Cliffs, especially on north-facing slopes. Some Ponderosa pine, Douglas fir, aspen, cottonwood, and box elder are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs. Riparian-sagebrush communities cover approximately 4 percent (2,457 acres) of the WSA and occur in the canyon bottoms.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	10	6,143	122,861
High	10.0	-	-	-	40	24,572	245,720
Medium	5.0	-	-	-	10	6,143	30,175
Low	1.0	60	36,858	36,858	20	12,286	12,286
Very Low	0.1	20	12,286	1,229	-	-	-
None	0.0	20	12,286	-	20	12,286	-
Totals		100	61,430	38,087[a]	100	61,430	411,042[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.62 under present conditions; 6.7 if disturbed).

Vegetation communities are localized depending on elevation, availability of water, and slope aspect. Table 4 lists existing vegetation types of the WSA. One Category 2 candidate species, Physaria acutifolia var. purpurea may occur in the WSA (see Appendix 4 in Volume I). There are no threatened, endangered or other special status plant species known to occur in the WSA.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir forest	6,030	10
Pinyon-juniper woodland/Douglas fir/ mountain shrub	47,229	77
Pinyon-juniper woodland	4,914	8
Riparian/sagebrush	2,457	4
Sahadscale/salina wildrye	800	1
Total	61,430	100

Source: USDI, BLM, 1983a

The Coal Canyon WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA are listed on Table 5.

Water Resources

The Coal Canyon WSA is located within a sub-basin to the Colorado river in the Upper Colorado River hydrologic region. Major drainages include Cottonwood Canyon, along the northern border of the WSA; Horse, Coal, and Spring Canyons in the eastern half; and the upper forks of Bull Canyon and Nash Wash in the western portion. Cottonwood Creek is a perennial stream flowing for approximately 8 miles along the northeast boundary of the WSA. All other canyons have intermittent streams. Sections of Cottonwood Creek have been identified as damaged by floods and contributing to sediment damage. The potential exists for watershed treatments to minimize downstream damage. Adjacent areas contributing to sediment and runoff would also be considered for treatment. In-stream drop structures are projected for Horse and Cottonwood Canyons to improve water quality. Gully plugs, contour furrows, and retention dams are planned in the Sagers and Cisco watersheds to help reduce downstream salinity.

Table 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	34,229	56
Saltbush-greasewood	17,201	28
Mountain mahogany-oak scrub	7,500	12
Douglas fir forest	2,500	4
Total	61,430	100

Source: USDI, USGS, 1978.

There are no developed springs within the WSA although geologic conditions are favorable for natural springs and seeps. In the far western half of the WSA, 22 unnamed springs have been inventoried. No springs or wells have yet been inventoried in the central or eastern sections of the WSA. The two major geologic formations in which the 22 inventoried springs are located also exist in the central and eastern areas of the WSAs. Water quality in the known springs is good.

COAL CANYON WSA

The WSA is located within Water Right Adjudication Area 01. The water within this area is not fully appropriated. Consideration may be given for appropriation of isolated springs, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in this area (UDNRE, DWR, 1988).

Since the waters from this WSA drain into the Colorado River, the water quality standards for the Colorado River apply. The water quality standards for Colorado River and tributaries, from Lake Powell to the Colorado state line are as follows: Class 1C (protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health); Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]); Class 3B (protected for warm water species of game fish and other warm water aquatic life); and Class 4 (protected for agricultural uses including irrigation of crops and stockwatering).

Surface water quality for Cottonwood Creek is considered reasonably good based on samples obtained at the irrigation division downstream from the WSA. The highly saline Mancos Shale is only exposed in the very lower reaches of the WSA; therefore, for the most part, surface water quality in the WSA is acceptable for recreation, wildlife, livestock, and agricultural uses. Data are not available on the amount or quality of groundwater in the WSA.

Mineral and Energy Resources

The energy and mineral resource rating summary for the Coal Canyon WSA is given in Table 6. Appendix 5 in Volume I explains the mineral and energy resource rating system.

There are no materials currently listed as strategic and critical known to occur within the WSA (USDoD, 1988).

- Leasable Minerals

Currently, there are no active drilling, mining, or exploration activities for leasable minerals occurring in the WSA.

- Oil and Gas

The WSA is located along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields producing from the Jurassic Entrada and Morrison Formations and the Cretaceous Cedar Mountain and Dakota formations. Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA. Portions of two known oil and gas fields cover 7,209 acres (12 percent) of the WSA.

Table 6
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 3	c3	10 to 50 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Coal	f 3	c4	80 million metric tons (in-place)
Tar Sand	f 2	c2	Less than 10 million barrels
Oil Shale	f 2	c4	Less than 10 million barrels
Uranium	f 2	c2	Less than 500 metric tons of uranium oxide

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

The interior of the WSA has been drilled, but none of the wells have produced. Two of the wells are shut-in gas wells and one well has been plugged and abandoned. A major oil and gas field is located 10 miles southeast of the WSA.

Approximately 50 holes have been drilled for oil and gas within 10 miles of the WSA. Twenty of these wells have been plugged and abandoned. The remainder of the wells are oil and gas producers. Of these, 24 are gas wells and six are oil wells.

Leasing and drilling activity has been high. Some of the fields on the perimeter of the WSA include the Book Cliff, Left Hand Canyon, Bull Canyon, and Cisco Dome fields. The largest fields in the vicinity of the tract are located 10 to 15 miles northeast of the WSA. San Arroyo, the largest of the group, produced about 89 billion cubic feet of gas through 1984 since its discovery in 1962. Other relatively large fields in this area include Bar X (more than 50 billion cubic feet of gas produced) and Westwater (about 30 billion cubic-feet of gas produced).

The favorability of f3 for the tract indicates a recoverable reserve of 10 to 50 million barrels of

oil and/or 60 to 300 billion cubic feet of gas. The moderate certainty of c3 is conservative with a more realistic certainty rating for the WSA approaching c4 (SAI, 1982).

The WSA contains nine oil and gas leases covering 5,430 acres. Seven of the leases are pre-FLPMA (3,610 acres) and two are post-FLPMA (1,820 acres). Portions of two units, Willow Creek East and Book Cliffs, are located in the WSA.

Under the 1975 BLM oil and gas category system (USDI, BLM, 1975a), all of the WSA originally was classified as Category 1 (standard stipulations), but has been revised in the Grand RMP to Category 1 (1,400 acres) and Category 2 (60,030 acres). The Category 2 classification would restrict winter use to protect critical watershed and elk habitat.

- Coal

The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary formations. Coal in the WSA is found in the Cretaceous Mesa Verde Group. Coal outcrops occur in the southern border of the WSA. Most of the WSA lies within the Sego coal field, which is about 65 miles long, 6 miles wide, and extends from the Green River to the Colorado state line. The Sego field comprises only a small part of the demon-strated coal reserve base of Utah, with recover-able reserves of the 293.6 million short tons of coal in beds of 4 or more feet thick. The Sego field was mined from 1912 to the early l950s, but not within the WSA. A coal withdrawal is shown on some plats, but was revoked in 1982.

The rating for coal is f3 favorability with a high certainty of c4 for occurrence (SAI, 1982). The highest potential for coal is within the western and southern end of the WSA and about 16,935 acres are within the former Thompson KRCRA originally designated in 1978. Some 13,760 of these acres are considered to contain an in-place resource of 80 million tons of which 38 million metric tons could be recovered. The remaining acres in the KRCRA are not believed to contain recoverable coal. None of the WSA is currently leased for coal.

- Tar Sand and Oil Shale

Tar sand and oil shale may exist in the WSA; however, neither have been leased and potential for development is considered very low due to unfavorable geologic conditions. These resources are rated within the WSA as having much less than 10 million barrels of oil from tar sand and less than 10 million barrels of oil from oil shale. A Special Tar Sand Area (STSA) does not extend into the WSA. The rating for tar sand is an f2 favorability with a low certainty of c2 for occurrence. The oil shale rating is f2 favorability with a high certainty of c4 for occurrence (SAI, 1982).

- Geothermal

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees Centigrade). It seems very unlikely, however, that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low-temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA. The rating is an f1 favorability with a moderate certainty of c3 that geothermal resources do not exist (SAI, 1982).

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA. There are presently four mining claims, covering 80 acres.

- Uranium

The WSA has been rated as having an f2 favorability with a low certainty of c2 for uranium (SAI, 1982). The uranium potential would be less than 500 metric tons of uranium oxide mill occurrence in a geologic environment only marginally favorable for the resource to occur. The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, the other major uranium-producing zone regionally, lies an additional 600 feet below the

Morrison. Both are too deep to be considered favorable for production. The Wasatch Formation contains small anomalous uranium deposits. Because the Wasatch Formation is present within the WSA, it may have marginal potential for uranium.

- Salable Minerals

Minor amounts of sand and gravel can be found in drainages and on benches in the WSA. However, they are not of economic interest due to the presence of much better and more accessible deposits elsewhere.

Wildlife Including Special Status Species

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, mountain lion, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food and cover.

The WSA supports moderate to high populations of big game species. Most common is mule deer. Approximately 415 to 425 animals inhabit the area, moving to lower elevations in winter. Elk can be found yearround: about 40 winter within the WSA. Approximately 34,300 acres of the WSA are high value winter range for deer and 19,600 acres are high quality elk winter range. Approximately 25,300 acres in the southern portion of the WSA are critical winter range for deer and 300 acres are critical elk winter range (USDI, BLM, 1990).

The WSA favors wildlife because of its relative lack of human activity. Three species present are very sensitive to human intrusion: black bear, mountain lion. Remote and isolated conditions greatly enhance habitat favorability for these species.

Upland game found in the WSA include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffled grouse, and cottontail rabbit. A limited number of ducks inhabit Cottonwood Creek except in winter.

Cottonwood Creek is a perennial stream that has potential for supporting a population of trout. No game fish presently inhabit this stream. Several species of nongame fish (dace, shiners, suckers, and killifish) are present.

There are several species of reptiles and amphibians present. The most common are horned lizard, Great Basin sagebrush lizard, northern tree lizard, side-blotched lizard, whiptail lizard, gopher snake, smooth green snake, striped whipsnake, and midget faded rattlesnake. Several species of amphibians such as the red-spotted toad, Rocky Mountain toad, Great Basin spade foot toad, canyon tree frog, and Utah tiger salamander could be present along the Cottonwood Creek drainage.

The most common birds in the WSA are red-tailed hawk, golden eagle, American kestrel, great horned owl, goshawk, sharp-skinned hawk, Cooper's hawk, blue jay, pinyon jay, sparrows, juncos, swifts, swallows, king birds, kinglets, nuthatches, and magpies.

No wildlife transplants are planned in the WSA. There are no existing or proposed wildlife management facilities or habitat improvement projects planned within the WSA.

The endangered black-footed ferret may inhabit the WSA. Five candidate species (the ferruginous hawk, long-billed curlew, southern spotted owl, Great Basin Silverspot butterfly, and western yellow-billed cuckoo) may also occur in the WSA. If present, most of these species would be associated with riparian and wet meadow areas or cliff faces and deep canyons, except for the ferruginous hawk. The ferruginous hawk inhabits pinyon-juniper woodland areas where there are ecotones or edges that provide opportunities for nesting, cover, and hunting activities. No other special status species are known to occur in the WSA.

Forest Resources

No harvest of forest resources is known to have taken place within the WSA. Adequate volumes for timber harvest are present in most of the tree-dominated vegetation types and could produce limited amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees. However, slopes are prohibitive to production in most of the WSA, accessibility is very poor, distance to a mill is not favorable, and growth of trees is slow. More suitable stands are available elsewhere. As a result, there is no commercial or noncommercial interest in forest products within the WSA. There are approximately 6,030 acres of Douglas fir forest, 4,914 acres of pinyon-juniper woodland, and 47,229 acres of pinyon-juniper woodland/Douglas fir/mountain shrub mix in the WSA. None of the forest types are capable of

yielding 20 cubic feet of commercial wood per acre per year. At present, approximately 58,173 cords of pinyon-juniper woodland and 9,049 cords of Douglas fir firewood are potentially available but are not likely to be harvested in the foreseeable future.

Livestock and Wild Horses/Burros

The Coal Canyon WSA contains portions of five grazing allotments and approximately 2,562 AUMs. Information concerning these allotments is presented in Table 7. There is little use of vehicles for livestock management inside the WSA.

Range developments in the WSA are limited to shortgap fences, which run across drainages from rim to rim. The areas above and below these fences serve as management units. The potential exists for vegetation treatments (spraying, burning, or chaining and seeding) in wider canyon bottoms to remove overgrown sagebrush, which would increase forage. Approximately 346 acres in the WSA have been identified for burning and seeding. An additional 43 AUMs would result from this treatment.

APHIS conducts predator control in BLM grazing allotments that comprise the WSA. A total of 55 coyotes were taken in the allotments in and surrounding the WSA during 1986 to 1987 period (USDA, APHIS 1988). Of the coyotes, 26 were taken from aircraft, 28 by cyanide guns (M-44s), and one by calling. The WSA comprises between 11 and 100 percent of the area of any one allotment. It is not known what proportion of the predators were actually taken within the WSA. The combined, confirmed livestock losses for 1986-1987 in these allotments were eight sheep.

Wild horses or burros are not known to inhabit the WSA.

Visual Resources

The Coal Canyon WSA has steep slopes that present 10- to 50-foot high sheer stone faces alternated with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give a striped appearance to the slopes that is noticeable some miles away. Towards the Roan Cliffs in the northern half of the WSA, rock outcrops shade to reddish-brown, as the name implies. Landforms are more dissected in the Roan Cliffs, and are chiseled to sharp and intricate ridge lines.

A visual resource inventory classified the entire WSA as Class A scenery, which is scenery that contains the most outstanding visual characteristics of the physiographic region (Roy Mann Associates, Inc., 1977). The entire WSA is in the foreground/middleground zone visible from boundary roads. The sensitivity level has been rated as high over about 26 percent (15,972 acres) of the WSA, medium over 36 percent (22,115 acres), and low over the remaining 38

Table 7
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Cottonwood	29,936	16,630	900	423	185 Cattle	06/01-10/15	1
Thompson Canyon	12,280	1,300	500	45	89 Cattle	05/20-11/10	1
Bogart	10,790	10,790	209	209	817 Cattle 13 Horses	06/15-11/15	1
Cisco Mesa	48,260	7,740	3,180	381	381 Sheep	11/15-05/15	1
Cisco	126,407	24,970	7,961	1,504	400 Cattle 3,810 Sheep 30 Horses	10/25-06/20 12/01-04/30	2
Total	227,673	61,450	12,750	2,562			6

Source: BLM File Data.

percent (23,343 acres), reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors, the entire WSA is managed as VRM Class II. An explanation of the BLM VRM system can be found in Appendix 7 in Volume I.

Cultural Resources

Prehistoric cultures represented in the region include the Paleo-Indian, Desert Archaic, Fremont, Anasazi, Ute, and historic European.

The earliest human occupation of the region is by the Paleo-Indian big game hunters. They dated from about 5,500 to 10,000 B.C. and followed migrating herds of giant Pleistocene animals such as mammoths and bison antigus. Over half the Paleo-Indian points found in Utah are from the Moab vicinity, and research may yield finds in the WSA.

Archaic peoples are better represented in the region and possibly were more numerous. Evidence from their broad range of foraging pursuits is found in nonceramic open campsites and caves and rockshelters. Cave excavations at locations not in the Coal Canyon WSA show a long occupation from about 6,060 B.C. to A.D. 500, depending on interpretation.

The Formative or sedentary agricultural culture which followed took two forms: the Anasazi and the Fremont. The WSA occurs in the border area between these two groups, but large numbers of Fremont ceramics at the Turner-Look site suggest their dominance in the area. Both Fremont and Anasazi cultures had ended in the area by about 1,300 A.D.

Evidence for the Ute nomadic foragers follows the end of the Formative cultures in the area. Sites consist of caves and open camps, as well as wickiup pole and brush structures.

European influence in the region dates from the Dominguez-Escalante Expedition of 1776, followed by Mexican traders on the Old Spanish Trail and French fur trappers in the 1810 through 1840 era. The latter are represented by an inscription by Antoine Robidoux, dating to 1837, located in Westwater Canyon to the east. American explorers crossed the region just south of the WSA in the 1850s just before the first Anglo-American settlement was also attempted at Moab. Permanent American settlement occurred in the late 1870s and early 1880s, with ranching spreading to the region by that time.

As a result of the Central Coal Project (Hauck, 1977), approximately 700 acres have been intensively inventoried within the boundaries of the WSA and two sites have been recorded (USDI, BLM, 1988). Both sites are small prehistoric lithic scatters. Using these data, an average site-density estimate of 66 sites per 23,000 acres was computed for the WSA. This is slightly lower than estimates computed for the Book Mountain Planning Unit as whole (78 sites per 23,000 acres) (Hauck, 1977). This inventory was not designed specifically for the WSA, thus, statistics based on it may be unreliable. However, the potential for finding additional sites in the unit is considered to be moderate. Most of these sites would probably be small lithic scatters, but Fremont habitation sites or rockshelters may also be present.

Recreation

The primary recreational use is hunting. Due to the steep slopes and lack of roads within the WSA, hunters use four-wheel drive vehicles and motorcycles to drive up the road in the bottom of Cottonwood Canyon (this road separates Coal Canyon and Spruce Canyon WSAs) and hunt the hillsides on foot or by horseback.

Additional recreation opportunities in the WSA include hiking, cross-country skiing, horseback riding, backpacking, camping, and sightseeing. The entire WSA is open to ORV use although the rugged terrain presents a natural barrier to ORV use. Currently, recreational ORV use (not related to hunting access) is very low on the approximately 8 miles of way due to the distance of the WSA from population centers and the presence of attractive ORV use areas more accessible from population centers. There are no designated trails, campgrounds, or other recreational facilities within the WSA.

The total recreational use is estimated at approximately 500 visitor days annually. As much as 10 percent (50 visitor days) is from motorized access to the WSA while the remaining 90 percent (450 visitor days) is from primitive recreation. Abou 10 visitor days annually are related to commercial use. Use is low due to the remoteness of the WSA and the limited access available.

Land Use Plans

The Coal Canyon WSA is located in the BLM Grand Resource Area. The current BLM planning document for the WSA is the Grand RMP (USDI, BLM, 1983a).

COAL CANYON WSA

Wilderness is not addressed in the RMP. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

Current land use of the Book Cliffs area is mainly oil and gas exploration activities, hunting, recreation, and livestock grazing. The WSA is BLM-administered public land except for five State sections (3,116.36 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. Of the 3,116.4 acres of in-held State land, 2,476.4 are under lease for oil, gas, and hydrocarbons; 1,280 are under lease for coal; and 1,836.4 acres are under lease for grazing. The only current activity on these lands is livestock grazing and oil and gas exploration (UDNRE, DSLF, 1988).

The WSA is contiguous for about 5 miles with a large block of State land in the Roan Cliffs designated as a State roadless area that has not been open to leasing since 1975. The 48,491.9-acre State land area, northeast of the WSA, was described as "unique areas due to their isolation, wilderness qualities, and other natural esthetics. The ever-present possibility of destructive erosion occurring on this fragile watershed has prompted the Board of State Lands . . . to declare [this area] as being roadless and no vehicles of any kind are to be allowed in this area" (UDNRE, BSLF, 1976). This declaration was subject to existing rights of mineral lease holders.

Private lands used for ranching adjoin the WSA on the southwest.

BLM has prepared a transportation plan (USDI, BLM, 1981b) which indicated engineering feasibility should access roads be proposed in the WSA. The purpose of this plan is to control location of roads and provide construction standards for roads built as a result of oil and gas activities. There are no existing rights-of-way within the WSA. Oil field development of pre- and post-FLPMA leases could involve right-of-way applications for access roads or oil and gas pipelines. Normally, rights-of-way are not required for on-lease development.

Access to the WSA currently is from I-70 by about 12 miles of graded dirt county roads (Cottonwood Canyon). It can be accessed directly from the Sego Canyon road (Thompson exit) and from the east Cisco exit. It can also be accessed from roads up Nash Wash, about 25 miles from the west Cisco exit. Roads below the Book Cliffs are maintained for oil field operations; above the cliffline they are sometimes impassable after wet weather or heavy snow.

The WSA is contiguous to three other BLM WSAs in Grand County (Floy, Spruce, and Flume Canyons). The four are very similar in terms of landforms, ecosystems, and development pressures.

The Grand County Master Plan (UofU, BCD, 1979) recognizes mineral potential in the Book Cliffs area but does not make specific management directives.

The Grand County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The Coal Canyon WSA is located in north-central Grand County. The nearest communities are Thompson (population 200), about 10 miles southwest, and Cisco (population 45), about 15 miles southeast. Services are available in Thompson, but not in Cisco. The closest major communities, or main gateways, to the WSA are Green River and Moab, Utah (66 and 67 road miles, respectively), and Grand Junction, Colorado (64 road miles).

Grand County can be characterized as rural and sparsely populated. The majority of the county is unpopulated with 97 percent of the settlement concentrated in the Moab area.

From 1970 to 1980, the population of Grand County grew from 6,688 to 8,250, an overall increase of about 23 percent. Table 8 presents baseline and projected population data for Grand County. It is estimated that between 1980 and 1987, population decreased to about 7,250. Population projections for the county indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

Table 8
Baseline and Projected Population and Employment Growth
Grand County

	1980	1990	2000	2010
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900

Source: Utah Office of Planning and Budget, 1987.

- Employment

Grand County is part of the Southeast MCD. Table 9 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trade (15 percent) and services (8 percent).

Table 9
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

It is projected that by the year 2010, employment in the MCDwill increase by 27 percent and that services will increase to 18 percent and transportation to 17 percent of the total, while government will decline to 15 percent and mining to less than 20 percent of the total MCD employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent by the year 2010 (Utah Office of Planning and Budget, 1987).

- Sales and Revenues

Economic-related activities in the WSA include leasable mineral exploration and production, livestock grazing, and recreation mostly related to hunting. Table 10 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 10
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	0	$10,860
Livestock Grazing	$51,240	$3,945
Recreational Use	$ 2,050	$ 50
Total	$53,290	$14,855

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Past oil and gas activities within the WSA boundaries have brought an unquantified but likely minor increase in income and employment to the area.

The WSA has four mining claims that appear current in assessment work. Regulations require a $100 annual expenditure per claim for labor and improvements. An undetermined part of this expenditure is spent in the local economy.

Six livestock operators have grazing privileges in the WSA. Based on the average consumption of 2,562 AUMs of forage by cattle, it is estimated that the WSA accounts for $51,240 of livestock sales, including $12,810 of ranchers' returns to labor and investment.

Expenditures associated with deer hunting in the South Book Cliffs Deer Herd Unit contribute an estimated $40,000 annually of wage salary and proprietors' income to the local economy. Some of this hunting takes place within the WSA. The WSA provides habitat for mule deer, and comprises about 10 percent of the acreage in Deer Herd Unit 28B. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Coal Canyon WSA is estimated at about 500 visitor days per year.

The WSA generates revenues to the Federal Treasury from three sources: mineral leases, grazing fees, and commercial recreation. Within the WSA, 5,430 acres are currently leased for oil and gas. At $2 per acre, this generates $10,860 annually. Half of these monies are allocated to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development.

Based on the average 2,562 AUMs of forage consumed by livestock in the WSA (at $1.54 per AUM grazing fee), the WSA can potentially account for $3,945 of annual grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM District for the construction of range development projects.

Over the past 3 years, two commercial outfitters have been permitted to run commercial hunting trips within the adjacent Flume Canyon WSA, with some incidental use of the Coal Canyon WSA. The amount of use in Coal Canyon has generated an average of about $50 of revenue to the Federal Treasury annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Coal Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on all 61,430 acres).

In the foreseeable future, disturbance of approximately 526 acres from oil and gas exploration and development, vegetation treatments, providing access to State in-holdings, and from watershed treatments would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Some special features, including special status species, geological features, and archaeological values would not be significantly affected because the disturbance would involve only 0.85 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Refer to the Wildlife and Vegetation Including Special Status Species sections for more information). Class A scenery would be reduced in quality in the disturbed and surrounding areas.

During the period of activity, the visual and audible disturbance from mineral exploration and development, vegetation treatments, and other disturbance would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. As much as 25 percent (15,357 acres) of the WSA could be so affected in the foreseeable future. Some wildlife associated with wilderness would leave the area of direct and indirect disturbance during the period of activity. Hunting is the most popular recreational activity and would be highly influenced by impacts to wildlife and their habitat.

Because future vehicular use would generally be limited by terrain to existing vehicular ways and future roads, no additional disturbance from ORV activity is anticipated in the future. The continued vehicular use of 8 miles of existing ways, and use of future mineral roads and access roads to State in-holdings, would detract from opportunities for solitude and primitive recreation.

The gradual increase in visitor use would not be expected to significantly reduce wilderness values. This is because the additional use is expected to be small and largely primitive in nature, and the WSA is large enough to incorporate the additional use adequately, particularly in conjunction with adjacent WSAs.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on about 526 acres and the quality of opportunities for solitude and primitive recreation would be indirectly reduced on up to 15,357 acres. Class A scenery would be reduced in quality in the disturbed and surrounding areas and some wildlife associated with wilderness may leave the areas of direct and indirect disturbance during periods of activity.

- Impacts on Vegetation Including Special Status Species

A total of 526 acres of surface disturbance is projected to occur in the WSA in the foreseeable future. The anticipated disturbance (0.85 percent of the WSA)

would not result in major changes in vegetation types. Disturbance resulting from oil and gas activities could alter the composition of portions of the riparian-sagebrush community over the long term, if development occurred there. The vegetation treatment project for livestock would result in a planned vegetation change from sagebrush to grass species on 346 acres. It is projected that the grass vegetation would be maintained over the long term. However, once active maintenance ceased, the area would eventually revert back to a sagebrush community.

The 10 acres of disturbance resulting from access-road construction to State lands would also remain over the long term.

The Category 2 candidate species that may occur in the WSA (Physaria acutifolia var. purpurea) could be located in the drier areas of the WSA; e.g., pinyon-juniper woodland, and the small Ponderosa pine stands or Douglas fir communities. Before authorizing any surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, individual plants may be inadvertently destroyed but the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 0.85 percent (526 acres) of the vegetatio in the WSA would be modified. Fourteen percent (346 acres) of the sagebrush type in the WSA would be converted to a grass-shrub type. Special status plant species would not be significantly affected.

• Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

The entire WSA is important wildlife habitat, including 25,300 acres of crucial deer winter range and 300 acres of crucial elk winter range. The WSA also provides habitat for black bear and cougar, species sensitive to human presence. In the short term, these species would be adversely affected by the anticipated 170 acres of surface disturbance from oil and gas exploration and development (including 10 acres for access to State land) because habitat would be altered and the level of human activity in the area would increase. Category 2 oil and gas leasing stipulations would provide protection for these species and their range by prohibitng human activities during critical periods of the year and by selective placement of drill pads, roads, and other facilities. The animals may move into adjacent areas because the WSA encompasses only a small part of their recognized habitat and the adjacent areas include portions of WSAs proposed for wilderness and the State roadless area. Overall, effects on the populations of deer and elk would probably be small because only 0.28 percent of the habitat in the WSA would be disturbed and mitigation would be required. Increased use of vehicles on new access roads for oil and gas activities and recreation would reduce the value of the area for cougar and black bear.

Disturbance of 10 acres for watershed treatment projects would not significantly affect wildlife because they would be completed in a short period of time and would require only periodic maintenance.

Over the long term, the reclamation of disturbed areas and the planned 346-acre vegetation treatment would provide ecotones, improve forage for some wildlife as well as improve livestock forage, and reduce forage competition between livestock and big game.

Prior to surface-disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas. If the endangered black-footed ferret or any other special status species could be affected, BLM would initiate consultation with the FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refere to Appendix 4 in Volume I). Because

necessary measures would be taken to protect these animal species, the viability of populations of special status species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 0.85 percent (526 acres) of the wildlife habitat in the WSA would be disturbed by oil and gas exploration and production, vegetation treatment, and watershed projects. Disturbance would displace some species including deer and elk. Increased human activity would reduce the value of the WSA for black bear and cougar. The vegetation treatment would benefit some wildlife species and increase populations by providing additional forage and ecotones. Special status species would not be significantly affected.

• Impacts on Livestock Management

Domestic livestock grazing would continue as authorized. The estimated 2,562 AUMs currently allocated within five allotments in the WSA are assigned to six livestock permittees. The potential exists for 170 acres to be disturbed by mineral exploration and development (including access to in-held State lands). This could result in the loss of about seven AUMs. However, these AUMs would be restored upon successful vegetation reclamation. Since there is little use of motorized vehicles to manage livestock, few, if any, changes in livestock management are expected. Short-gap fences could be maintained. Use of the existing 8 miles of way and 7 miles of cherry-stemmed road would continue. The 346-acre vegetation treatment project could occur without concern for wilderness values and would result in an increase of 43 AUMs annually and would improve livestock distribution.

Conclusion: Livestock management would not be adversely affected by implementation of the No Action/No Wilderness Alternative. Vegetation treatment projects would result in an increase of 43 AUMs annually and would improve livestock distribution.

• Impacts on Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil and gas in the WSA were developed, it would lead to increased employment and income for Grand County. Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one period of time. This would represent about 0.1 percent of the projected employment in the Southeast MCD workforce in the year 2010 and only 1.0 percent of the projected Grand County employment in the year 2010. There would be minor increases in local sales in communities such as Green River (in Emery County) and Thompson.

There would be no livestock-related economic losses because the existing grazing use (2,562 AUMs available) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed vegetation treatment that would produce 43 AUMs of new allocated forage could lead to an additional $860 of livestock sales, including $215 of ranchers' returns to labor and investment.

Recreational use and, therefore, recreation-related local expenditures, would increase at a rate of 2 to 7 percent per year over the next 30 years. Recreational use in 30 years could thus increase from the current 500 visitor days to between 950 and 4,350 visitor days per year. Since the recreation-related local expenditures average $4.10 per visitor day, recreation-related annual expenditures of between $3,895 and $17,835 would accrue to the local economy.

Existing Federal and State revenues would not be reduced by this alternative. The existing $10,860 in Federal lease revenues would continue. In addition, there are 56,000 acres in the WSA open to oil and gas leasing that are currently not leased. If leased, they would bring up to $112,000 additional Federal lease fee revenues per year in addition to possible new royalties from lease production. Depending on the number of production wells, royalties could range from about $20,000 to well over $100,000 per year depending on production levels. Half of the Federal revenues would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently up to $3,945 per year) would continue. The additional 43 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative could increase Federal revenues by $66 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects. Federal revenues provided by commercial recreation use (currently $50 annually) would continue at about the same percentage.

Conclusion: Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0

percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $17,835 annually to the local economy by the year 2020. The WSA could contribute up to $52,100 annually in local livestock sales and $4,011 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $122,860 to over $250,000 per year in Federal and State revenues. Federal revenues from commercial recreation outfitting (currently $50 annually) would continue.

All Wilderness Alternative (61,430 Acres)

- Impacts on Wilderness Values

Designation and management of all 61,430 acres as wilderness would contribute to the preservation of the wilderness values in the Coal Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness and opportunities for solitude and primitive recreation exist and would be protected on all 61,430 acres. Resources that could be considered as special features in the WSA, including Class A scenery, special status species, wildlife associated with wilderness and archaeological values, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 55 acres is anticipated from exploration and development of pre-FLPMA oil and gas leases, from providing access to State in-holdings, and from watershed projects. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas at least until activities and noise cease and reclamation is complete. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 3 percent (1,843 acres) of the WSA could be indirectly affected. Special features would not be significantly affected because the direct disturbance would involve only 0.09 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Refer to the Vegetation and Wildlife Including Special Status Species sections for more information. Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. Watershed projects, on the other hand, would be designed to meet wilderness management criteria and upon completion would not be substantially noticeable in the area as a whole. All in all, the foreseeable disturbance would not be substantially noticeable in the area as a whole.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for naturalness, solitude, and primitive recreation.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for long-term development of existing mining claims, pre-FLPMA leases, and State in-holdings is not accurately known but would be less with this alternative than with No Action/No Wilderness due to application of mitigation that would protect wilderness values subject to valid existing rights.

The gradual increase in visitor would be primitive in nature and would be managed so as to not result in loss of wilderness values. Primitive recreational use of the area would most likely increase with public awareness of the wilderness area. The WSA is adjacent to two other BLM WSAs and a State roadless area. The recreational values of horseback riding, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. Naturalness and opportuni-ties for solitude and primitive recreation would be directly lost on 55 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,843 acres. Class A scenery would be reduced in quality in disturbed and surrounding areas.

- Impacts on Vegetation Including Special Status Species

The projected 346 acres of vegetation treatments would not be allowed. Only 55 acres of surface disturbance are projected with this alternative, therefore vegetation types would not be significantly affected. Wilderness designation would provide additional protection for threatened, endangered, and other special status plant species.

Conclusion: Implementation of the All Wilderness Alternative would protect vegetation types and special status species in the WSA.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

    Approximately 5,430 acres are under oil and gas leases, however, no exploration or development of oil and gas is presently occurring within the WSA. Existing pre-FLPMA leases (3,610 acres) could be developed subject to the stipulations issued at the time of leasing. Expired leases will not be reissued and new leasing would not be allowed.

    Some of the more favorable areas surrounding the WSA have been explored and developed and pre-FLPMA leases within the WSA are either held by production or are in an oil and gas unit. Therefore, it is expected that these areas would continue to be developed under prior existing rights. Terrain characteristics combined with current economic conditions have resulted in a relatively low level of oil and gas activity in and near the WSA at the present time. It is concluded that resource exploration and development within the WSA would be costly, but likely would occur in the future due to overall favorability for production in the immediate area.

    A potential resource of between 10 and 50 million barrels of oil or 60 to 300 billion cubic-feet of natural gas could exist in the WSA. Only the portion of the oil and gas pre-FLPMA leases could be recovered. Therefore, an unknown but locally significant amount of oil and gas production would be foregone.

  - Locatable Minerals

    Because of the low potential of the deposit and unfavorable economic conditions (high transportation costs, poor market conditions, etc.), no exploration or development of locatable minerals is anticipated in the foreseeable future with or without wilderness designation. Therefore, significant locatable mineral production would not be foregone.

  - Salable Minerals

    No exploration or development of salable minerals is anticipated. Because of low potential of the deposit, and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Wilderness designation would preclude exploration and constrain development of significant deposits of oil and gas. An unknown but locally significant amount of oil and gas production would be foregone. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from the preservation of and the reduction of potential surface-disturbance. Some wildlife could be affected as a result of oil and gas activities on leases with prior existing rights. However, only 55 acres are projected to be disturbed with this alternative as compared to 526 acres with the No Action/No Wilderness Alternative. Therefore, impacts on wildlife habitat or populations in the WSA would not be significant.

Habitat for the black-footed ferret (endangered), any candidate species that may be in the WSA, and habitat for elk, black bear, and mountain lion would receive additional protection from surface disturbance with this alternative. Prior to any mineral development, BLM would conduct site-specific clearances of potentially disturbed areas as described in the No Action/No Wilderness Alternative and the viability of populations of special status species would be preserved.

No wildlife management facilities have been proposed for the WSA. The potential vegetation treatment of 346 acres for livestock would not occur with this alternative; therefore, incidental wildlife habitat benefits would be foregone.

Conclusion: Only about 0.09 percent (55 acres) of the habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed vegetation treatment project which would have benefitted some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Threatened, endangered, or other special status species would be protected.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized in the Grand RMP. The estimated 2,562 AUMs currently allocated in the WSA would remain available for livestock forage. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected. There would be slight increases in costs of management for two permittees because of restrictions on predator control in two sheep allotments.

Existing rangeland developments (short-gap fences) would be maintained as in the past, based on practical necessity and reasonableness. The projected 346-acre vegetation treatment project proposed for the WSA would not be allowed and the potential increase of 43 AUMs would be foregone. This would not have a significant affect on livestock production.

Conclusion: Wilderness designation would not significantly affect current livestock management practices. The opportunity for an increase of 43 AUMs through vegetation treatments would be foregone.

- Impacts on Economic Conditions

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources with wilderness designation, there could be losses in part of the local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11), as well as loss of potential increases in income and Federal revenues that could otherwise occur with the No Action/No Wilderness Alternative.

Existing pre-FLPMA oil and gas leases could be explored and developed, but designation would preclude new leases and claims from being established in the WSA.

Exploration and development of potentially recoverable oil and gas would be foregone on 94 percent of the WSA. This would not alter existing conditions, but could alter future economic conditions from those that could otherwise occur under the No Action/No Wilderness Alternative. The potential for 30 jobs, 0.75 percent of the Grand County employment projected for the year 2020, would be foregone.

Primitive recreational use and, therefore, recreation-related local expenditures would increase at a rate of 2 to 7 percent annually. Local expenditures for recreation would be small (average of $4.10 per visitor day Statewide). Current motorized recreational use of the WSA is light. Initially, the closure of the wilderness may result in a slight decrease in related local expenditures, but as motorized recreational use is replaced by primitive recreational uses, any local economic losses would balance out. By the year 2020, local recreation-related expenditures would probably be about the same as with the No Action/No Wilderness Alternative. Overall, the change in recreation expenditures would be small and would be well distributed among businesses in Green River and Moab, Utah with some spill over into western Mesa County, Colorado.

Recreation expenditures from the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of this and the adjoining WSAs over the past 3 years. It is possible that additional outfitters would make use of the area if it were designated wilderness, both for hunting and other primitive recreational uses. Hunter pressure on the South Book Cliffs Deer Herd Unit and related local expenditures likely would remain unchanged. Other than to recreation outfitters, recreation expenditures would also be locally insignificant to any single business in the affected area.

There would also be a potential loss of $115,640 annually in Federal revenues from the 57,820 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases could also be foregone.

Livestock use and ranchers' income would continue as at present with up to $51,240 of livestock sales including up to $12,810 of ranchers' return to labor and investment. The proposed 346-acre vegetation treatment would be foregone. As a result, annual local livestock sales of $860 and an estimated annual $66 of Federal grazing revenues from 43 additional AUMs would be foregone.

Federal revenues from commercial recreation use would probably increase.

Conclusion: Present economic conditions would not be significantly affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percent of the projected Grand County

employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Potential annual local sales and Federal revenues related to livestock grazing could be reduced by $860 and $66 respectively. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $115,640 and potential royalties of up to $100,000 per year from wells on 94 percent ofthe WSA would be foregone. Recreation-related local sales could contribute up to $17,835 annually to the local economy by the year 2020. Federal revenues from commercial recreation outfitting would probably increase because of recognition from wilderness designation.

Partial Wilderness Alternative (Proposed Action) (20,774 Acres)

- Impacts on Wilderness Values

Wilderness designation of 20,774 acres would contribute to preservation of the area's wilderness values. Although overall disturbance would be about the same as identified for the No Action/No Wilderness Alternative, this Partial Wilderness Alternative would protect wilderness values in the designated area, which is about 34 percent of the WSA. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure (including closure of 2.5 miles of way), and closure to future mineral leasing or location. Naturalness and outstanding opportunities for solitude and primitive recreation (all acres meet the standards), and special features (including approximately 34 percent of the WSA's Class A scenery and archaeological sites) would receive additional protection. Wildlife associated with wilderness and special status species would also receive additional protection in the designated area.

In the foreseeable future, direct loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil and gas exploration and development, from vegetation treatments, from providing access to State inholdings, and from watershed treatment, would occur on up to 22 acres within the designated portion and on up to 436 acres within the nondesignated portion. Some special features would be unaffected because direct disturbance would involve only 0.25 percent (458 acres) of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. Class A scenery would be reduced in quality in the disturbed and surrounding areas.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to 20 percent (12,286 acres) of the WSA. Wildlife associated with wilderness would leave the areas of direct and indirect disturbance during the period of activity. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation somewhat. However, vehicular use of 5.5 miles of way and of future exploration and access roads in the nondesignated area, would detract from these opportunities during the period of activity.

The gradual increase in visitor use would be mostly primitive in nature and would be managed so as to not result in loss of wilderness values. The WSA is adjacent to two other BLM WSAs and a State roadless area. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. It would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights.

This alternative would complement and enhance wilderness uses, values, and management of adjacent WSAs.

Conclusion: Wilderness values would be preserved overall in the designated area which is approximately 34 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 458 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 12,286 acres of the WSA. Almost all of the impact would be in the nondesignated area. Class A scenery would be reduced in quality in the disturbed and surrounding areas and wilderness dependent species would leave the areasof direct and indirect disturbance during periods of activity.

• Impacts on Vegetation Including Special Status Species

Approximately 458 acres of surface disturbing activities would occur in the WSA. About 300 acres would be disturbed as a result of vegetation treatments. Projected impacts to the vegetation resource would be essentially the same as described in the No Action/No Wilderness Alternative.

The 458 acres of projected surface disturbance would be 0.75 percent of the WSA. No significant impacts to vegetation types are anticipated in either the designated or nondesignated portions of the WSA. As discussed for the No Action/No Wilderness Alternative, prior to any surface-disturbing activities BLM would conduct site-specific clearances, initiate consultation with FWS, if necessary, and take appropriate mitigation measures where needed. Nevertheless, some inadvertent loss of individual special status plants may occur. However, the existence of populations of special status species would not be threatened.

About 150 acres of the projected surface disturbance would result from oil and gas exploration and development in both the designated (128 acres) and the nondesignated (22 acres) portions of the WSA. While no significant impacts on any vegetation type are anticipated, this disturbance would remain for the life of the operations.

Conclusion: Vegetation types and special status species in the WSA would not be significantly altered. Only 0.75 percent (458 acres) of the WSA would experience surface disturbance. Most of this disturbance would result from vegetation treatments. No significant impacts on special status species are projected.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

    The nondesignated portion of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values as discussed for the No Action/No Wilderness Alternative. Therefore, mineral and energy resources located in the nondesignated portion, 66 percent of the WSA, would not be affected by implementation of the Partial Wilderness Alternative.

    The designated portion of the WSA would be placed in Category 4 status (no leasing). There are 4,155 acres of leases located in the designated portion of the WSA. About 2,335 acres are under pre-FLPMA lease and could be developed per stipulations issued at the time of leasing. New leasing would not be allowed. Because oil and gas exploration and development in the designated area would be restricted to existing pre-FLPMA leases, implementation of the Partial Wilderness Alternative could result in the loss of production of an unknown but locally significant amount of il and gas on 30 percent (18,439 acres) of the WSA.

  • Locatable Minerals

    No mining claims are currently located within the area that would be designated wilderness. Development work, extraction, and patenting could occur on all valid claims located prior to wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to mineral location (USDI, BLM, 1981a). BLM does not project exploration or development in the designated portion because locatable mineral resources are not sufficient to support a development assumption.

    The nondesignated portion of the WSA would remain open to mineral location as discussed in the No Action/No Wilderness Alternative. However, because locatable minerals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, development is not likely in the foreseeable future. Therefore, implementation of this alternative would not prevent recovery of significant amounts of locatable minerals.

  • Salable Minerals

    No exploration or development of salable minerals is anticipated in either the designated or nondesignated portions of the WSA. Because of the availability of better sources of material outside of the WSA, any loss of salable mineral products would not be significant.

Conclusion: Partial wilderness designation would preclude or severely constrain potential exploration of leasable minerals not under pre-FLPMA lease in the designated portion of the WSA. Production of an

unknown portion of the oil and gas in the WSA would be foregone because 30 percent of the WSA could not be leased and developed. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from preservation of solitude and the reduction of potential mineral-related disturbance from 170 acres with the No Action/No Wilderness Alternative to 150 acres with this alternative.

In the designated area, 22 acres would be disturbed by oil and gas exploration and development and access to State land. This disturbance would have only a short-term impact on wildlife species while work was on-going. Thus, with this alternative, wildlife spe-cies would benefit through provision of solitude on 34 percent of the WSA.

Up to 128 acres of mineral-related surface disturbance could occur in the nondesignated portion of the WSA, and at least some of the disturbance would occur within crucial habitat. Noise and increased access due to development of roads could, in combination with loss of habitat, cause deer, elk, bear, and cougar to leave the area at least for the duration of the activities. Category 2 stipulations would limit oil and gas activities during critical periods and would protect animals through selective placement of facilities. Approximately 300 acres of vegetation treatment could benefit other wildlife species through provision of additional forage and ecotones.

In the designated area, the one endangered and five candidate species, if present, would receive added protection from wilderness restrictions, while in the nondesignated area these species would not have this added protection. The Endangered Species Act and BLM policy would provide protective provisions for such species in all areas.

Conclusion: About 0.75 percent of the habitat in the WSA would be disturbed. Three-hundred acres of vegetation treatment would be allowed in the nondesignated portion of the WSA, which would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 40,656 acres not designated wilderness and deer, elk, cougar, and bear would be displaced. Threatened, endangered, or other special status species would not be significantly affected.

• Impacts on Livestock Management

Of the estimated 2,562 AUMs allocated, 488 would be within the designated portion of the WSA and 2,074 within the nondesignated portion. The existing gap fences would be located in both the designated and nondesignated portions of the WSA. Motorized vehicles are used on a limited basis for livestock management. The 2.5 miles of way located in the designated portion of the WSA would not be available for vehicular use. The 1.5 miles of cherry-stemmed road in the designated portion and the 5.5 miles of way and 5.5 miles of cherry-stemmed road in the nondesignated portion would continue to be available for vehicular use. In the 40,656-acre nonwilderness area, about 300 acres of vegetation treatment would be allowed. As many as 37 additional livestock AUMs could be provided. In the designated area, 46 acres of proposed vegetation treatment would not be allowed and the potential for 6 additional livestock AUMs would be foregone. Overall, livestock management would not be significantly affected.

Conclusion: Implementation of the Partial Wilderness Alternative would not result in a change in the level of livestock use. Only 6 potential AUMs of forage would be foregone.

• Impacts on Economic Conditions

Partial wilderness designation is not expected to result in any changes in existing patterns or trends in population, employment, and local income distribution. The estimated 2,562 AUMs would remain available to cattle in the six allotments. The revenues, sales, and returns to ranchers would continue as discussed in the No Action/No Wilderness Alternative. About $120 in potential livestock sales and $9 in Federal revenues from grazing fees would be foregone each year.

Restrictions on oil and gas leasing would not alter existing economic conditions, but could alter future economic conditions from those that would occur with the No Action/No Wilderness Alternative. The level of employment in the WSA, 40 jobs, would be the same, but the length of employment would be reduced because oil and gas could not be developed on 30 percent of the WSA.

About 2,335 acres of pre-FLPMA oil and gas leases are located in the designated portion of the WSA and could be explored and developed. Revenues from potential future leases on the remaining 18,439 acres

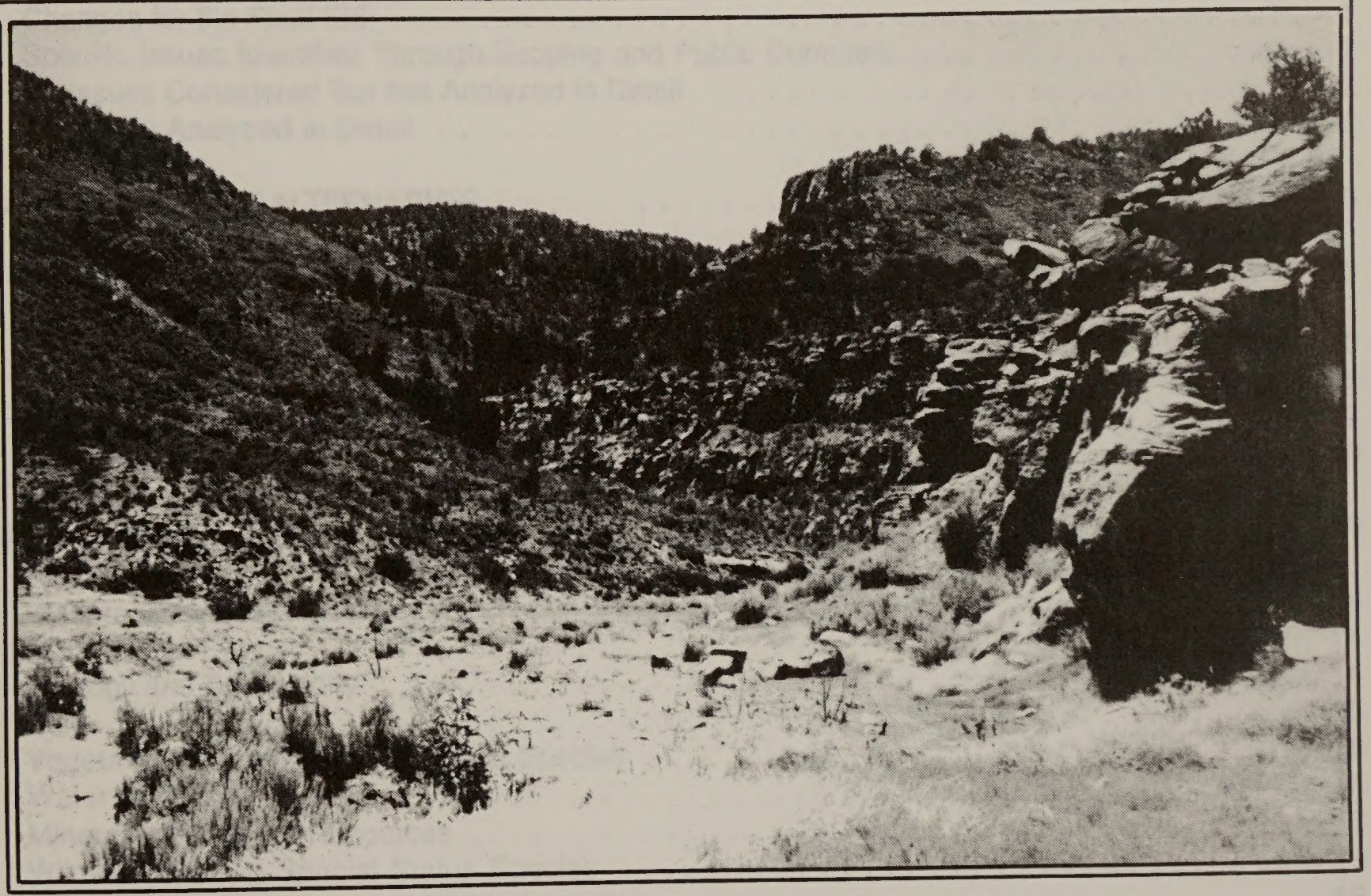
in the designated area would be foregone. Potential royalties would also be foregone Approximately 40,656 acres would be in the nondesignated area and could be leased for oil and gas at up to $81,312 per year. No exploration or development of locatable or salable minerals is projected in either the designated or nondesignated portions of the WSA.

Recreation-related local expenditures would be small (average of $4.10 per visitor day Statewide) and would be about the same as with the No Action/No Wilderness and All Wilderness Alternatives.

Recreation expenditures for the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of this and the adjoining WSAs over the past 3 years. It is possible that additional outfitters would make use of the area if it were designated wilderness, both for hunting and other primitive recreational uses. Hunter pressure on the South Book Cliffs Deer Herd Unit and related local expenditures likely would remain unchanged. Federal revenues due to commercial recreation use would probably increase.

Conclusion: Present economic conditions would not be affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 30 percent of the area. Annual local sales and Federal revenues related to livestock grazing could be reduced by $120 and $9 respectively as compared to the No Action/No Wilderness Alternative. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $36,878. Annual royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced but potential royalties of up to $100,000 per year from potential wells on 30 percent of the WSA would be foregone. Recreation-related local sales would be about the same as with the No Action/No Wilderness Alternative. Federal revenues from commercial recreation outfitting would probably increase if the area receives recognition from wilderness designation.

Spruce Canyon WSA



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SPRUCE CANYON WSA

(UT-060-100C1)

INTRODUCTION

General Description of the Area

The Spruce Canyon WSA is located in the Book Cliffs region of north-central Grand County, Utah. It contains approximately 20,350 acres of public land administered by BLM. One section of State land totaling 640 acres is located within the WSA boundaries. The BLM Intensive Wilderness Inventory originally indicated the WSA's size as 20,650 acres (USDI, BLM, 1980). Acreage differences in this amended document are attributable to Master Title Plat checks. The WSA is crescent-shaped, roughly 9 miles east to west and 6 miles north to south.

The WSA is located in the rugged terrain of the Book Cliffs and extends to the top of the Roan Cliffs. It consists of a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading south to Cottonwood Canyon along the southern boundary of the WSA.

Vegetation within the WSA is predominantly Douglas fir forest, pinyon-juniper woodland, and a riparian-sagebrush community located in the canyon bottoms. Average annual precipitation is 12 to 18 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F.

The WSA is about 15 miles northwest of I-70. The nearest towns are the small communities of Thompson and Cisco, Utah (about 15 miles southwest and southeast of the WSA, respectively) and Mack, Colorado (about 25 miles southeast). It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Desolation, Flume, Turtle, and Jack Canyons WSAs) that are either managed as roadless or are under study for wilderness status. The adjoining WSAs on either side of Spruce Canyon are Flume Canyon (UT-060-100B) and Coal Canyon (UT-060-100C2).

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the Spruce Canyon WSA have been made since publication of the Draft EIS.

1. Small portions of the boundary of the WSA (T. 18 S., R. 22 E., secs. 25, 26, and 33) have been redrawn to correct errors in the Draft EIS maps. These changes did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. No Partial Wilderness Alternative was identified in the Draft EIS. However, in response to public comments, a Partial Wilderness Alternative has been analyzed in the Final EIS. With the new Partial Wilderness Alternative, 14,736 acres would be designated wilderness and 5,614 acres in the WSA would not be designated wilderness (refer to Map 3).

3. The BLM Proposed Action in the Draft EIS was the No Action/No Wilderness Alternative. The BLM Proposed Action for the Final EIS is the Partial Wilderness Alternative (14,736 acres). Refer to Appendix 11 in Volume I for a summary of rationale for the Proposed Action.

4. The anticipated surface disturbance presented in the Draft EIS (722 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 722 acres reported in the Draft EIS to 713 acres for the Final EIS.

5. The projected coal mining discussion in the Draft EIS has been eliminated in the Final EIS. It is not projected that coal mining would take place in the WSA in the foreseeable future. Consequently, associated impacts are not discussed.

STATEWIDE POCKET MAP
WSA NO. 70
SEE VOL.I

SPRUCE CANYON WSA

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Spruce Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: Soil disturbance estimates have been revised downward from the 722 acres analyzed in the Draft EIS to 713 acres in the Final EIS. About 542 acres of the projected disturbance would result from vegetation treatments that would improve soil conditions over the long term. Further, this disturbance would take place in those portions of the WSA where reclamation potential is the highest. Some of the proposed watershed impovement projects would be allowed with all of the alternatives. The impacts of direct disturbance of soil would affect only about 3.5 percent of the WSA, and mitigation would be required. Therefore, impacts on soils are a significant for analysis in the Final EIS.

2. Water Resources: The public is concerned that wilderness designation would interfere with development of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. There are approximately 15 miles along the borders of the WSA and an undetermined number of undeveloped springs in the WSA. Therefore, there are no potential consumptive uses of water upstream of the WSA. The only potential uses of water including the springs in the WSA are the present uses associated with recreation, livestock, and wildlife. Springs could be developed following wilderness designation if designed and installed compatibly with wilderness protection guidelines. As explained above for soils, significant increases in soil erosion that might affect water quality are not expected. Therefore, impacts on water uses and quality are not significant for the Spruce Canyon WSA.

3. Forest Resources: The forest resources in the WSA consists of approximately 18,950 acres with pinyon and juniper trees and somestands of Douglas fir trees. Opportunities for forest-resource harvest are limited. No commercial harvest has occurred in the WSA in the past. Demand for forest resources in the future would continue to be very low due mainly to more accessible and higher quality areas located elsewhere. Therefore, impacts on forest resources are not significant for analysis in the Final EIS.

4. Visual Resources: The 713 acres of surface disturbance projected to occur in the foreseeable future would affect only about 3.5 percent of the WSA. Disturbance would occur in scenic Class A and B areas and in VRM Class II and III areas. Impacts on visual resources are considered in the Final EIS as part of the discussion of naturalness and special features in the Wilderness Values section.

5. Cultural Resources: Only three archaeological sites are known to occur in the WSA. However, because surface-disturbing activities could potentially disturb or destroy sites not now known to occur in the WSA, inventories for the purpose of site recordation and mitigations of impacts would take place prior to any surface disturbance. Given these conditions, impacts on cultural resources are not a significant issue for EIS analysis in the Spruce Canyon WSA.

6. Recreation: Recreational use of the Spruce Canyon WSA is light, approximately 350 visitor-use days per year. About 95 percent of this use is primitive. Motorized use is restricted by rugged terrain to the 1 mile of way and canyon bottoms in and adjacent to the WSA. Recreational changes resulting from designation or nondesignation would not be significant due to limited use now occurring and projected to occur in the future in the WSA.

- Issues Analyzed in Detail

The significant issues for the Spruce Canyon WSA are:

1. Impacts of on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on leasable mineral exploration and production.

3. Impacts on vegetation including special status species.

4. Impacts on wildlife habitat and populations including special status species.

5. Impacts on livestock management.

6. Impacts on local economic conditions

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, visual resources, and mineral values.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis, and Volume VII-C, Section 70, for responses to specific comments about the Spruce Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

An alternative that would add 650 acres to the WSA was suggested in the public comments. This alternative is not analyzed because these public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1). Other citizen-proposed alternatives are comparable to the All Wilderness Alternative of 20,350 acres.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness, (2) All Wilderness (20,350 acres), and (3) Partial Wilderness (Proposed Action) (14,736 acres). A description of BLM's management practices with each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections with each alternative. These assumptions are indicated in each case. The analysis assumption presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 20,350-acre Spruce Canyon WSA would be designated by Congress as part of the NWPS. Although BLM's land use plans are regularly updated, it is assumed that the area would continue to be managed for multiple uses in accordance with the Grand RMP (USDI, BLM, 1983a). The one section (640 acres) of State land within the WSA (refer to Map 1) has not been identified in the RMP for special Federal acquisition through exchange or purchase. No private or split-estate lands are located in the WSA. The figures and acreages given are for Federal lands only.

- Management Conditions and Constraints

  About 15,910 acres would remain open to mineral location. The additional 4,440 acres in the WSA would be closed to mineral entry due to an oil shale withdrawal. Development work, extraction, and patenting would be allowed on any future valid mining claims. No mining claims are presently located in the WSA. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), without consideration for wilderness values.

  The entire WSA would be open to mineral leasing and sale. There are five existing pre-FLPMA oil and gas leases in the WSA covering 2,132 acres. These leases could be developed per the stipulations imposed at lease issuance, without concern for wilderness values. About 720 acres currently under lease make up part of the Book Cliffs unit. Future oil and gas leases could be issued and developed under Category 1 (standard stipulations) on 11,580 acres, and under Category 2 (standard and special stipulations) on 8,770 acres. The special stipulations would restrict use to protect watershed and wildlife.

  Domestic livestock grazing use of the Spruce Canyon WSA would be carried out as authorized in the Grand RMP (currently an estimated 552 AUMs). Existing rangeland developments (shortgap fences) could be used and maintained and new rangeland developments could be implemented without wilderness considerations. A 542-acre vegetation treatment project (burning, drilling, and seeding) is projected. Special riparian management and season-of-use adjustments are also planned in the RMP.

  Watershed treatments (in-stream drop structures, gully plugs, and retention dams) are planned for Diamond and Cottonwood Creeks to improve water quality. The entire WSA acreage including 1 mile of way would continue to be open to ORV use.

  The entire 20,350-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any

SPRUCE CANYON WSA

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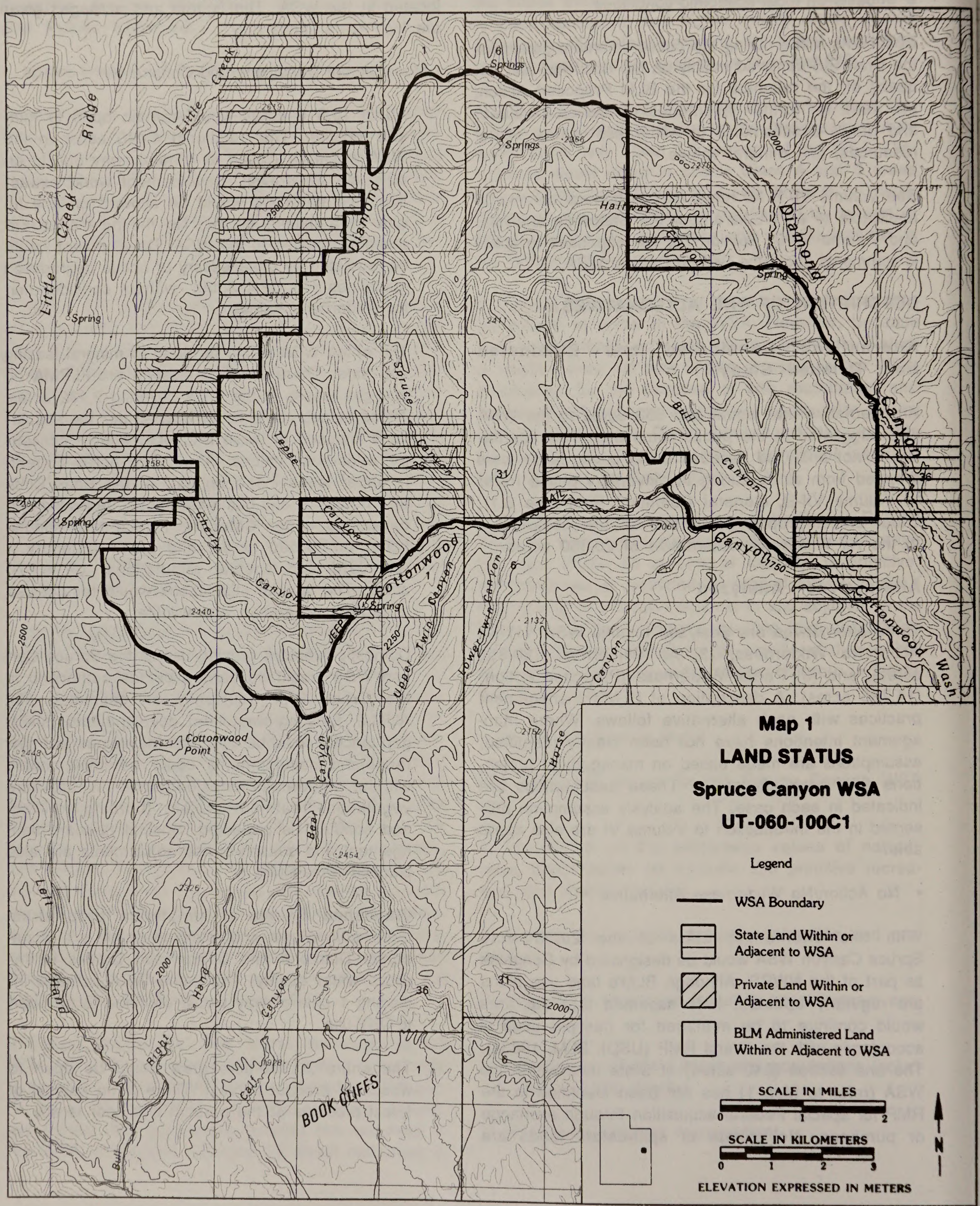

Map 1
LAND STATUS
Spruce Canyon WSA
UT-060-100C1

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

N

ELEVATION EXPRESSED IN METERS

projected in the foreseeable future due to access problems.

This entire WSA acreage would continue to be managed under VRM Class II on 17,900 acres and Class III on 2,450 acres.

- Action Scenario

It is projected that implementation of the No Action/No Wilderness Alternative would result in approximately 713 acres of surface disturbance in the foreseeable future.

About 160 acres of surface disturbance would result from exploration and development of the oil and gas resource located in the WSA including up to 20 miles of access roads. It is projected that future seismic work would locate traps that could be drilled and developed. If the initial wells are producers, additional wells would be drilled on 640- or 160-acre centers. The most likely area of activity would be in the Book Cliffs unit located just west of Bull Canyon.

Development would include roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. BLM's land use planning (Grand RMP) stipulates special designs on slopes of 30 percent or greater and no occupancy is allowed on slopes greater than 50 percent. It is projected that surface disturbance associated with developed leases would remain over a long-term period of time.

Employment would average 10 employees for each exploration well drilled. An average of 3 to 6 months would be required to complete drilling operations at each site. A maximum of 40 employees would be required at one time. Each site would be reclaimed following abandonment. Producing wells would generally require only an average of two employees for periodic maintenance.

In addition to oil and gas exploration and development activities, it is projected that about 1 acre of surface disturbance would result from access-road construction to in-held State land. This road would be constructed for mineral exploration and development purposes on the State land.

About 542 acres of disturbance would result from projected vegetation treatments (burning, drilling and seeding) to improve livestock forage and wildlife habitat. Approximately 68 AUMs would be produced. About 1 week would be necessary to complete these projects. No additional rangeland or wildlife habitat projects are projected.

About 10 acres of land would be disturbed from watershed improvement activities. These would include in-stream drop structures, gully plugs, and retention dams in Diamond and Cottonwood creeks. These structures would help improve water quality and reduce downstream salinity.

No disturbance is anticipated from ORV use due to rugged terrain and remoteness of the area.

Recreation use is projected to increase over the current estimated use of 350 annual visitor-use days at a rate of 2 to 7 percent per year. Less than 5 percent of the use would involve vehicular use of 1 mile of way and canyon bottom areas.

- All Wilderness Alternative

With this alternative, all 20,350 acres of the Spruce Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy to preserve its wilderness character (BLM Manual 8560).

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Volume I, Chapter 1). Based on this policy regarding exchange of State lands, it is projected that State lands would remain under existing ownership. There is one State section (640 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given with this alternative are for Federal lands only. There are no private or split-estate lands located within or immediately adjacent to the WSA.

- Management Conditions and Constraints

After wilderness designation, all 20,350 acres would be withdrawn from mineral location and closed to new mineral leasing and sale.

Currently, there are no mining claims in the WSA. Should any be located prior to wilderness

SPRUCE CANYON WSA

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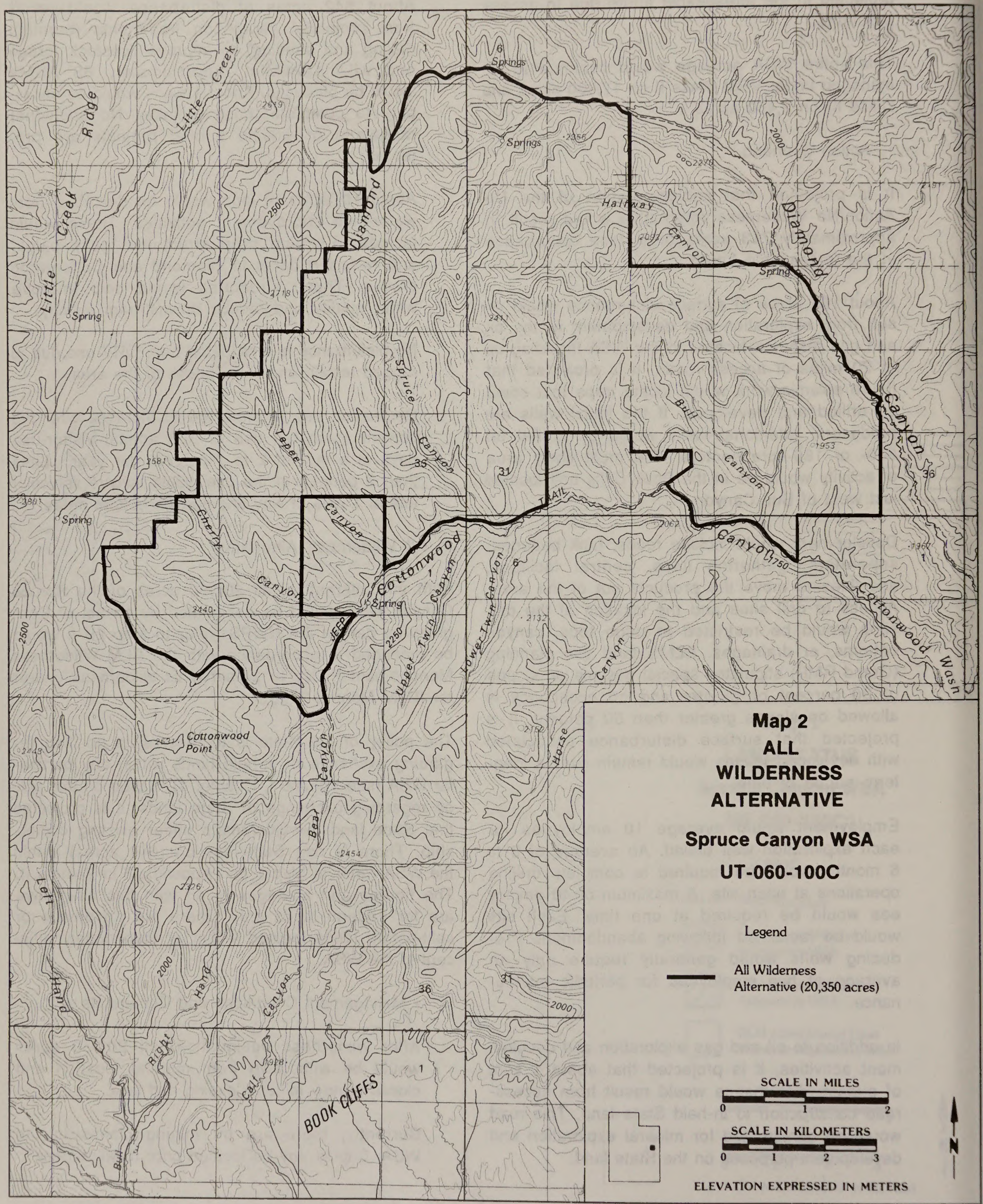

Map 2
ALL WILDERNESS ALTERNATIVE

Spruce Canyon WSA

UT-060-100C

Legend

All Wilderness Alternative (20,350 acres)

SCALE IN MILES

0 1 2

SCALE IN KILOMETERS

0 1 2 3

N

ELEVATION EXPRESSED IN METERS

designation, development would be regulated by the unnecesssary or undue degradation guidelines (43 CFR 3809), with consideration given to wilderness values. There are approximately 2,132 acres of pre-FLPMA leases, either held by production (1,412 acres) or within a unit (720 acres). These leases could be developed per the stipulations assigned at the time of lease issuance. New oil and gas leases would not be issued.

Present domestic livestock grazing would be carried out as authorized in the RMP. The estimated 552 AUMs in the WSA would remain available to livestock. After designation, existing rangeland developments (short-gap fences) could be maintained in the same manner as in the past based on practical necessity and reasonableness. The 542 acres of vegetation treatments would not be allowed.

The projected in-stream drop structures and gully plugs for Diamond and Cottonwood Creeks would be allowed if designed to blend with the wilderness environment and constructed of natural materials by hand methods. The retention dams would not be allowed.

The entire 20,350-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. One traveled way, about 1 mile in length, would be closed. About 13 miles of road or jeep trails border the WSA and would remain open to vehicle use.

Visual resources in the WSA would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 49 acres would be disturbed following wilderness designation of the Spruce Canyon WSA. It is projected that portions of the existing pre-FLPMA oil and gas leases in the WSA would be explored and developed. About 720 acres of these leases are located in the Book Cliffs unit. Exploration and development activities similar to those described in the No Action/No Wilderness Alternative would disturb about 40 acres west of Bull Canyon including up to 5 miles of access roads. Employment assumptions are the same per well as with the No Action/No Wilderness Alternative. However, maximum employment at one time would be about 10 employees. Emoployment assumptions are the same per well as with the No Action/No Wilderness Alternative. However, maximum employment at one time would be about 10 employees. New mineral location or mineral leasing would not be allowed. No locatable mineral resource exploration or development is projected to occur following wilderness designation. No leasable mineral exploration or development would occur on lands not under lease at the time of designation.

About 1 acre would be disturbed as a result of access road construction to an in-held State section as described in the No Action/No Wilderness Alternative. About 8 acres would be disturbed from construction of watershed improvement activities including construction of in-stream drop structures and gully plugs in Cottonwood and Diamond Creeks. These structures would be designed to blend with the wilderness environment and constructed with natural materials found onsite and by hand methods. However, the proposed retention dams would not be allowed.

No disturbance would occur from ORV use due to rugged terrain and management constraints.

Primitive-type recreation use would increase over the current estimated primitive use of about 332 annual visitor days at a rate of 2 to 7 percent per year.

- Partial Wilderness Alternative (Proposed Action) (14,736 acres)

With this alternative, 14,736 acres of the Spruce Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that has the greatest wilderness values and would minimize or avoid areas of greatest mineral development potential. The area analyzed as wilderness includes the western three-fourths of the WSA. The eastern portion, comprising about one-forth (5,614 acres) of the area within the WSA but outside of that designated as wilderness, would be managed in accordance with the RMP, as described for the No Action/No Wilderness Alternative. The 14,736-acre area designated as wilderness would be managed in

SPRUCE CANYON WSA

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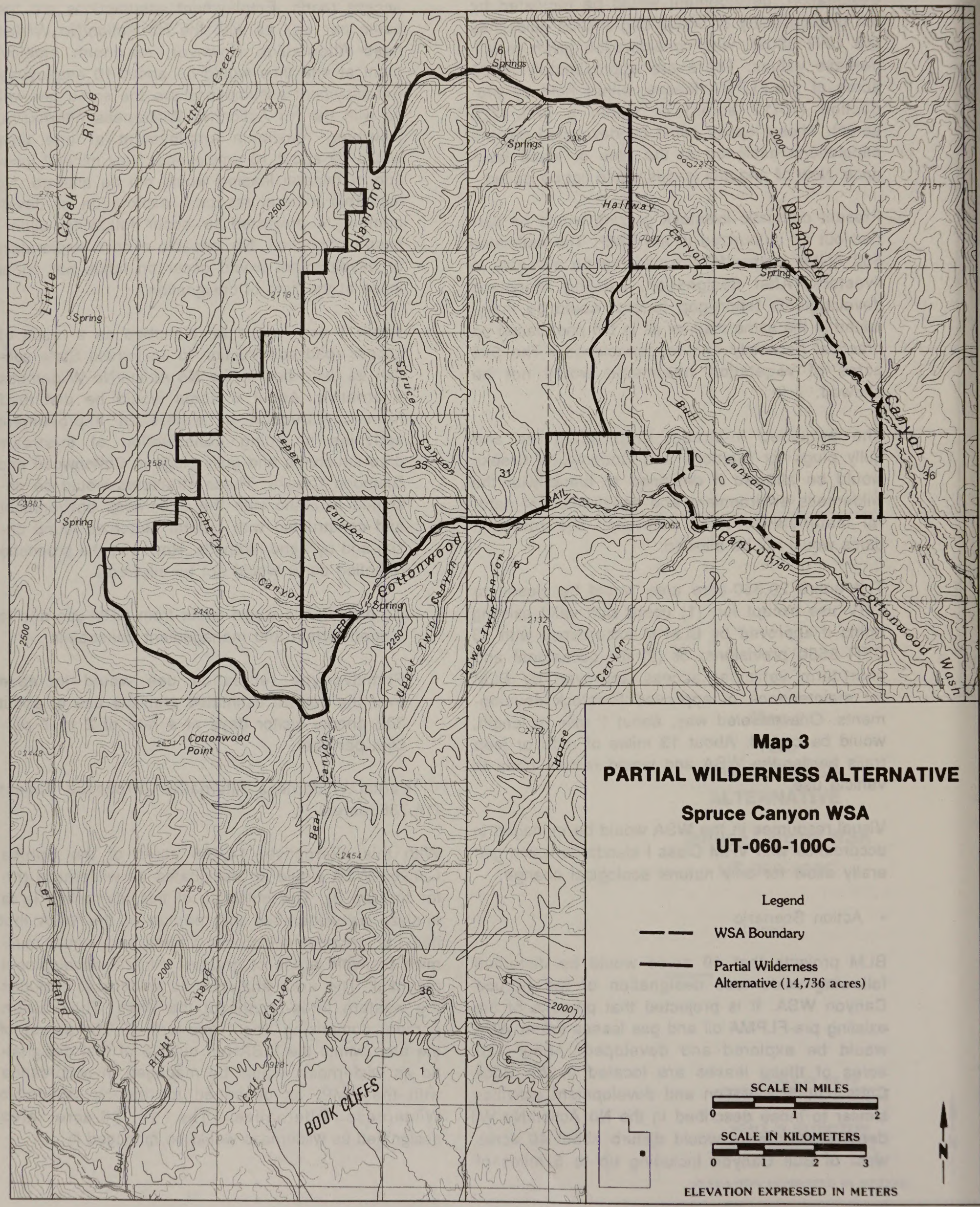

Map 3

PARTIAL WILDERNESS ALTERNATIVE

Spruce Canyon WSA

UT-060-100C

Legend

WSA Boundary

Partial Wilderness Alternative (14,736 acres)

SCALE IN MILES

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SCALE IN KILOMETERS

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ELEVATION EXPRESSED IN METERS

accordance with the BLM Wilderness Management Policy as described in the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is projected that State lands would remain under existing ownership. There is one State section (640 acres) in the portion of the WSA that would be designated wilderness (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

The 14,736-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on any new mining claims located prior to wilderness designation, provided that they are valid. Development would be regulated by the unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. The pre-FLPMA oil and gas leases that cover 1,612 acres would continue so long as production in paying quantities occurs. The 5,614-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur. The area not designated wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on the entire 5,614 acres. Two leases covering 520 acres are located in the portion of the WSA that would not be designated.

Domestic livestock grazing would continue to occur in the 14,736-acre wilderness area. The estimated 399 AUMs would remain available to livestock as presently allotted and the existing livestock facilities in the area (short-gap fences) could be maintained based on necessity and reasonableness. It is projected that less than 10 percent (approximately 42 acres with a potential for 5 additional AUMs) of the projected 542-acre vegetation treatments would not be allowed. In the 5,614-acre non-wilderness area, grazing use would be allowed as currently authorized. Use is estimated at 153 AUMs and existing developments (short-gap fences) could be maintained as at present. New rangeland developments could be allowed in this area without concern for wilderness values. About 500 acres of the projected 542-acre vegetation treatment project would be allowed.

In the designated portion of the WSA, in-stream drop structures and gully plugs would be allowed as described in the All Wilderness Alternative. In the 5,614-acre non-wilderness area, water resource facilities would be allowed without concern for wilderness values if in accordance with the RMP. In-stream drop structures, gully plugs, and retention dams would be allowed as described for the No Action/No Wilderness Alternative.

The entire 14,736-acre wilderness area would be closed to ORV use. About 1 mile of existing vehicular way would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the unit would remain open to vehicular travel.

Visual resources in the wilderness area would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The nondesignated area would be managed as Class II (changes not visually evident) on 3,614 acres and Class III (changes evident but should remain subordinate to the landscape character) on 2,000 acres.

- Action Scenario

BLM projects that implementation of the Partial Wilderness Alternative would result in a total of 579 acres of surface disturbance. It is projected that 34 acres would be disturbed in the designated portion of the WSA and that 545 acres of disturbance would occur in the nondesignated portion.

In the designated portion, 1 acre would be disturbed as a result of access-road construction to in-held State land in Spruce Canyon for mineral exploration purposes. No locatable or salable mineral exploration or development on public land is projected. However, 30 acres of surface disturbance is projected for leasable mineral exploration and development (oil and gas) as described in the All Wilderness Alternative. A maximum of 10 employees would be required at one time. No new rangeland or wildlife projects are projected. In-stream drop structures and gully plugs would be allowed as described in the All Wilderness Alternative, resulting in about 3 acres of temporary surface disturbance.

In the nondesignated portion, 40 acres of surface disturbance is projected as a result of oil and gas exploration and development as described in the No Action/No Wilderness Alternative. A maximum of 30 employees would be required at one time. About 500 acres of the projected vegetation treatment would also be allowed. Placement of in-stream drop structures, retention dams, and gully plugs would be allowed and would disturb 5 acres.

No disturbance from ORV use is projected due to rugged terrain and management constraints.

Recreation use is projected to increase over the current estimated use of 350 annual visitor use days at a rate of 2 to 7 percent per year. Less than 5 percent would involve vehicular use of some canyon bottom areas. The one mile of way would be closed to vehicle access.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

At 20,350 acres, the WSA's size is sufficient to meet this wilderness study criterion. The WSA is crescent-shaped, roughly 9 miles east to west and 5 miles north to south at its widest point. The WSA is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Desolation, Flume, Turtle, and Jack Canyons WSAs) that are either managed as roadless or are under study for wilderness status.

- Naturalness

Human imprints are not substantially noticeable within the WSA as a whole and are capable of being reclaimed naturally. These include dry drill holes covering a total of 10 acres and a vehicular way that runs for about 1 mile in a side canyon off Diamond Canyon. There are no post-FLPMA imprints within the WSA.

Grazing has taken place on ridges and in canyon bottoms but not on the steep sideslopes. Mineral exploration has taken place in side canyons off Diamond and Cottonwood Canyons. These areas total about 4,000 acres (20 percent of the WSA). The remainder of the WSA (16,350 acres or 80 percent) can be considered untouched. The entire WSA meets the criteria for naturalness.

- Solitude

The large size and blocky configuration of the WSA contribute to a feeling of vastness, and the WSA's rugged topography and isolated nature provide outstanding opportunities for the visitor to find solitude.

The rugged topography provides screening sufficient to obscure sights and sounds of other visitors within the WSA. The vertical separation between the ridge tops and canyon bottoms (up to 1,000 feet) provides opportunities for seclusion. These opportunities are more pronounced in the northwestern portion of the WSA.

The effectiveness of vegetation screening on steep slopes is diminished by the wide bands of rock outcrop. Vegetation in higher elevations (areas of Douglas fir forest) is more dense, enhancing screening possibilities. Areas of mountain shrubs provide dense thickets but screening potential varies with overall height of vegetation. Canyon bottoms vegetated with sagebrush generally do not provide cover from slopes and ridgetops above.

Sights and sounds from outside the WSA are temporary and include such things as drilling along boundary roads, pipeline development, and use of mechanized equipment along the perimeter of the WSA.

There is good potential that vistas to the southeast from Diamond Ridge and other high points in the WSA are adequate to give a visitor the feeling of vastness.

SPRUCE CANYON WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (20,350 Acres)	Partial Wilderness (14,736 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 713 acres because of vegetation treatments, oil and gas exploration and development construction of access to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 5,088 acres of the WSA. Special features would generally not be significantly affected. Some Class A scenery would be reduced in quality in disturbed and surrounding areas and some wilderness dependent wildlife species would leave the area during the period of disturbance. Vehicular use of 1 mile of way and up to 20 miles would detract from opportunities for solitude and primitive recreation.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 49 acres and indirectly reduced in quality on up to an additional 611 acres because of oil and gas exploration, development on pre-FLPMA leases, and construction of access to in-held State lands. Special features generally would be preserved, although some Class A scenery would be reduced in quality on the disturbed and surrounding areas.	Wilderness values would be preserved overall in the designated area which is approximately 72 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 579 acres because of mineral exploration and development, construction of access roads to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 4,130 acres. Almost all of the impact would be in the nondesignated area. Special features would not be significantly affected. Some Class A scenery would be reduced in quality in the disturbed and adjacent areas and some wilderness dependent species would temporarily leave the area. Vehicular use of new roads in the nondesignated portion would detract from opportunities for solitude and primitive recreation.
Impacts on Vegetation	Approximately 3.5 percent (526 acres) of the vegetation in the WSA would be modified with this alternative. The Category 2 candidate species that may be located in the WSA would not be significantly affected because protective measures would be required.	Vegetation types and special status plant species would be protected because potential surface disturbance would be reduced from 713 acres to 49 acres and the area would be closed to ORV use.	Approximately 2.9 percent (579 acres) of the vegetation in the WSA would be modified. Vegetation types and special status plant species would not be significantly modified with this alternative because the potential for major disturbance would be reduced on 65 percent (13,124 acres designated without pre-FLPMA leases) of the WSA. In addition, protective measures would be required on the remainder of the area.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (20,350 Acres)	Partial Wilderness (14,736 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims and mineral developments could occur without restriction for the protection of wilderness values.	The portion to the projected 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of natural gas in the pre-FLPMA leases in the WSA could be produced. Recovery of an unknown but locally significant amount of oil and gas would be foregone because only 10 percent (2,132 acres) of the WSA could be developed for oil and gas.	Partial wilderness designation would preclude or constrain potential exploration and development of an unknown portion of 10 to 50 million barrels of oil and 60 to 300 billion cubic-feet of natural gas that may occur in the WSA because only 35 percent of the WSA could be developed for oil and gas. Loss of exploration and development opportunities for other mineral and energy resources would not be significant because the probability of development is low even if a portion of the WSA is not designated wilderness.
Impacts on Wildlife Habitat and Populations	Implementation of the land treatment would benefit some wildlife species and population levels by providing additional forage and ecotones. Surface disturbance on 3.5 percent (713 acres) of the habitat in the WSA may displace or reduce populations of some wildlife species during the lifetime of the projects. Crucial deer winter range would be disturbed. Special status species would not be significantly adversely affected because protective measures and mitigation would be required.	Only about 0.24 percent (49 acres) of the habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed land treatment project which would have benefitted some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Special status species would be protected.	Wildlife would benefit from a reduced acreage of surface disturbance when compared to the No Action/No Wilderness Alternative. Only 2.9 percent (579 acres) of the habitat in the WSA would be disturbed. Approximately 500 acres of vegetation treatment would be allowed in the nondesignated portion, which would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 49,465 acres not designated. Crucial deer and elk winter range would be disturbed. Special status species would not be significantly affected because protective measures and mitigation would be required.

SPRUCE CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (20,350 Acres)	Partial Wilderness (14,736 Acres) (Proposed Action)
Impacts on Livestock Management	With this alternative, there would be no changes in livestock use or management techniques. Surface disturbances resulting from mineral exploration and development would reduce forage production by about four AUMs per year. This would not significantly impact grazing. The proposed 542-acre burning and seeding project could be completed to provide an additional 68 AUMs of livestock forage and to improve livestock distribution.	No change in livestock authorization would occur with this alternative. Restrictions on predator control would result in slightly increased costs of livestock management for one livestock permittee in a sheep allotment. The proposed 542-acre burning and seeding that would produce 68 AUMs would not be allowed.	Livestock management practices and grazing levels would not be significantly affected. Only 4 AUMs of potential forage would be foregone because vegetation treatment would not be allowed.
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $12,485 to the local economy by the year 2020. The WSA could contribute up to $12,400 annually in local livestock sales and $955 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $40,700 to over $250,000 per year in Federal and State revenues. Federal revenues from commercial recreation outfitting (currently $150 annually) would continue.	Present economic conditions would not be significantly affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percent of the projected Grand County employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Potential annual local sales and Federal revenues related to livestock grazing could be reduced by $1,360 and $105 respectively. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $36,436, and potential royalties of up to $100,000 per year from wells on 90 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation use would probably increase as this type of use increases.	Present economic conditions would not be affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 65 percent of the area. Annual local sales and Federal revenues related to livestock grazing could be reduced by $100 and $38 respectively as compared to the No Action/No Wilderness Alternative. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $11,228. Annualy royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced, but potential royalties of up to $100,000 per year from wells on 65 percent of the WSA would be foregone. Recreation-related local sales would be about the same as with the No Action/No Wilderness Alternative because both motorized and primitive use would increase. Federal revenues from commercial recreation use would increase as this type of recreation use increases.

SPRUCE CANYON WSA

The deeply incised, branching drainages within the WSA provide many travel routes that allow dispersion of recreational use.

All in all, the entire WSA (20,350 acres) meets the requirements for outstanding opportunities for solitude, particularly because of topographic screening.

• Primitive and Unconfined Recreation

Although lack of water in the interior of the WSA and the steepness and height of side slopes may limit primitive-recreation opportunities somewhat, the many drainages and the dissected terrain provide several potential hiking routes up canyon bottoms and along ridge tops. Opportunities for hiking, backpacking, and hunting are considered outstanding throughout the WSA. The Spruce Canyon WSA is located between Coal and Flume Canyon WSAs. Logical travel routes include the various drainages at the northern end of the WSAs. A travel route exists from the road at the end of Sego Canyon along the Roan Cliffs all the way to Cottonwood Canyon. Primitive-recreation opportunities are enhanced by combining the opportunities available in adjacent WSAs.

All in all, the entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

• Special Features

The WSA has supplemental ecological, wildlife, scenic, and potential archaeological values. The WSA is part of a critical watershed. The WSA is an integral part of the Book Cliffs ecosystem and links Coal Canyon and Flume Canyon WSAs. There is one animal species (black-footed ferret) listed as endangered that may inhabit the WSA. There are six animal species and one plant species that are considered sensitive that may occur in the WSA. The WSA has year-round populations of cougar, elk, and black bear, which are wildlife species associated with wilderness. Refer to the Affected Environment and Vegetation and Wildlife Including Special Status Species sections for additional information. Approximately 76 percent (15,500 acres) of the WSA is rated Class A for scenic quality. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, and arches. The WSA has approximately 15 miles of perennial streams.

• Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV type of juniper-pinyon woodland. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential NWPS units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour driving time of two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA and surrounding area have been designated Class II air quality per the PSD regulations under the 1977 Clean Air Act Amendments. The nearest Class I area is Arches National Park, about 30 miles south of the WSA. Canyonlands National Park, another Class I area, is about 60 miles southwest of the WSA. No significant sources of air pollution are close enough to affect the WSA. Fugutive dust is the most significant air pollutant to the WSA and is intermittent depending on localized activities and winds. Air quality is good and visibility from ridgetops in the WSA ranges from 30 to 100 miles.

Geology and Topography

The WSA is in the Uinta Basin section of the Colorado Plateau Physiographic Province. It is located entirely in the rugged terrain between the south-facing face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading north to Diamond Canyon along the northern boundary of the WSA, or south to Cottonwood Canyon along the southern boundary. Elevations range from 8,500 feet along Diamond Ridge in the northwestern part of the WSA to 5,500 feet in Cottonwood Canyon in the southeastern tip of the WSA.

The WSA is underlain by sedimentary rocks of Triassic, Jurassic, Cretaceous, and Tertiary age. At the base of the tract along its southeastern side, the Mancos Shale and the Mesa Verde group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde group, which in turn is overlain by interfingered strata of the Wasatch and Green River Formations. In the northwestern part of

the WSA, the oil shale rich Parachute Creek Member of the Green River Formation crops out in an irregular band (specifically, the Mahogany oil shale bed). All strata in the vicinity of the WSA dip gently northward into the Uinta Basin.

The WSA is underlain by several sandstone units which are hydrocarbon producers in the vicinity, notably the Dakota, Cedar Mountain, Entrada, and Navajo Formations. The Morrison and Chinle Formations, known as major uranium producers in other areas of southeastern Utah, are also present, but indications are that the ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation.

Important vertebrate fossils may be found in the Chinle, Morrison, Cedar Mountain, and Green River Formations.

Differential erosion of the layers of sandstones and shales has created the distinctive banded appearance characteristic of the Book Cliffs. In the higher elevations toward the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. The landforms and geologic features of the WSA are typical of those found in the Book Cliffs as a whole. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, and arches.

Soils

About 45 percent (9,158 acres) of the WSA is composed of moderately deep and deep loamy soils on steep mountainsides. About 25 percent (5,087 acres) of the area is composed of shallow and deep stony soils on steep canyon sides. About 20 percent (4,070 acres) is very deep loamy soils on gently sloping alluvial fans along the canyon floors. The remaining 10 percent (2,035 acres) is rock outcrop occurring as cliffs and ledges. Refer to Table 2 for soil characteristics and land types.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	10	2,035	0.0	0
Moderately deep and deep loamy soils on steep mountainsides	45	9,158	0.0	20
Shallow and deep stony soils on steep canyon sides	25	5,087	1.0	10
Very deep loamy soils on sloping alluvial fans and floodplains	20	4,070	0.1	1
Totals	100	20,350		

Source: Hansen, 1985.

Erosion throughout the WSA is a potential concern because of steep slopes and a tendency toward flash-flooding. Erosion is generally natural in origin, from both wind and water. Sheet erosion (runoff) estimates for flat areas range from 0.1 cubic yard per acre per year to as high as 1.0 cubic yard per acre per year on steep side slopes. (Refer to Table 3 for erosion condition estimates.)

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubicyards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	45	9,158	183,160
High	10.0	-	-	-	25	5,087	50,870
Medium	5.0	-	-	-	-	-	-
Low	1.0	70	14,245	14,245	20	4,070	4,070
Very Low	0.1	20	4,070	407	-	-	-
None	0.0	10	2,035	-	10	2,035	-
Totals		100	20,350	14,652[a]	100	20,350	238,100[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.72 under present conditions; 117.00 if disturbed).

About 60 percent (12,210 acres) of the soils in the WSA are considered strongly saline and 40 percent (8,140 acres) are considered slightly saline. Annual salt production from soils in the WSA is estimated to be 73 lb per acre.

Fair seeding suitability occurs on approximately 20 percent (4,130 acres) of the WSA. On these areas, soils are moderately deep to deep on alluvial fans and terraces in canyon bottoms or drainages. The remaining portion of the WSA has steep slopes, shallow and/or stony soils, and rock outcrops which preclude any successful seeding.

Vegetation Including Special Status Species

Three major vegetation types are located in the WSA. They are Douglas fir, pinyon-juniper woodland, and riparian/sagebrush (refer to Table 4). Existing vegetation is predominantly Douglas fir forest and pinyon-juniper woodland of varying density. The pinyon-juniper woodland also consists of high desert plant communities found along the lower elevations in the southeastern portion of the WSA. The Douglas fir vegetation type also consists of mountain shrub communities found along ridgelines toward the Roan Cliffs, especially on north-facing slopes. A riparian-sagebrush vegetation type occurs in the canyon bottoms. Scattered stands of Ponderosa pine, aspen, cottonwood, and box elder are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs, but not in sufficient amounts to be classified as separate vegetation types. There are no known threatened or endangered plant species within the WSA. However, one Category 2 candidate species, Physaria acutifolia var. purpurea may occur in the WSA (see Appendix 4 in Volume I).

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir forest	9,550	47
Pinyon-juniper woodland	9,400	46
Riparian/sagebrush	1,400	7
Total	20,350	100

Source: USDI, BLM, 1983a

The WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV type of the WSA is juniper-pinyon woodland.

Water Resources

The WSA is located within a subbasin to the Colorado River in the Upper Colorado River hydrologic region. Major drainages in the WSA include Cottonwood, Diamond, Cherry, Tepee, Spruce, and Bull Canyons. Diamond Creek is a perennial stream from Oak Springs which flows along the northern boundary of the WSA. It runs for approximately 7 miles within and along the WSA. Cottonwood Creek along the southern boundary is also perennial in part and flows for about 8 miles within and along the WSA. The other streams are intermittent. Two of the major drainages for the Spruce Canyon WSA (Diamond and Cottonwood Creeks) have been identified as areas damaged by floods and contributing to sediment damage. They have been identified as having potential for watershed treatments in order to minimize downstream damage. Adjacent areas contributing sediment and runoff could also be considered for treatment.

A detailed water inventory has not been completed in the WSA, therefore, the number of springs or seeps is not known. However, geologic conditions are favorable for springs and seeps. There are no developed springs or wells in the WSA. Water quality data are lacking for the existing water resources within the WSA, but such data have been obtained from two point sources downstream from the WSA, each on perennial streams that make up the WSA boundaries.

The WSA is located within Water Right Adjudication Area 01. The water within this area is not fully appropriated. Consideration may be given for appropriation of isolated springs, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in this area (UDNRE, DWR 1988).

Since the waters from this WSA drain into the Colorado River, the water quality standards for the Colorado River apply. The water quality standards for the Colorado River and tributaries, from Lake Powell to the State line, are as follows: Class 1C (protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health), Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]), Class 3B (protected for warm water species of game fish and other warm water aquatic life), and Class 4 (protected for agricultural uses, including irrigation of crops and livestock watering).

Since the highly saline Mancos Shale is exposed only in the lower reaches of the WSA, surface water

quality should, for the most part, be acceptable for recreation, wildlife, livestock, and agricultural uses. The extent or quality of the groundwater resource in the WSA is not well known although the presence of springs indicates aquifers are in the area.

Mineral and Energy Resources

The WSA could contain deposits of vanadium that is currently listed as a strategic and critical material (USDoD, 1988).

The energy and mineral resource rating summary for the Spruce Canyon WSA is given in Table 5. Appendix 5 in Volume I explains the mineral and energy resource rating system.

Table 5
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability[a]	Certainty[b]	
Oil and Gas	f 3	c3	10 to 50 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Tar Sand	f 2	c2	Less than 10 million barrels
Oil Shale	f 2	c4	Less than 15 gallons per ton of shale
Uranium/Vanadium	f 2	c2	Less than 500 metric tons
Coal	f 3	c4	10 to 60 million metric tons (in-place)
Geothermal	f 1	c3	None

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Leasable Minerals

  - Oil and Gas

The WSA is along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields producing from the Entrada and Morrison Formations (Jurassic), and the Cedar Mountain and Dakota Formations (Cretaceous). Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA.

Approximately 26 holes have been drilled for oil and gas exploration within 3 miles of the WSA. Of these, three located on the boundary of the WSA are gas producers, and one about 3 miles to the southwest is an oil producer. These producing holes account for the presence of a formerly designated known geologic structure (KGS) within the WSA.

The interior of the WSA has not been drilled, but it is believed that other small fields would be located in this area.

Leasing and drilling activity has been high. Some of the fields near the WSA include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields are located northeast of the WSA. San Arroyo, the largest, has produced about 89 billion cubic feet of gas through 1984 since its discovery in 1962. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 billion cubic feet of gas). Small structural traps are responsible for their production.

The rating of f3 for oil and gas indicates that the potential exists within the WSA for recoverable reserves of 10 to 50 million barrels of oil or 60 to 300 billion cubic feet of gas (SAI, 1982). The moderate certainty level of c3 indicates a reasonable assumption that oil and gas resources are present, based on the positive drilling data of nearby holes and the numerous nearby fields.

The original oil and gas leasing categories (USDI, BLM, 1975b.) have been modified by the Grand RMP(USDI, BLM, 1983a). With the current land use plan, 11,580 acres are in Category 1 (standard stipulations) and 8,770 acres are in Category 2 (special stipulations). There are presently five pre-FLPMA oil and gas leases in the WSA, covering 2,132 acres.

A portion of one formerly designated KGS is located in the WSA (5,548 acres within the WSA). The WSA also contains part of the Book Cliffs oil and gas unit agreement (approximately 720 acres within the WSA).

  - Oil Shale and Tar Sand

The WSA has limited potential for both oil shale and tar sand. An oil shale withdrawal covers approximately 4,440 acres (22 percent) of the WSA. This type of withdrawal, dating to 1930, was made to withdraw oil shale deposits both

from oil and gas leases and from mining claim locations under the mining laws. The SAI rating for oil shale is f2 favorability with a high certainty of occurrence (c4), based on the appearance of a small part of the Mahogany Zone of the Parachute Creek Member (SAI, 1982). This rating indicates a potential for thin beds of oil shale with a yield of less than 15 gallons of petroleum per ton of shale. Extraction appears economically infeasible for the foreseeable future. The oil shale beds in the vicinity of the WSA are relatively thin and low grade.

The same Parachute Creek Member could have some potential for tar sand and is part of the reservoir rock in the P. R. Spring STSA located about 2 miles north of the WSA. Tar sand leases cannot be issued outside of STSAs. The rating of f2 favorability with a low certainty of c2 for occurrence indicates that potential exists for less than 10 million barrels of oil in place (SAI, 1982). Extraction appears infeasible for the foreseeable future.

- Coal

The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary Formations. The WSA is underlain by these strata, with coal bed outcrops in the southeastern border of the WSA. Most of the WSA lies within the Sego coal field, which is about 65 miles long, 6 miles wide, and extends from the Green River to the Colorado/Utah State line. The Sego field comprises only a small part of the demonstrated coal reserve base of Utah, with recoverable reserves of 293.6 million short tons of coal in beds 4 feet or more thick (Doelling 1972). The Sego field was mined from 1912 to the early 1950s, but not within the WSA. A 3,925-acre coal withdrawal is shown on some plats but was revoked in 1982.

The rating of f3 favorability for coal indicates that a moderate tonnage of coal exists within the tract evaluated which includes the WSA. The high c4 certainty level is assigned based on the hundreds of coal sections measured in and around the tract (SAI, 1982). The highest potential for coal is within the western end of the adjacent Coal Canyon WSA (UT-060-100C2), about 3 to 4 miles southwest of the WSA. The Spruce Canyon WSA is higher in the geologic section, northwest of the Coal Canyon coal outcrops. Between 10 and 60 million tons of in-place coal could be located in the WSA. There are no coal leases in the WSA.

- Geothermal

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees C). It seems very unlikely; however, that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA. The favorability rating is f1 with a moderate certainty of c3 that geothermal resources do not exist (SAI, 1982).

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA. No mining claims exist in the WSA. The 4,440 acres in the WSA which are covered by the oil shale withdrawal are closed to mineral location.

- Uranium and Associated Minerals

The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the southern end to almost 10,000 feet at the northern end. The Chinle, another major uranium-producing zone regionally, lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. The Wasatch Formation contains small anomalous uranium deposits. because the Wasatch Formation is present within the WSA, it may have marginal potential for uranium/vanadium.

The uranium/vanadium rating of f2 favorability indicates that any deposit would be less than 500-metric tons of uranium oxide mill concentrate in a geologic environment only mariginally favorable for the resource to occur. The certainty level is low at c2, indicating that limited positive data exists within the vicinity (SAI, 1982).

- Salable Minerals

The only possible salable minerals in the WSA are building stone and sand and gravel. Potential markets are very small and there are available sources of supply closer than those found in this WSA. No interest

has been expressed in the development of salable minerals in the WSA and none is anticipated in the future.

Wildlife Including Special Status Species

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, cougar, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food, thermal cover, escape cover, and birthing areas. The black-footed ferret (which is endangered) could be an inhabitant of prairie dog towns located in and near the WSA. The ferruginous hawk, long-billed curlew, southern spotted owl, western yellow-billed cuckoo, Great Basin Silverspot butterfly (all of which are Category 2 candidate species), and the golden eagle (which is a BLM sensitive species) may be found in the WSA (see Appendix 4 in Volume I). If present, most of these species would be associated with riparian and wet meadow areas on cliff faces and deep canyons, except for the ferruginous hawk. The ferruginous hawk inhabits pinyon-juniper woodland areas where there are ecotones or edges that provide opportunities for nesting, cover, and hunting activities.

The WSA supports moderate to high populations of big game species. The most common is mule deer. A small number of deer can be found in the area yearlong. Most of the deer stay along the lower portions of the riparian drainages in the WSA. Approximately 170 to 200 deer (256 AUMs) inhabit the area during the spring through fall seasons, moving to lower elevations in the winter. The WSA is within Deer Herd Management Unit 28-B, and comprises about 3 percent of the acreage within that unit. Elk can be found yearlong in the WSA. An additional 80 head (211 AUMs) of elk migrate into the area in the winter. Approximately 13,000 acres of the WSA are high value winter range for deer and elk. About 3,100 acres are crucial winter range for deer (USDI, BLM, 1990).

The WSA is favorable to wildlife because of its lack of human activity. Three species present are very sensitive to human intrusion: black bear, mountain lion, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species. Habitat for these species is found over the entire Book Cliffs area, including this WSA.

Upland game species include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffed grouse, and cottontail rabbit. Mourning dove are common in the WSA during the spring through fall seasons and may nest in pinyon pine and juniper trees. Grouse are present in this WSA yearlong. Blue grouse can be found at the higher elevations in the Douglas fir and aspen vegetation communities and ruffed grouse can be found along riparian drainages. Sage grouse are found in sagebrush parks at higher elevations. Cottontail rabbits are found unitwide.

The lower portions of Cottonwood and Diamond Creeks, which border the WSA, are perennial streams that have potential for supporting a population of trout. Several species of nongame fish (dace, shiners, suckers, and killifish) are present. No game fish presently inhabit these streams.

Several species of reptiles and amphibians are present. The most common are horned lizard, Great Basin sagebrush lizard, northern tree lizard, sideblotched lizard, whiptail lizard, gopher snake, smooth green snake, striped whipsnake, and midget faded rattlesnake. Several species of amphibians such as the red-spotted toad, Rocky Mountain toad, Great Basin spadefoot toad, canyontree frog, and Utah tiger salamander could be present along the Diamond Creek drainage.

The most common birds in the WSA are the red-tailed hawk, golden eagle, kestrel, great horned owl, goshawk, Cooper's hawk, sharp-shinned hawk, bluebird, blue jay, pinyon jay, sparrows, juncos, swifts, swallows, chickadees, kingbirds, kinglets, nuthatches, and magpie.

There are no existing or proposed wildlife habitat management facilities or proposed wildlife transplants in the WSA. No habitat management plans have been prepared for this area.

Forest Resources

No forest production is known to have taken place within the WSA. Even though timber species are present, the area is considered non-commercial and non-productive because of inaccessibility, rugged terrain, and slow growth of trees. Distance to potential mill sites is also not favorable. Pinyon-juniper woodland in the area is generally incapable of yielding 20 cubic feet of commercial wood per acre per year. The area may have been used to provide firewood or posts in the past and could possibly yield Christmas trees for

local use. There are 18,950 acres of pinyon-juniper woodland and Douglas fir forest that could supply firewood. However, there is no current interest in forest products in the WSA and none is expected in the foreseeable future.

Livestock and Wild Horses/Burros

The Spruce Canyon WSA contains portions of three grazing allotments used by three permittees that support approximately 552 AUMs (see Table 6 for livestock grazing use data). There is only one mile of way in the WSA and vehicles are not regularly used for livestock management inside the area.

Range development projects of record within the WSA are limited to short-gap fences, generally rim to rim across narrow drainages. The areas above and below these fences thus serve as management units. The potential exists for vegetation treatments in wider canyon bottoms to remove overgrown sage, which would increase forage.

The RMP proposes vegetation treatment on 542 acres (burning, drilling, and seeding) resulting in an increase of approximately 68 AUMs.

Short segments of Cottonwood and Diamond Creeks, bordering the WSA, were identified for special grazing management of the riparian areas. A strip along Diamond Canyon, including about 1,300 acres along the northern border of the WSA, has been identified for potential change in season-of-use.

No wild horses or burros are known to exist within the WSA. Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the Spruce Canyon WSA (USDA, APHIS, 1988).

Visual Resources

The WSA presents a landscape typical of the Book Cliffs. The steep slopes present sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark green vegetation give a striped appearance to the slopes that is noticeable some miles away.

Toward the Roan Cliffs in the northern half of the WSA rock outcrops shade to a reddish-brown. Landforms are more dissected in the Roan Cliffs and are chiseled to sharp and intricate ridge lines.

The WSA is classified as having both Class A and Class B scenery (Roy Mann Associates, Inc., 1977). Class A, which is scenery containing the most outstanding characteristics of the physiographic region, covers about 15,500 acres (76 percent) of the WSA. Class B, which is scenery that combines some outstanding features with some fairly common to the physiographic region as a whole, covers about 4,850 acres (24 percent) of the WSA. About 4,850 acres (24 percent) of the WSA is in the foreground/ middleground zone visible from boundary roads. The sensitivity level has been rated as high over about 17,900 acres (88 percent) of the WSA and medium over the remaining 2,450 acres (12 percent), reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors, the WSA is managed as VRM Class II on 17,900 acres (88 percent) and VRM Class III on

Table 6
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Numberd of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Diamond	18,964	6,500	588	188	98 Cattle	05/10-11/10	1
Cottonwood	29,936	13,650	900	360	185 Cattle	06/01-10/15	1
Cisco Mesa	48,260	200	3,180	4	2,650 Sheep	11/15-05/15	1
Totals	97,160	20,350	4,668	552			3

Source: BLM File Data.

2,450 acres (12 percent). (Refer to Appendix 7 in Volume I for information on BLM's VRM system and definition of terms.)

Cultural Resources

Prehistoric cultures represented in the region include the Paleo-Indian, Desert Archaic, Fremont, Anasazi, Ute, and historic European.

The earliest human occupation of the region is by the Paleo-Indian big game hunters. They dated from about 5,500 to 10,000 B.C. and followed migrating herds of giant Pleistocene animals such as mammoths and bison antiguous. Over half the Paleo-Indian points found in Utah are from the Moab vicinity, and research may yield more in the WSA.

Archaic peoples are better represented in the region and possibly were more numerous. Evidence from their broad range of foraging pursuits is found in non-ceramic open campsites and caves and rockshelters. Cave excavations at locations not in the Spruce Canyon WSA show a long occupation from about 6,060 B.C. to A.D. 500, depending on interpretation.

The Formative or sedentary agricultural culture which followed took two forms: the Anasazi and the Fremont. The WSA occurs in the border area between these two groups, but large numbers of Fremont ceramics at the Turner-Look site located just outside the WSA to the southeast, suggest their dominance in the area. Both Fremont and Anasazi cultures had ended in the area by about 1,300 A.D.

Evidence for the Ute nomadic foragers follows the end of the Formative cultures in the area. Sites consist of caves and open camps, as well as wickiup pole and brush structures.

European influence in the region dates from the Dominquez-Escalante Expedition of 1776, followed by Mexican traders on the Old Spanish Trail and French fur trappers in the 1810 through 1840 era. The latter are represented by an inscription by Antoine Robidoux, dating to 1837, located in Westwater Canyon to the east. American explorers crossed the region just south of the WSA in the 1850s just before the first Anglo-American settlement was attempted at Moab. Permanent American settlement occurred in the late 1870s and early 1880s with ranching spreading to the WSA region by that time.

A total of three archaeological sites have been recorded in the WSA (USDI, BLM, 1988b). These consist of one prehistoric campsite and two Fremont pictograph sites. None of these sites have been evaluated for National Register eligibility and there are no documented National Register sites in the WSA.

As a result of the Central Coal Project, 320 acres have been intensively surveyed within the boundaries of the WSA, but no sites were recorded (Hauck, 1977). No site-density estimates can be computed specifically for the WSA, however, average site-density estimates of 78 sites per 23,000 acres were computed for the Book Mountain area of which Spruce Canyon is a part (Hauck, 1977). These figures indicate that potential for finding additional sites in the WSA are moderate. Most of the additional sites would be prehistoric surface lithic scatters, but prehistoric habitations, historic sites, and additional rock art sites may also be present.

Recreation

Recreational use of the WSA is low due to its remote nature and limited access. The total recreational use is estimated to be approximately 350 visitor days annually and is mostly attributed to hunting. Hunters use four-wheel drive vehicles to drive along the boundary roads in Cottonwood and Diamond Canyons and hunt the canyons and hillsides on foot or by horseback. Because of this, hunting in the WSA is considered a primitive use. Bull elk hunting by permit is also allowed in the WSA. Two commercial users occassionally use Spruce Canyon WSA in conjunction with use of the Flume Canyon WSA. About 30 of the total visitor use days are attributed to use of Spruce Canyon WSA.

Other possible recreation opportunities include hiking, backpacking, camping, sightseeing, horseback riding, hunting, and ORV use. In the RMP, the entire WSA has been designated as open to ORV use under 43 CFR 8560. Currently, recreational ORV use is very low due to the WSA's distance from population centers and because there are more attractive ORV-use areas elsewhere in the general area. The rugged terrain presents a natural barrier to ORV use. There are no trails, campgrounds, or other recreational facilities within the WSA. There is 1 mile of way off Diamond Canyon that is used by hunters but less than 5 percent of recreational activity in the WSA involves vehicular access.

SPRUCE CANYON WSA

Land Use Plans

The Spruce Canyon WSA is located in the BLM Grand Resource Area. The current BLM planning document for the WSA is the Grand RMP (USDI, BLM, 1983a). Wilderness is not addressed in the RMP. Wilderness designation is part of the BLM multiple-use concept, and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

Current use of the Book Cliffs area is mainly oil and gas exploration activities, hunting, recreation, and livestock grazing. The WSA is BLM-administered public land except for one State section (640 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Volume I, Chapter 1). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. The 640 acres of in-held State lands are under lease for coal, oil, gas, hydrocarbons, and grazing. The only current activity on these lands is livestock grazing (UDNRE, DSLF, 1988).

The WSA is contiguous for about 6 miles with a 48,492-acre block of State land in the Roan Cliffs designated as a State roadless area that has not been open to leasing since 1975. The land was declared as a roadless area by the State of Utah in August 1975. The lands are described as " . . . unique areas due to their isolation, wilderness qualities, and other natural aesthetics. The ever-present possibility of destructive erosion occurring on this fragile watershed has prompted the Board of State Lands . . . to declare [this area] as being roadless and no vehicles of any kind are to be allowed in this area" (UDNRE, BSLF, 1976). This declaration was subject to existing rights of mineral lease holders. The adjacent and in-held State lands are similar in character to lands within the WSA. There are no private or split-estate lands within the WSA.

BLM has developed a transportation plan that evaluates engineering feasibility should access roads be proposed in the WSA (USDI, BLM, 1981b). There are no existing or pending rights-of-way within the WSA; however, development of pre- and post-FLPMA oil and gas leases could involve rights-of-way applications for access roads or oil and gas pipelines. Normally, rights-of-way are not required for on-lease development.

The Grand County Master Plan does not specifically address the Spruce Canyon WSA (U of U, BCD, 1979). While the plan recognizes the mineral potential in the Book Cliffs area, it does not make any specific management directives. In general, the plan would continue existing uses and maximize mineral development. Wilderness designation within the county is not favored.

The Grand County Commission has endorsed the Consolidated Local Government Response to Wilderness that opposes wilderness designation of BLM lands in Utah (Utah Counties, 1986).

Socioeconomics

- Demographics

The Spruce Canyon WSA is located in north-central Grand County. The nearest communities are Thompson (population 200), about 15 air miles southwest, and Cisco (population 45), about 15 air miles southeast of the WSA. Thompson offers limited services. The main gateways to the WSA are Grand Junction, Colorado, which is about 52 miles east of the east Cisco exit on I-70; Green River, Utah, about 54 miles west; and Moab, Utah, about 55 miles to the south of the WSA.

Access to the WSA currently is from I-70 by means of graded dirt county roads (Cottonwood Canyon road). The WSA can be reached within 30 minutes to 1 hour from I-70. From the east Cisco exit, it is about 20 miles via Diamond Canyon.

Roads below the Book Cliffs are well maintained for oil field operations; above the cliff line they are sometimes impassable during wet weather or heavy snow.

Grand County can be characterized as rural and sparsely populated. The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area.

From 1970 to 1980, the population of Grand County grew from 6,688 to 8,250, an overall increase of about 23 percent. Table 7 presents baseline and projected population data for Grand County. It is estimated that between 1980 and 1987, population decreased to about 7,250. Population projections for the county indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

Table 7

Baseline and Projected Population and Employment Growth
Grand County

	1980	1990	2000	2010
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900

Source: Utah Office of Planning and Budget, 1987.

- Employment

Grand County is part of the Southeast MCD. Table 8 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trade (15 percent), and service (8 percent).

It is projected that by the year 2010, employment in the MCD will increase by 27 percent, services to 18 percent, and that transportation to 17 percent of the total. Government will decline to 15 percent and mining to less than 20 percent of the total MCD employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent by the year 2010 (Utah Office of Planning and Budget, 1987).

Table 8
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

- Sales and Revenues

Economic-related activities in the WSA include leasable mineral exploration, livestock production, and recreation, mostly related to hunting. Table 9 summarizes local sales and Federal revenues. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 9
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	0	$4,264
Livestock Grazing	$11,040	$850
Recreational Use	$ 1,435	$ 0
Total	$12,475	$5,114

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Oil and gas exploration in the WSA has accounted for an unknown but minor amount of local employment and income. The WSA currently has no mining claims, therefore, no annual expenditures on claims have been made.

Three livestock operators have a total grazing privilege of 552 AUMs within the WSA. If all this forage were utilized, it would account for $11,040 of livestock sales, including $2,760 of ranchers' returns to labor and investment.

Expenditures associated with deer hunting in the south Book Cliffs deer herd unit contribute an estimated $40,000 annually of wage salary and proprietors' income to the local economy. An unknown but minor amount of this hunting takes place in the WSA. The WSA's non-motorized recreational use is low and related local expenditures are low. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that the Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for Spruce Canyon WSA is estimated at about 350 visitor days per year.

The WSA generates Federal revenues from mineral leases, livestock sources, and commercial recreation (refer to Table 9).

Oil and gas leases in the WSA cover approximately 2,132 acres. At $2 per acre, lease rental fees generate up to $4,264 of Federal revenues annually. In addition, the Federal government has received revenues from royalties and bonus bids related to production and leasing in that portion of the KGS located in the WSA. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy

development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 552 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $850 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM District for the construction of rangeland developments.

The Federal government receives about $150 in revenues annually from permitting commercial recreation use in the WSA.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Spruce Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy. Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II Management on 17,900 acres and withdrawal from mining claim location of 4,440 acres).

In the foreseeable future, disturbance of approximately 713 acres from oil and gas exploration and development, from vegetation treatments, from watershed treatments, and from providing access to State in-holdings would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Some imprints, such as roads and drill pads on steep, rocky slopes, would be irreversible. Most special features would not be significantly affected because the direct disturbance would involve only about 3.5 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural resources prior to any surface-disturbing activity. (Refer to the Wildlife and Vegetation Including Special Status Species sections for more information.) Some Class A scenery would be reduced in quality in disturbed and surrounding areas, and wilderness-dependent wildlife species may leave both disturbed areas and areas adjacent to the disturbance during the period of activity. Proposed vegetation treatments would benefit some wildlife associated with wilderness because of increased forage and ecotones.

During the period of activity, the visual and audible disturbance from mineral exploration and development, vegetation treatments, watershed development, and from providing access to State in-holdings would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also on adjacent portions of the WSA. As much as 25 percent (5,088 acres) of the WSA could be so affected in the foreseeable future.

Because future vehicular use would generally be limited by terrain to the existing vehicular ways to canyon bottom area, and to future roads constructed for mineral exploration and development and for access to State in-holdings, no additional disturbance from ORV activity is anticipated in the future. However, the use of existing ways and new roads would occasionally detract from opportunities for solitude and primitive recreation.

The increased visitor use that would occur would not be expected to significantly reduce the quality of wilderness values because the additional use would be largely primitive in nature and the WSA is large enough to incorporate the additional use adequately, especially when considered in conjunction with adjacent roadless areas.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Losses would occur, however, as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 713 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 5,088 acres. Class A scenery would be reduced in quality in disturbed and surrounding areas, and some

wilderness-dependent wildlife species would leave the area during the period of activity.

• Impacts on Vegetation Including Special Status Species

A total of 713 acres of surface disturbance is projected to occur in the WSA in the foreseeable future. The anticipated disturbance (3.5 percent of the WSA) would not result in major changes in vegetation types. Disturbance resulting from oil and gas activities (161 acres) could result in the loss of some trees. Roads would generally be constructed in the canyon bottoms in the riparian-sagebrush community resulting in some loss of riparian vegetation. The 542-acre vegetation treatments would substantially alter the vegetation composition of the affected areas. These projects are designed to convert pinyon-juniper woodland and sagebrush communities to grassland. This vegetation change would be long term, especially if the areas were maintained and reseeded. However, on a WSA-wide basis, the overall effect to vegetation would be small and once active maintenance ceased, the area would eventually revert back to the pinyon-juniper woodland and sagebrush.

The Category 2 candidate species (Physaria acutifolia var. purpurea) would be located in the drier areas of the WSA (e.g., pinyon-juniper woodland or in the Douglas fir communities). The habitat for this species extends beyond the WSA boundary. Before authorizing any surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, individual plants may be inadvertently destroyed, but the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 3.5 percent of the vegetation in the WSA would be modified. The majority of this disturbance would result from vegetation treatments. Some loss of riparian vegetation would occur due to road construction. Special status plant species would not be significantly affected.

• Impacts on Mineral and Energy Exploration and Production

About 4,440 acres would remain closed to locatable mineral entry due to the oil shale withdrawal. However, the remainder of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be significantly affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

The entire WSA is important wildlife habitat, including 3100 acres of crucial deer winter range. The WSA also provides habitat for black bear and cougar, species sensitive to human presence. In the short term, these species would be adversely affected by the anticipated 161 acres of surface-disturbance from oil and gas exploration and development (including 1 acre for access to State land), because habitat would be altered and the level of human activity in the area would increase. Category 2 oil and gas leasing stipulations would provide protection for animals and their habitat by prohibiting human activities during critical periods of the year and by selective placement of drill pads, roads and other facilities. The animals may move into adjacent areas because the WSA encompasses only a small part of their recognized habitat and the adjacent areas include portions of WSAs proposed for wilderness and the State roadless area. Overall, effects on populations of deer and elk would probably be small because only 0.8 percent of the habitat in the WSA would be disturbed by mineral activity, and mitigation would be required. Increased use of vehicles on new access roads for oil and gas activities and recreation would reduce the value of the area for cougar and black bear.

Disturbance of only 10 acres for watershed projects would not significantly affect wildlife species because they would be completed in a short period of time and would require only periodic maintenence. Over the long term, the reclamation of disturbed areas and the planned 542 acre vegetation treatment would provide ecotones, improve forage for some wildlife as well as improve livestock forage and reduce forage competition between live stock and big game.

Prior to surface disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas. If the endangered black-footed ferret or any other special status species could be affected, BLM would initiate consultation with the FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Volume I, Appendix 4). Because necessary measures would be taken to protect these animal species, the viability of populations of special status species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 3.5 percent (713 acres) of the wildlife habitat in the WSA including portions of crucial deer winter range would be disturbed oil and gas exploration and production, vegetation treatment and watershed projects. Disturbance would displace some species including deer and elk. Increased human activity would reduce the value of the WSA for black bear and cougar. The 542 vegetation treatment would benefit some wildlife species and increase populations by providing additional forage and ecotones. Special status species would not be significantly affected.

- Impacts on Livestock Management

Domestic livestock grazing would continue as authorized. The estimated 552 AUMs currently allocated within three allotments are controlled by three livestock permittees. The potential exists for 161 cares to be disturbed by oil and gas exploration (including access to in-held State lands). Access for management of livestock, would not be affected. The existing short-gap fences could be maintained as in the past. The 542-acre vegetation treatment could occur without concern for wilderness values. The project would ultimately result in an annual increase of 68 AUMs and would improve livestock distribution.

Conclusion: Livestock management would not be adversely affected by implementation of the No Action/ No Wilderness Alternative. Vegetation treatments would result in an increase of 68 AUMs annually and would improve livestock distribution.

- Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil and gas in the WSA were developed, it would lead to increased employment and income for Grand County. Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one period of time. This would represent about 0.1 percent of the projected employment in the Southeast MCD workforce in the year 2010 and only 1.0 percent of the projected Grand County employment in the year 2010. There would be minor increases in local sales in communities such as Green River (in Emery County) and Thompson.

There would be no livestock-related economic losses because the existing grazing use (552 AUMs available) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed vegetation treatment that would produce 68 AUMs of new allocated forage could lead to an additional $1,360 of livestock sales, including $340 of ranchers' returns to labor and investment.

Recreational use and, therefore, recreation-related local expenditures, would increase at a rate of 2 to 7 percent per year over the next 30 years. Recreation use in 30 years could thus increase from the current 350 visitor days to be between 665 and 3,045 visitor days per year. Since the recreation-related local expenditures average $4.10 per visitor day, recreation-related annual expenditures of between $2,727 and $12,485 would accrue to the local economy.

Existing Federal and State revenues would not be reduced by this alternative. The existing in Federal lease revenues would continue. In addition, there are $18,218 acres in the WSA open to oil and gas leasing that are currently not leased. If leased, they would bring up to $36,436 additional Federal lease fee revenues per year in addition to possible new royalties from lease production. Depending on the number of production wells, royalties could range from about $20,000 to well over $100,000 per year. Half of the Federal revenues would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently up to $850 per year) would continue. The additional 68 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative could increase Federal revenues by $105 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects. Federal revenues provided by commercial recreation use (currently $150 annually) would continue.

Conclusion: Present economic conditions and trends would not be affected. Oil and has exploration and

development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation related local sales would contribute up to $12,485 annually to the local economy by the year 2010. The WSA could contribute up to $12,400 annually in local livestock sales and in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $40,700 to over $250,000 per year in Federal and State revenues. Commercial recreation permitting would continue to provide about $150 in Federal revenues annually.

All Wilderness Alternative (20,350 Acres)

- Impacts on Wilderness Values

Designation and management of all 20,350 acres as wilderness would contribute to the preservation of the wilderness values in the Spruce Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I (which allows for only natural ecological change). Naturalness and outstanding opportunities for primitive and unconfined recreation and solitude would be protected on all 20,350 acres. Resources that could be considered as special features in the WSA, including Class A Scenery, endangered and sensitive species, wildlife associated with wilderness, perennial streams, and archaeological values, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of valid existing rights. In the foreseeable future, disturbance of up to 49 acres is anticipated from exploration and development of pre-FLPMA oil and gas leases and from providing access to State in-holdings, as well as from watershed projects. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be indirectly reduced in quality on adjacent portions of the WSA. As much as 3 percent (611 acres) of the WSA would be so affected. Special features would not be significantly affected because the direct disturbance would involve only about 0.24 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Although the vegetation treatments that would benefit wildlife would be foregone, preservation of solitude would benefit wilderness-dependent species overall. (Refer to the Wildlife and Vegetation Including Special Status Species sections for more information.) Some Class A Scenery would be reduced in quality in disturbed areas.

Overall, mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. Watershed projects, on the other hand, would be designed to meet wilderness management criteria, and upon completion would not be noticeable in the area as a whole. All in all, the foreseeable disturbance would not be substantially noticeable in the area as a whole.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for solitude and primitive recreation.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims.

Increased visitor use that would occur with time would be primitive in nature and would be managed so as to not result in loss of wilderness values. The WSA is adjacent to two other BLM WSAs and a State roadless area. The primitive recreational values of hiking, horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

Conclusion: Wilderness designation would preserve overall the wilderness values in the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 49 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 611 acres of the WSA. Class A Scenery would be reduced in quality on disturbed and surrounding areas.

- Impacts on Vegetation Including Special Status Species

The projected 542 acres of vegetation treatments would not be allowed. Surface disturbance would be limited to only 49 acres (0.24 percent) of the WSA. Therefore, vegetation types would not be significantly altered. Wilderness designation would provide additional protection for threatened, endangered, or other special status plant species.

Conclusion: Implementation of the All Wilderness Alternative would protect vegetation types and special status species in the WSA.

• Impacts on Mineral and Energy Exploration and Production

• Leasable Minerals

Approximately 2,132 acres are under pre-FLPMA oil and gas leases. Existing leases could be developed subject to the stipulations issued at the time of leasing. Expired leases will not be reissued and new leasing would not be allowed.

A potential resource of between 10 and 50 million barrels of oil or 60 to 300 billion cubic feet of natural gas could exist in the WSA. Only the portion of the oil and gas in pre-FLPMA leases could be recovered. Therefore, an unknown but locally significant amount of oil and gas, not in producing leases prior to designation, would be foregone.

• Locatable Minerals

Because of the low potential of the deposit and unfavorable economic conditions (high transportation costs, poor market conditions, etc.), no exploration or development of locatable minerals is anticipated in the foreseeable future with or without wilderness designation. Therefore, significant locatable mineral production would not be foregone.

• Salable Minerals

No exploration or development of saleable minerals is anticipated. Because of low potential of the deposit, and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Wilderness designation would preclude or severely constrain potential exploration and development of significant deposits of oil and gas. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from the preservation of solitude and reduction of potential, surface disturbance. Some wildlife could be affected as a result of oil and gas activities on leases with prior existing rights. However, only 49 acres are projected to be disturbed with this alternative as compared to 713 acres with the No Action/No Wilderness Alternative. Therefore, no significant habitat loss or reduction in animal numbers would be anticipated.

No wildlife management facilities have been proposed for the WSA. The planned 542 acres of vegetation treatment would not occur with this alternative; therefore, incident wildlife habitat benefit would be foregone.

Habitat for endangered, candidate, and BLM sensitive species that may be in the WSA would receive more protection from surface disturbance with this alternative than with the No Action/No Wilderness Alternative. Because of this and because necessary measures would be taken to protect these animals as discussed in the No Action/No Wilderness Alternative, the viability of populations of these species would be preserved under the All Wilderness Alternative.

Conclusion: Only about 0.24 percent (49 acres)of the habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed vegetation treatment project which would have benefited some wildlife species. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Threatened, endangered, and other special status species would be protected.

• Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized. The estimated 552 AUMs currently allocated in the WSA would remain available for livestock. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected. There could be slight increases in costs of management because of restrictions on predator control on one sheep allotment.

Within the WSA, the short-gap fences would be maintained as in the past, based on practical necessity and reasonableness. The projected 542-acre vegetation treatment would not be allowed, and the resulting gain of approximately 68 AUMs would not be realized. This would not have a significant affect on livestock production.

Conclusion: Wilderness designation would not significantly affect current livestock management practices. The opportunity for an increase of 68 AUMs through vegetation treatments would be foregone. Restriction on predator control may increase sheep and lamb losses on one allotment and result in slight increases in management costs for one permittee.

- Impacts on Local Economic Conditions

Overall, there would not be significant changes in current trends of population, employment, and local income distribution resulting from wilderness designation of the Spruce Canyon WSA.

Because of restrictions placed on the use of resources with wilderness designation, there could be losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 9), as well as loss of potential increases in income and Federal revenues that could occur with the No Action/No Wilderness Alternative.

Existing pre-FLPMA oil and gas leases and valid mining claims could be developed, but designation would preclude new leases and mining claims from being established in the WSA. Exploration and development of potentially recoverable oil and gas would be foregone on 90 percent of the WSA. This would not alter existing economic conditions, but could alter future economic conditions from those that could otherwise occur under the No Action/No Wilderness Alternative. The potential for 30 jobs, 0.75 percent of the Grand County employment projected for the year 2010, would be foregone. Any local income related to assessment of future mining claims would be lost.

Many oil and gas field services would be provided by local businesses, and some of the wages earned by the oil and gas workers would circulate through the local economy. Exploration and development of an area's oil and gas resources are the most labor-intensive phases of oil and gas production, but are of relatively short duration.

Livestock use and ranchers' income would continue as at present with $11,040 of livestock sales, including $2,760 of ranchers' return to labor and investment. The proposed 542-acre vegetation treatment would be foregone. As a result, annual local livestock sales of $1,360 and annual $105 of Federal grazing revenues from 68 additional AUMs would be foregone.
Nonmotorized recreation use would likely increase at a rate of 2 to 7 percent annually following wilderness designation. Related local expenditures would be small (average of $4.10 per visitor day Statewide). Motorized recreational use of the WSA would be curtailed, but use is light, involving less than 5 percent of the recreational use. Primitive recreation would eventually replace motorized use Any changes in related local expenditures would be small and would be distributed among businesses in Green River and Moab, Utah, with some spillover into western Mesa County, Colorado. The resulting local expenditures would be regionally insignificant.

Two outfitters make commercial hunting use of the WSA and the adjoining WSAs. With designation, they could probably charge more per trip. It is also probable that additional outfitters would use the area if it were designated wilderness, both for hunting and other primitive-recreational uses. Other than to recreation outfitters, recreation expenditures would also be locally insignificant to any single business in the affected area.

The 2,132 acres in pre-FLPMA leases could be developed. There would be a potential loss of $36,436 annually in Federal revenues from the 18,218 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases could also be foregone.

Federal revenues from commercial recreation use would probably increase as this type of use increases.

Conclusion: Present economic conditions would not be significantly affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percent of the projected Grand County employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Potential annual local sales and Federal revenues related to livestock grazing could be reduced by $1,360 and $105 respectively. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $36,436 potential royalties of up to $100,000 per year from wells on 90 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation use would probably increase as this type of recreation use increases.

Partial Wilderness Alternative (Proposed Action) (14,736 acres)

- Impacts on Wilderness Values

Wilderness designation of 14,736 acres would contribute to preservation of the area's wilderness values. Although foreseeable disturbance would involve about 81 percent (579 acres) of the disturbance identified for the No Action/No Wilderness Alternative, this alternative would protect wilderness values in the designated area, which is about 72 percent of the WSA. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure (including closure of 1 mile of way), and closure to future mineral leasing and location. Naturalness and outstanding opportunities for solitude and primitive recreation would be protected on all acres in the designated area, as would special features, including Class A scenery, endangered and special status species, wilderness-dependent wildlife species, archaeological sites, and perennial waters.

In the foreseeable future, loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil and gas exploration and development, vegetation treatments, watershed projects, and from providing access to State in-holdings would occur on up to 34 acres within the designated portion and on up to 545 acres within the nondesignated portion. Special features would be largely unaffected because disturbance would directly involve only about 2.9 percent (579 acres) of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and cultural values prior to any surface-disturbing activity. Some wilderness-dependent wildlife would leave the disturbed areas during the period of activity. (Refer to the Vegetation and Wildlife Including Special Status Species sections.) Some Class A scenery would be reduced in quality in the disturbed and surrounding areas.

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to 20 percent (4,130 acres) of the WSA. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated areas including vehicular use of 1 mile of way, would improve opportunities for solitude, naturalness, and primitive recreation. Vehicular use of some canyon bottom areas and future exploration and access roads in the nondesignated area would detract from these opportunities during the period of activity.

The extent that disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known but would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights.

This alternative would complement and enhance wilderness uses, values, and management of contiguous roadless areas.

Conclusion: Wilderness values would be preserved overall in the designated area which is approximately 72 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 579 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 4,130 acres of the WSA. Almost all of the impact would be in the nondesignated area. Special features in the designated area would be given additional protection, although Class A scenery would be reduced in quality in the disturbed and surrounding areas and wilderness dependent species would leave the area.

- Impacts on Vegetation Including Special Status Species

Approximately 579 acres of surface-disturbing activities would occur in the WSA. About 500 acres would be disturbed as a result of vegetation treatments. Projected impacts to the vegetation resource would be essentially the same as described in the No Action/No Wilderness Alternative.

The total area disturbed in the foreseeable future would be about 2.9 percent (579 acres) of the WSA. No significant impacts to vegetation types are anticipated in either the designated or nondesignated portions of the WSA. As discussed for the No Action/No Wilderness Alternative, prior to any surface-disturbing activities BLM would require site-specific clearances; initiate consultation with FWS, if necessary; and take appropriate mitigation measures where needed. Nevertheless, some inadvertent loss of individual special status plants may occur. However, the existence of population of special status species would not be threatened.

SPRUCE CANYON WSA

About 71 acres of the projected surface disturbance would result from association with mineral exploration and development would occur in both the designated (31 acres) and nondesignated (40 acres) portions of the WSA. While no significant impacts on any vegetation type are anticipated, this disturbance would remain for the life of the operations.

Conclusion: Vegetation types and special status species would not be significantly affected. About 2.9 percent (579 acres) of the vegetation in the WSA would be disturbed. Most of this disturbance would result from vegetation treatments.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

    The nondesignated portion of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values as discussed for the No Action/No Wilderness Alternative. Therefore, mineral and energy resources located in the nondesignated and most accessable portion (28 percent) of the WSA would not be affected by implementation of the Partial Wilderness Alternative.

    The designated portion of the WSA would be placed in Category 4 status (no leasing). Portions of three pre-FLPMA oil and gas leases (1,612 acres) are located in the designated portion of the WSA and could be developed per stipulation issued at the time of leasing. Because oil and gas exploration and devolpment in the designated area would be restricted to existing pre-FLPMA leases, implementation of the Partial Wilderness Alternative could result in the loss of production of an unknown but locally significant amount of oil and gas on 65 percent (13,124 acres) of the WSA.

  - Locatable Minerals

    No mining claims are currently located within the WSA. In the designated portion, development work, extraction, and patenting could occur on any future valid claims located prior to wilderness designation under the unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to mineral location (USDI, BLM, 1981b). BLM does not project exploration or development in the designated portion because locatable mineral resources are not sufficient to assume development.

    The nondesignated portion of the WSA would remain open to mineral location as discussed in the No Action/No Wilderness Alternative. However, because locatable minerals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is not assumed that development would occur in the foreseeable future. Therefore, implementation of this alternative would not prevent recovery of significant amounts of locatable minerals.

  - Salable Minerals

    No exploration or development is anticipated in either the designated or nondesignated portions of the WSA. Because of low potential of the deposit and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Partial wilderness designation would preclude or constrain potential exploration of leasable minerals not under pre-FLPMA lease in the designated portion of the WSA Production of an unknown portion of the oil and gas in the WSA would be foregone because 65 percent (13,124 acres) of the WSA could not be leased or developed. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from preservation of solitude and the reduction of potential mineral-related disturbance from 171 acres with the No Action/No Wilderness Alternative to 71 acres with this alternative.

In the designated area, 34 acres would be disturbed by oil and gas exploration and development, access to State land, and watershed projects. This disturbance would have only a short-term impact on wildlife species while work was ongoing. Thus, with this alternative, wildlife species would benefit through provision of solitude on 65 percent of the WSA.

Up to 130 acres of mineral-related surface disturbance could occur in the nondesignated portion of the WSA, and at least some of the disturbance would occur within crucial habitat. Noise and increased

access due to development of roads could, in combination with loss of habitat, cause deer, elk, bear, and cougar to leave the area at least for the duration of the activities. Category 2 stipulations would limit oil and gas activities during critical periods and would protect animals through selective placement of facilities. Approximately 500 acres of vegetation treatment could benefit other wildlife species through provision of additional forage and ecotones.

In the designated area, the one endangered and five candidate species, if present, would receive added protection by wilderness restrictions, while in the nondesignated area these species would not have this added protection. The Endangered Species Act and BLM policy would provide protective provisions for such species in all areas.

About 2.9 percent of the habitat in the WSA would be disturbed. Five hundred acres of vegetation treatment would be allowed in the nondesignated portion of the WSA, whoch would benefit some wildlife. Wildlife would not receive the additional benefit of solitude on the 5,614 acres not designated wilderness. Special status species would not be significantly affected.

- Impacts on Livestock Management

Of the estimated 552 AUMs allocated, 399 would be within the designated portion of the WSA and 153 within the nondesignated portion. The existing gap fences would be located in both the designated and the nondesignated portions of the WSA. Motorized vehicles are used on a limited basis for livestock management. The 1 mile of way is located in the designated portion of the In the 5,614-acre nonwilderness area, about 500 acres of vegetation treatment would be allowed. As many as 63 additional livestock AUMs could be provided. In the designated area, 42 acres of proposed begetation treatment would not be allowed and the potential for 5 additional livestock AUMs would be foregone. WSA and would not be available for vehicular use. Overall, livestock management would not be significantly affected.

Conclusion: Implementation of the Partial Wilderness Alternative would not result in a change in the level of livestock use. Only 5 potential AUMs of livestock forage would be foregone.

- Impacts on Local Economic Conditions

Partial wilderness designation is not expected to result in any changes in existing patterns or trends in population, employment, and local income distribution. The estimated 552 AUMs would remain available to cattle in the three allotments. The revenues, sales, and returns to ranchers would continue as discussed in the No Action/No Wilderness Alternative. About $100 in potential livestock sales and $8 in Federal revenues from grazing fees would be foregone each year.

Restrictions on oil and gas leasing on 65 percent of the WSA would not alter existing economic conditions from those that would occur with the No Action/No Wilderness Alternative. The level of employment in the WSA, 40 jobs, would be the same, but the length of employment would be reduced because oil and gas could not be developed on 65 percent of the WSA.

About 1,612 acres of pre-FLPMA oil and gas leases are located in the designated portion of the WSA and could be explored and developed. Revenues from potential future leases on the remaining 13,124 acres in the designated acres would be foregone. Potential royalties would also be foregone. Approximately 5,614 acres would be in the nondesignated area and could be leased for oil and gas at up to $11,228 per year. No exploration of development of locatable of salable minerals is projected in either the designated or nondesignated potions of the WSA.

Recreation-related local expenditures would be small (average of $4.10 per visitor day Statewide), and would be about the same as with the No Action/No Wilderness Alternative because both primitive and motorized use would increase.

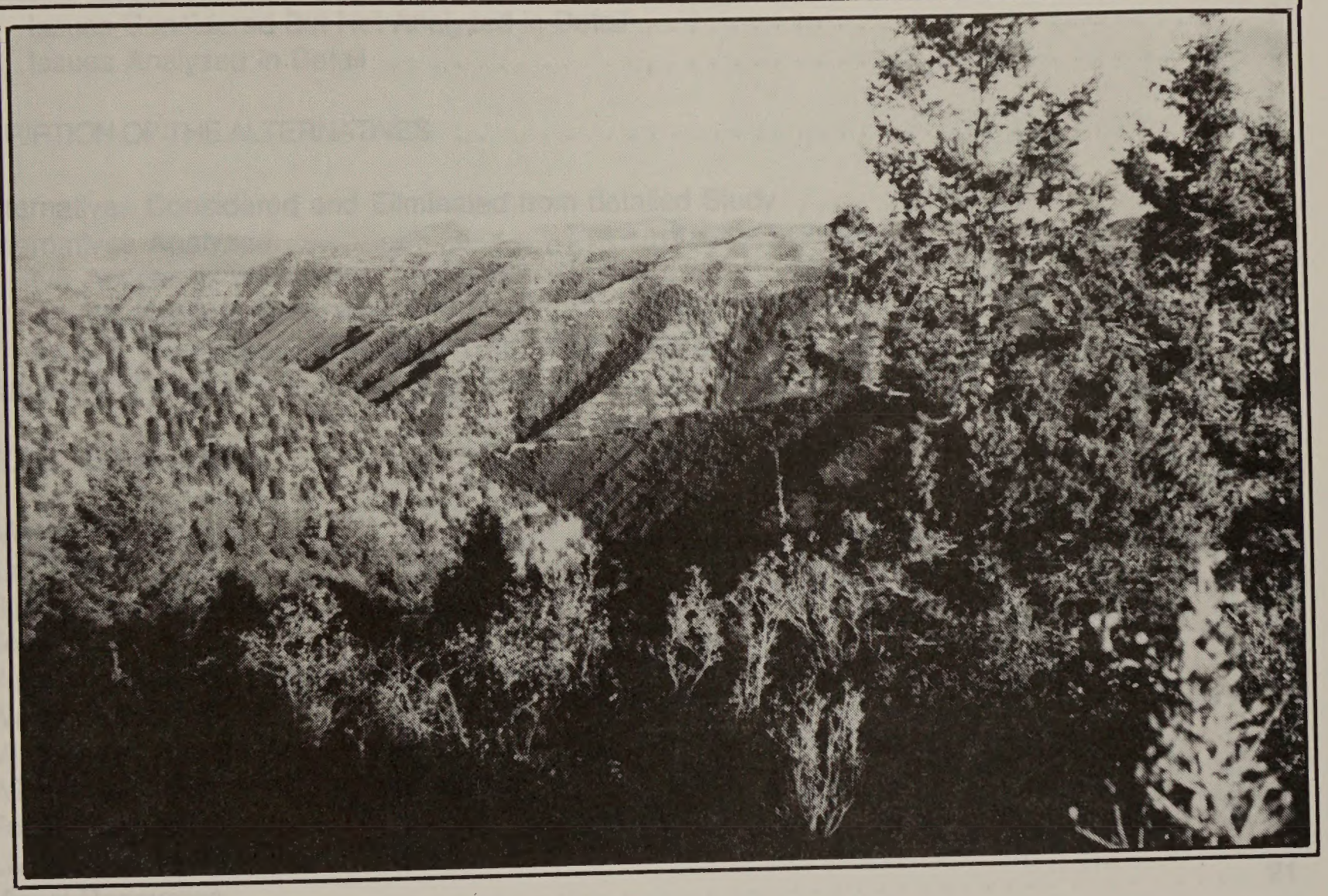
Federal revenues from commercial recreation use would probably increase as commercial use increases.

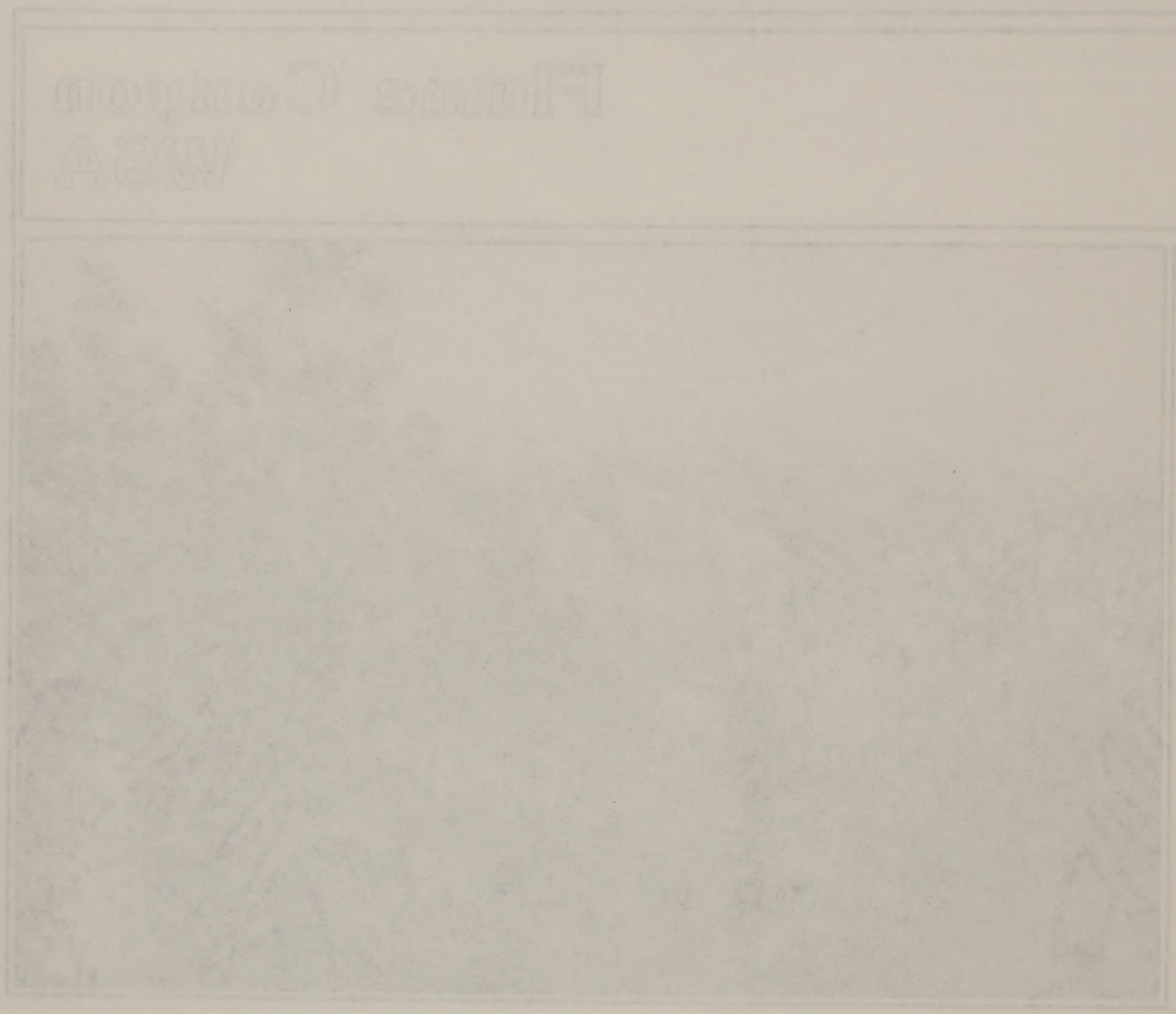
Present economic conditions would not be affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 65 percent of the area. Annual local sales and Federal revenues related to livestock grazing could be reduced by $100 and $8 respectively as compared to the No Action/No Wilderness Alternative. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $11,228. Annual royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced, but potential royalties of up to $100,000 per year from wells on 65 percent of the WSA would be foregone. Recreation-related local sales would be about the same as with the No

SPRUCE CANYON WSA

Action/No Wilderness Alternative because both motorized and primitive use would increase. Federal revenues from commercial recreation use would increase as this type of recreation use increases.

Flume Canyon WSA





FLUME CANYON WSA

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FLUME CANYON WSA

(UT-060-100B)

INTRODUCTION

General Description of the Area

The Flume Canyon WSA is located in the Book Cliffs region of north-central Grand County, Utah. It contains approximately 50,800 acres of BLM-administered public lands. The BLM Intensive Wilderness Inventory (USDI, BLM, 1980) indicated a 48,240-acre WSA. An additional 3,250 acres were added to the WSA following an Interior Board of Land Appeals (IBLA) decision remanding portions of the WSA. Other differences are attributable to master title plat checks and a dedicated right-of-way north of the Pear Park gas field, which eliminated approximately 690 acres. Six sections of State land totaling 3,811.8 acres are located within the WSA. The WSA is of irregular configuration, roughly 14 miles east-west and 10.5 miles north-south at its widest point.

Average annual precipitation ranges from 12 to 17 inches. Annual temperatures range from 100 degrees Fahrenheit (F) in the summer to -20 degrees F in the winter. Predominant vegetation is pinyon-juniper woodland, Douglas fir forest, mountain shrub, and high desert plant communities along the lower elevations.

Flume Canyon WSA is located in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading north to Westwater Creek Canyon along the northern boundary of the WSA, east to Sulphur Creek and Antoine Wash, and south to Diamond Canyon along the southern boundary. Flume Canyon runs south in the central part of the WSA. Elevations range from 8,500 feet along Westwater Point in the northwestern part of the WSA to 5,100 feet at the mouth of Long Canyon in the southern tip of the WSA. The 300-foot face of the lower Book Cliffs, visible for miles along Interstate 70 (I-70), is located just south of the WSA.

The towns nearest to the WSA are the small communities of Thompson, Utah (located about 20 air miles southwest of the WSA); Cisco, Utah (located about 18 air miles south of the WSA); and Mack, Colorado (about 20 air miles southeast of the WSA). It is part of a 956,220-acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Spruce, Desolation, Turtle, and Jack canyons WSAs) that are either managed as roadless or are under study for wilderness status. The adjoining WSA to the west is Spruce Canyon.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the Flume Canyon WSA have been made since publication of the Draft EIS.

1. Small portions of the boundary of the WSA (T. 17 S., R. 23 E., secs. 27, 34, 35; T. 18 S., 23 E., Secs. 10, 11; T. 19 S., R. 23 E., Secs. 17, 18) have been redrawn to correct errors in the Draft EIS maps. These changes did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. No Partial Wilderness Alternative was identified in the Draft EIS. However, in response to public comments received, a Partial Wilderness Alternative has been analyzed for the Final EIS. With the Partial Wilderness Alternative, 16,495 acres would be designated wilderness and 34,305 acres in the WSA would not be designated wilderness (refer to Map 3).

3. The BLM Proposed Action in the Draft EIS was the No Action/No Wilderness Alternative. The BLM Proposed Action for the Final EIS is the Partial Wilderness Alternative (16,495 acres). Refer to Appendix 11 in Volume I for rationale for the Proposed Action.

4. The anticipated surface disturbance presented in the Draft EIS (286 acres) was based on the assumption that all mineral and other resources potentially in the WSA would be developed sometime in the future without consideration of technical and economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future

STATEWIDE
POCKET MAP
WSA
NO. 71
SEE VOL.I

(see Appendix 6 of Volume I). This resulted in elimination of the 20 acres of disturbance estimate for the WSA has been reduced from the 286 acres analyzed in the Draft EIS to 184 acres for the Final EIS. Twenty-two acres of the projected surface disturb-ance would be for access to in-held State lands and 2 acres of surface disturbance are anticipated for construction of watershed projects that were not analyzed in the Draft EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Flume Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: Soil disturbance estimates have been revised downward from the 286 acres analyzed in the Draft EIS to 184 acres in the Final EIS. One hundred and eighty-two acres of the disturbance would be for oil and gas exploration and development including construction of access roads. Soils would be protected because oil and gas leasing stipulations in this area require special designs on slopes greater than 30 percent, and no occupancy is allowed on slopes greater than 50 percent. Proposed in-stream drop structures in Diamond and Westwater Creeks would be allowed with any of the alternatives. Because only 0.4 percent of the surface of the WSA would be disturbed, and mitigation would be required, impacts on soils are not significant for analysis in the Final EIS.

2. Water Resources: The public is concerned that wilderness designation would interfere with development of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. There are approximately 7.5 miles of perennial streams along the boundaries but no springs in the Flume Canyon WSA. There are no potential consumptive uses of water upstream of the WSA. The only potential uses of water in the WSA are the present uses associated with recreation, livestock, and wildlife. As explained above for soils, significant increases in soil erosion that might affect water quality are not expected. Therefore, impacts on water uses and quality are not significant for the Flume Canyon WSA.

3. Forest Resources: The forest resources in the WSA consists of approximately 35,742 acres with pinyon and juniper trees and 11,105 acres of Douglas fir forest. However, opportunities for forest resource harvest in the WSA are limited. No demand for forest resources in the WSA is projected due mainly to more accessible and higher quality areas located elsewhere. Therefore, impacts on forest resources are not significant issues for analysis in the Final EIS.

4. Visual Resources: The 184 acres of surface disturbance projected to occur in the foreseeable future would affect only 0.4 percent of the WSA. Disturbance would occur in Scenic Class B areas and in VRM Management Class II, III, and IV areas. Impacts on visual resources are considered in the Final EIS as part of the discussion of naturalness in the Wilderness Values section.

5. Cultural Resources: Only five cultural resource sites are known to occur in the WSA. However, because the potential for additional sites is moderate, surface-disturbing activities could potentially disturb or destroy sites not now known to occur in the WSA. Only 0.4 percent of the WSA would be disturbed and inventories for the purpose of site recordation and mitigations of impacts would take place prior to any surface disturbance. All sites would continue to receive protection under existing law. Given these conditions, impacts in cultural resources are not significant for EIS analysis in the Flume Canyon WSA.

6. Recreation: Recreational use of the Flume Canyon WSA is light, approximately 350 visitor-use days per year. Primary use is by hunters and sightseers. Recreational changes resulting from designation or nondesignation would not be significant due to limited use now occurring and projected to occur in the future in the WSA.

- Issues Analyzed in Detail

The significant issues for the Flume Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on leasable mineral exploration and production.

3. Impacts on vegetation including special status species.

4. Impacts on wildlife habitat and populations including special status species.

5. Impacts on livestock management.

6. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; and BLM's assessments of wilderness values, visual resources, and mineral values.

See Volume VII-B, for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 71, for responses to specific comments about the Flume Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from detailed Study

An alternative that would add 9,200 acres of Federal, State, and private lands on the north and east sides of the WSA was suggested in the public comments. This alternative is not analyzed because the inclusion of State and private lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1). Other citizen-proposed alternatives are comparable to the All Wilderness Alternative of 50,800 acres.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (50,800 acres) and Partial Wilderness (Proposed Action) (16,495 acres). A description of BLM's management practices with each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections with each alternative. These assumptions are indicated in each case. The analysis assumptions discussed in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 50,800-acre Flume Canyon WSA would be designated by Congress as part of the NWPS. Although BLM land use plans are regularly updated, it is assumed that the area would continue to be managed for multiple uses in accordance with the Grand RMP (USDI, BLM, 1983a). Six sections (3,811.8 acres) of State land within the WSA (refer to Map 1) have not been identified in the RMP for special Federal acquisition through exchange or purchase. No private or split-estate lands are located in the WSA. The figures and acreages given are for Federal lands only.

- Management Condition and Constraints

Approximately 47,000 acres not covered by an oil shale withdrawal would remain open to mineral leasing, location, and sale. The remaining 3,800 acres in the WSA are covered by an oil shale withdrawal and would remain closed to mineral location. Development work, extraction, and patenting would be allowed on three existing (60 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), without consideration for wilderness values. The loss occurs in seven existing oil and gas leases (360 acres post-FLPMA; 695 acres pre-FLPMA) could be developed per the stipulations issued at the time of lease issuance. New leases would be issued under Category 2 (standard and special stipulations) on 48,800 acres and Category 1 on 2,000 acres. The special stipulations would restrict use to protect watershed and wildlife.

Domestic livestock grazing use of the Flume Canyon WSA would be carried out as authorized in the Grand RMP (currently estimated at 1,904 AUMs). Existing rangeland developments (shortgap fences) could be used and maintained.

In-stream drop structures are planned in Diamond and Westwater creeks to improve water quality and reduce sediment yield.

The entire WSA would be open to ORV use; however, due to ragged terrain, use is essentially limited to the 6 miles of existing ways.

The entire 50,800-acre area would be open to woodland product harvest. There is no harvest of

R. 22 E.

R. 23 E.

T. 17 S.

T. 18 S.

FLUME CANYON WSA

Map 1

LAND STATUS

Flume Canyon WSA

UT-050-238

Legend

- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES

0 1 2

SCALE IN KILOMETERS

0 1 2 3

ELEVATION EXPRESSED IN METERS

N

4

forest products at the present time, nor is any projected.

The WSA would continue to be managed under VRM Class II on 32,500 acres, Class III on 15,760 acres, and Class IV on 2,540 acres.

- Action Scenario

It is projected that implementation of the No Action/No Wilderness Alternative would result in approximately 184 acres of surface disturbance in the foreseeable future.

About 160 acres of surface disturbance including up to 30 miles of access roads would result from the exploration and development of the oil and gas resource located in the WSA. It is projected that future seismic work would locate traps that could be drilled and developed. If the initial wells are producers, additional wells would be drilled on 640- or 160-acre centers. Development would include roads, tank batteries, separators, gathering lines, central facilities, and lines to move the products out of the area. Access to drill sites and the location of the drill sites would be restricted to ridge tops, canyon bottoms, or drainages. BLM's land use planning (Grand RMP) stipulates special designs on slopes of 30 percent or greater and no occupancy is allowed on slopes greater than 50 percent. It is projected that surface disturbance associated with developed leases would remain over the long term. Employment would average 10 employees for each exploration well drilled. A maximum of 40 employees would be required at one time. An average of 3 to 6 months would be required to complete drilling operations at each site. Each site would be reclaimed following abandonment. Producing wells would generally require only two employees for periodic maintenance.

In addition to oil and gas exploration and development activities, up to 22 acres of surface disturbance would result from about 11 miles of access road construction to in-held State of Utah lands. These roads would be constructed for mineral exploration and development purposes on the State lands.

About 2 acres of surface disturbance would result from construction of in-stream drop structures in Diamond and Westwater Creeks.

No disturbance from ORV activity is projected due to rugged terrain. Recreation use is projected to increase over the current estimated use of 350 visitor use days per year at a rate of 2 to 7 percent annually. As much as 42 percent would involve vehicular access on 10 miles of existing ways and on future roads for hunting purposes.

- All Wilderness Alternative

With the All Wilderness Alternative, all 50,800 acres of the Flume Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character.

The policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA (see Volume I, Chapter 1). Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There are six State sections (3,811.8 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). No private or split-estate lands are located in the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 50,800 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 60 acres of existing mining claims that may be determined to be valid. Development would be subject to unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to protecting wilderness values. Existing post-FLPMA oil and gas leases involving about 360 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. The 695 acres of pre-FLPMA leases could be developed per the stipulations assigned at the time of lease issuance. New oil and gas leases would not be issued.

Present domestic livestock grazing would be carried out as authorized. The estimated 1,904 AUMs of livestock forage in the WSA would remain available to livestock. After designation, existing rangeland developments (short-gap fences) could be maintained in the same manner

R. 22 E.

R. 23 E.

T. 17 S.

T. 18 S.

Map 2
ALL WILDERNESS ALTERNATIVE
Flume Canyon WSA
UT-060-100B

Legend

All Wilderness Alternative (50,800 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

FLUME CANYON WSA

as in the past based on practical necessity and reasonableness.

The planned in-stream drop structures in Diamond and Westwater Creeks would be allowed if designed to blend with the wilderness environment and constructed of natural materials by hand methods.

The entire 50,800-acre WSA would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. About 6 miles of ways in the WSA would be closed to vehicular use. About 30 miles of roads or jeep trails that border the WSA would remain open to vehicle use.

Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

BLM projects that 34 acres would be disturbed following wilderness designation of the Flume Canyon WSA. About 10 acres would be disturbed as a result of oil and gas exploration and development on existing pre-FLPMA oil and gas leases including up to 3 miles of access road construction. Development would be similar in nature to that discussed in the No Action/No Wilderness Alternative except on a much smaller scale. Maximum employment at one time would be about 10 employees. About 22 acres would be disturbed as a result of 11 miles of access road construction to in-held State lands as described in the No Action/No Wilderness Alternative. About 2 acres would be disturbed from construction of in-stream drop structures in Diamond and Westwater Creeks. These structures would be designed to blend with the wilderness environment and constructed with natural materials found on site and by hand methods. No disturbance is projected to occur from ORV use due to management constraints.

Primitive-type recreation use is projected to increase above the current estimated 200 annual visitor days of primitive use at a rate of 2 to 7 percent annually.

- Partial Wilderness Alternative (Proposed Action) (16,495 Acres)

With this alternative, 16,495 acres of the Flume Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that would minimize or avoid areas of greatest mineral development potential. This alternative would also eliminate from wilderness designation portions of the WSA containing substantially noticeable pre-FLPMA structures associated with the Cottonwood Ranch. Most of the structures were built in trespass between 1917 and 1961. Refer to the Wilderness Values section for more discussion.

The area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative. The area analyzed as wilderness includes the northwest one-third of the WSA. The remaining area (34,305 acres) within the WSA, but outside of that designated as wilderness, would be managed in accordance with the Grand RMP, as described for the No Action/No Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any particular WSA, it is assumed that State lands would remain under existing ownership. There are three State sections (1,927.6 acres) in the portion of the WSA that would be designated wilderness (refer to Map 1 and Volume I, Appendix 3). No private or split-estate lands are located in either the designated or nondesignated portions of the WSA. The figures and acreages given for this alternative are for Federal lands only.

- Management Conditions and Constraints

The 16,495-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. However, development work, extraction, and patenting would be allowed to continue on any new mining claims located prior to wilderness designation, provided that they are valid. Development would be regulated by the unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. An existing post-FLPMA oil and gas lease that covers 160 acres would be phased out upon expiration unless a find in commercial quantities of oil or gas is shown. A portion of a pre-FLPMA lease (20 acres) is located in the

R. 22 E.

R. 23 E.

T. 17 S.

T. 18 S.

Map 3

PARTIAL WILDERNESS ALTERNATIVE

Flume Canyon WSA

UT-050-238

Legend

WSA Boundary

Partial Wilderness Alternative (16,495 acres)

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

designated area and could be developed per the stipulations issued at the time of leasing. The 34,305-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of existing mining claims (60 acres) and future mining claims could occur without wilderness consideration if claims are valid. The area not designated wilderness would be managed as oil and gas leasing Category 2 (standard and special stipulations) on 32,305 acres and Category 1 (standard stipulations) on 2,000 acres.

Domestic livestock grazing would continue to occur in the 16,495-acre wilderness area. The estimated 610 AUMs in the designated portion would remain available to livestock as presently allotted, and the existing livestock facilities (short-gap fences) could be maintained, based on necessity and reasonableness. In the 34,305-acre nonwilderness area, grazing use would be allowed as currently authorized. Use is estimated at 1,294 AUMs. Existing developments (short-gap fences) could be maintained as at present.

In the 16,495-acre wilderness, in-stream drop structures would be allowed in the designated area as described in the All Wilderness Alternative. In the 34,305-acre nonwilderness area, water resource facilities including in-stream drop structures would be allowed without concern for wilderness values if in accordance with the RMP.

The entire designated wilderness area would be closed to ORV use. About 1.5 miles of existing vehicular way would not be available for vehicular use except in situations described for the All Wilderness Alternative. The remainder of the unit, including about 4.5 miles of ways, would remain open to vehicular travel. The nondesignated portion would be open to ORV use as discussed in the No Action/No Wilderness Alternative. About 30 miles of dirt roads and jeep trails that border the WSA would remain open to vehicles.

Visual resources in the 16,495-acre wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The nondesignated area would be managed as Class II on 16,005 acres, Class III on 15,760 acres, and Class IV on 2,540 acres.

- Action Scenario

BLM projects that implementation of the Partial Wilderness Alternative would result in a total of 124 acres of surface disturbance. It is projected that 7 acres would be disturbed in the designated portion of the WSA and that 117 acres of disturbance would occur in the nondesignated portion.

In the designated portion, 6 acres would be disturbed as a result of 3 miles of access road construction to in-held State land for mineral development purposes. No leasable or locatable mineral exploration or development on public lands is assumed. No rangeland or wildlife projects are projected. However, in-stream drop structures would be allowed as described in the All Wilderness Alternative and would disturb 1 acre.

In the nondesignated portion, 100 acres of surface disturbance is projected as a result of oil and gas exploration and development as described in the No Action/No Wilderness Alternative including up to 25 miles of access roads. A maximum of 40 employees would be required at one time. Placement of in-stream drop structures would disturb 1 acre. About 16 acres of surface disturbance would result from 8 miles of access road construction to in-held State lands for mineral development purposes.

No disturbance is projected to occur from ORV use due to management constraints and rugged terrain.

Recreation use is projected to increase above the current estimated use of 350 annual visitor days at a rate of 2 to 7 percent per year. Less than 42 percent would involve vehicular access on about 4.5 miles of existing way and on future roads for hunter access.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines, and provides a data base for the cumulative Statewide analysis found in Volume I, as well as the

Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA is 50,800 acres in size. It is roughly 14 miles east to west and 10 miles north to south at its widest points. The WSA is adjacent to Spruce Canyon WSA and is part of a 956,220 acre Book Cliffs region which includes adjacent Indian, State, and Federal lands (Floy, Coal, Spruce, Desolation, Turtle, and Jack canyons WSAs) that are either managed as roadless or are under study to wilderness status.

- Naturalness

As a result of errors made during the wilderness inventory, three ranch buildings, three corrals, a water impoundment, an irrigation ditch, several large water fumes, and several smaller structures all currently in use near the Cottonwood Ranch were included within the Flume Canyon WSA. All of these structures were constructed prior to the passage of FLPMA. With the exception of the water flumes and irrigation ditch, which have pre-FLPMA rights-of-way under the Mining Law of 1872, all of these structures were erected in trespass upon public land administered by BLM. The area disturbed by these structures totals approximately 19.3 acres. The three ranch buildings are located on 6 acres in T. 19 S., R. 23 E., sec. 7. The other structures are located in T. 19 S., R. 22 E., secs. 6 and 7, and are within a discontinuous corridor, varying from 15 to 200 feet in width, that begins north of the ranch buildings and proceeds north-northwest for about 1.75 miles.

Other human imprints within the WSA associated with grazing and mineral exploration, are not substantially noticeable within the WSA as a whole, and are capable of being reclaimed naturally. These imprints include: (1) approximately 4.5 miles of vehicular ways in Long Canyon; (2) an abandoned vehicular way approximately 1.5 miles long; (3) two abandoned drill pads covering 5 acres each (pre-FLPMA); and (4) a rehabilitated road 3.5 miles long and a rehabilitated drill pad covering 5 acres. Overall, grazing has taken place on ridges and in canyon bottoms, but not on the steep side slopes. Approximately 25,000 acres have been grazed. Mineral exploration has occurred in side canyons off Diamond and Westwater Canyons involving approximately 800 acres. In May of 1986, unauthorized cutting of green pinyon trees was discovered on the edge of the WSA along the Pear Park road. The area is being reclaimed by natural revegetation.

In July of 1989 wildfire burned approximately 9,600 acres of sagebrush, Douglas fir, pinyon and juniper trees in the northern part of the WSA. As part of the fire fighting efforts, a 3 mile way on Westwater Point was widened and extended for about 0.5 mile as a fireline. In the fall of 1989 portions of the burned area were aerially seeded with a mixture of native and previously established species. Contracts will be issued to recontour and reseed the fireline and to build fences along the boundary of the WSA to protect the reseeded area from grazing and vehicle damage.

Following successful reclamation, the fireline will meet the naturalness criteria.

Overall, more than 99 percent (50,781 acres) of the WSA meets the wilderness criterion for naturalness. Much less than 1 percent (19 acres) of the WSA does not. As much as 50 percent (25,400 acres) of the WSA could be considered pristine.

- Solitude

The WSA provides outstanding opportunities for solitude by virtue of its rugged topography and isolated nature. It is relatively large (50,800 acres), which enhances the opportunities present.

The rugged topography provides screening sufficient to obscure sights and sounds of others within the WSA. The vertical separation between ridgetops and canyon bottoms of up to 1,000 feet enhances the ability to find seclusion. This characteristic is more pronounced in the northwestern portion of the WSA.

The effectiveness of vegetation screening is less on steep slopes because there are wide bands of rock outcrop. Vegetation in high elevations (areas of Douglas fir forest) is more dense, providing better screening. Areas of mountain shrub provide dense thickets but screening potential is largely determined by overall height. Canyon bottoms vegetated with sagebrush generally do not provide cover from lines of sight from slopes and ridgetops above.

Sights and sounds from outside the WSA primarily involve oil and gas exploration around the WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (50,800 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 184 acres because of oil and gas exploration and development, construction of access to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to an additional 7,620 acres of the WSA. Special features would generally not be significantly affected. Some wilderness dependent wildlife species would leave the area during the period of disturbance. Vehicular use of 6 miles of way and up to 41 miles would detract from opportunities for solitude and primitive recreation.	Wilderness designation would preserve overall the wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 34 acres and indirectly reduced in quality on up to an additional 1,524 acres because of construction of access to in-held State lands, oil and gas exploration and development on pre-FLPMA leases and watershed projects. Special features generally would be preserved overall.	Wilderness values would be preserved overall in the designated area which is approximately 32 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 124 acres because of oil and gas exploration and development, construction of access roads to in-held State lands, and watershed projects. Opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 6,096 acres. Almost all of the impact would be in the nondesignated area. Special features would generally not be significantly affected. Some wilderness dependent species would temporarily leave the area. Vehicular use of 4.5 miles of ways and up to 14 miles of new roads in the nondesignated area would detract from opportunities for solitude and primitive recreation.
Impacts on Vegetation	Approximately 0.4 percent (184 acres) of the vegetation in the WSA would be modified with this alternative. The Category 2 candidate species that may be located in the WSA would not be significantly affected because protective measures would be required.	Vegetation types and special status plant species would be protected because potential surface disturbance would be reduced from 184 acres to 34 acres and the area would be closed to ORV use.	Approximately 0.2 percent (124 acres) of the vegetation in the WSA would be modified. Vegetation types and special status plant species would not be significantly modified with this alternative because the potential for major disturbance would be reduced on 32 percent of the WSA. In addition, protective measures would be required on the remainder of the area.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (50,800 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not adversely affect mineral exploration or production because mineral leasing, location of mining claims and mineral developments could occur without restriction for the protection of wilderness values.	The portion to the projected 10 to 50 million barrels of oil and 60 to 300 billion cubic feet of natural gas in the pre-FLPMA leases in the WSA could be produced. Recovery of an unknown but locally significant amount of oil and gas would be foregone because only 1.4 percent (695 acres) of the WSA could be developed for oil and gas.	Partial wilderness designation would preclude or constrain potential exploration and development of an unknown portion of 10 to 50 million barrels of oil and 60 to 300 billion cubic-feet of natural gas that may occur in the WSA because only 68 percent of the WSA could be developed for oil and gas. Loss of exploration and development opportunities for other mineral and energy resources would not be significant because the probability of development is low even if a portion of the WSA is not designated wilderness.
Impacts on Wildlife Habitat and Populations	Surface disturbance on 0.4 percent (184 acres) of the habitat in the WSA may displace or reduce populations of some wildlife species during the lifetime of the projects. Crucial deer winter range would be disturbed. Special status species would not be significantly adversely affected because protective measures and mitigation would be required.	Only about 0.07 percent (34 acres) of the habitat in the WSA would be disturbed. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Special status species would be protected.	Wildlife would benefit from a reduced acreage of surface disturbance when compared to the No Action/No Wilderness Alternative. Only 0.2 percent (124 acres) of the habitat in the WSA would be disturbed. Wildlife would not receive the additional benefit of solitude on the 30,305 acres not designated. Crucial deer winter range would be disturbed. Special status species would not be significantly affected because protective measures and mitigation would be required.

FLUME CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (50,800 Acres)	Partial Wilderness (20,774 Acres) (Proposed Action)
Impacts on Livestock Management	With this alternative, there would be no changes in livestock use or management techniques. Surface disturbances resulting from mineral exploration and development would reduce forage production by about 7 AUMs per year. This would not significantly impact grazing.	No change in livestock authorization would occur with this alternative. Restrictions on predator control would result in slightly increased costs of livestock management for two livestock permittees in two sheep allotments.	Livestock management practices and grazing levels would not be significantly affected.
Impacts on Economic Conditions	Present economic trends and conditions would not be affected. Oil and gas exploration and development would increase employment in Grand County by 1.0 percent (40 jobs) by the year 2010. There would be only minor changes in local economic conditions. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. The WSA could contribute up to $38,080 annually in local livestock sales and $2,933 in grazing fees. Oil and gas leasing fees and royalty payments could contribute from $101,600 to over $250,000 per year in Federal and State revenues. Federal revenues (currently $150 per year) from commercial recreation use would continue.	Present economic trends and conditions would not be significantly affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percent of the projected Grand County employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Potential annual local sales and revenues related to livestock grazing would continue at $30,080 and $2,933 respectively. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $99,490 and potential royalties of up to $100,000 per year from wells on 99 percent of the WSA would be foregone. Recreatoin-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation fees (currently $150 annually) would continue and probably increase.	Present economic trends and conditions would not be significantly affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 32 percent of the area. Livestock sales and grazing fees would not be affected. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $3,350. Annual royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced, but potential royalties of up to $100,000 per year from wells on 32 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation fees (currently $150 annually) would continue and probably increase.

perimeter. Roads, pipelines, drilling activities, and pumping facilities for producing wells are a source of visual impact, noise, and dust. Views from the southeast part of the WSA include drilling activities in the Cisco Desert outside the WSA and I-70. These are far enough from the WSA that they do not detract from solitude, and to some individuals would enhance the feelings of remoteness within the WSA. There is good potential that vistas to the southeast from high points would be adequate to give a visitor the feeling of vastness.

The deeply incised, branching drainages within the WSA provide many travel routes which allow dispersion of recreational use.

It is possible to find secluded areas within the WSA because of the dissected topography, many possible routes of travel, the size of the unit, and the areas of forest cover. All in all, the entire WSA (50,800 acres) meets the outstanding criterion for solitude.

- Primitive and Unconfined Recreation

Outstanding opportunities for primitive-type recreation are present throughout the WSA. The WSA provides opportunities for hunting, hiking, backpacking, camping, rock scrambling, etc. The many drainages and dissected terrain provide hundreds of potential hiking routes up canyon bottoms and along ridgetops. Steepness and height of side slopes limit potential hiking routes into and out of canyons, but increase the challenge.

- Special Features

The WSA has supplemental ecologic, scenic, and archaeologic values. There is one animal species (black-footed ferret) listed as endangered that may inhabit the WSA. There are six animal species and one plant species that are considered sensitive that may occur in the WSA. The WSA has year-round populations of cougar, elk, and black bear, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.) The WSA has approximately 7.5 miles of perennial streams. Rock formations and color contrasts provide scenic value. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

- Diversity

This WSA is in the Rocky Mountain Forest and Colorado Plateau Province Ecoregions and has the PNV types of juniper- pinyon woodland and mountain mahogany-oak scrub. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5 hour driving time of two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA and surrounding area have been designated Class II air quality under the PSD 1977 Regulations Clean Air Act Amendments. The nearest Class I area is Arches National Park, about 30 air miles south. Canyonlands National Park, another Class I area, lies about 60 air miles to the southwest. No significant sources of air pollution are close enough to affect the WSA. Visibility from higher elevations of the WSA average 30 to 100 miles and is important because of scenic vistas from the WSA across the Book Cliffs and Cisco Desert.

Geology and Topography

The Flume Canyon WSA is located in the Book Cliffs, a physiographic feature that runs from west of Rifle, Colorado, to northwest of Price, Utah. It is part of the Uinta Basin section of the Colorado Plateau Physiographic Province. Elevations range from 5,100 feet in the southern portion of the WSA to 8,500 along Westwater Point in the northwestern portion of the WSA.

The WSA is along the south-facing Book Cliffs escarpment, with parts extending northward into the Roan Cliffs. The tract is underlain by sedimentary rocks of Triassic, Jurassic, Cretaceous, and Tertiary age. At the base of the tract along its southeastern side, the Mancos Shale and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River formations. In the northwestern part of the WSA, the oil shale rich Parachute Creek Member of the Green River Formation crops out in an

irregular bank (specifically, the Mahogany oil shale bed). All strata in the vicinity of the WSA dip gently northward into the Uinta Basin. Important vertebrate fossils may be found within the Chinle, Morrison, Cedar Mountain, and Green River formations.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Dakota, Cedar Mountain, Entrada and Morrison. The Morrison and Chinle formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth; however, indications are that ore formation did not occur in the Book Cliffs region. Some minor localized deposits of uranium occur in the Wasatch Formation. Differential erosion of the layers of sandstones and shales has created the distinctive banded appearance characteristic of the Book Cliffs. In the higher elevations towards the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Soils

Refer to Table 2 for soil characteristics and land types in the WSA. Flume Canyon WSA is characterized by steep canyons. About 65 percent (33,020 acres) of the area is composed of shallow to deep stony soils on steep sides of canyons and mountains. About 20 percent (10,160 acres) is composed of moderately deep and deep loamy soils on steep mountainsides. About 5 percent (2,540 acres) is very deep loamy soils along drainages on canyon floors, while about 10 percent (5,080 acres) is composed of rock outcrop occurring as cliffs and ledges. Erosion throughout the WSA is critical because of steep slopes and a tendency towards flash flooding.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	10	5,080	0.0	0
Moderately deep and deep loamy soils on steep mountainsides	20	10,160	1.0	20
Shallow and deep stony soils on steep canyon sides	65	33,020	1.0	10
Very deep loamy soils on sloping alluvial fans and floodplains	5	2,540	0.1	1
Totals	100	50,800		

Source: Hansen, 1985.

Erosion is generally natural in origin, from both wind and water. Erosion estimates for the WSA are found in Table 3.

No agricultural activity takes place within the WSA. There are existing farm fields within 0.50 mile of the WSA at the mouth of Westwater Creek Canyon and adjacent to the WSA at the mouth of Diamond Canyon. There is a possibility for agricultural development on 160 acres along Westwater and Diamond Creeks where there are favorable soils, but the short growing season (less than 110 days), erodibility of soils, and potential for flashfloods limit feasibility.

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	20	10,160	203,200
High	10.0	-	-	-	65	33,020	330,200
Medium	5.0	-	-	-	-	-	-
Low	1.0	85	43,180	43,180	5	2,540	2,540
Very Low	0.1	5	2,540	254		-	-
None	0.0	10	5,080	-	10	5,080	-
Totals		100	50,800	43,434[a]	100	50,800	535,940[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.86 under present conditions; 10.55 if disturbed).

About 60 percent (30,480 acres) of the soils in the WSA are considered strongly saline and 40 percent (20,320 acres) are considered slightly saline. Annual salt production from soils in the WSA is estimated to be 90 lb per acre.

Fair seeding suitability occurs on approximately 5 percent (2,000 acres) of the WSA. On these areas, soils are moderately deep to deep on alluvial fans and terraces in canyon bottoms or drainages. The remaining portion of the WSA has steep slopes, shallow and/or stony soils, and rock outcrops which make successful seeding difficult.

Vegetation Including Special Status Species

The WSA has five major vegetation types as shown in Table 4. Existing vegetation is predominantly pinyon-juniper woodland of varying density, with high desert plant communities found along the lower elevations in the southern portion of the WSA. Mountain shrub communities are located along ridgelines towards the Roan Cliffs, especially on north-facing slopes. Ponderosa pine, Douglas fir, aspen, cottonwood, and box elder trees are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs. About 4 percent (2,000 acres) of the WSA has sagebrush communities, and one percent (640 acres) has riparian communities, occurring in canyon bottoms and along water courses such as Diamond and Westwater Creeks. Vegetation communities are localized depending on elevation, availability of water, and slope aspect.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir	11,105	22
Pinyon-juniper/Douglas fir/Aspen/ Mountain Shrub	22,910	45
Pinyon-juniper/Mountain shrub	12,832	25
Riparian/sagebrush	2,640	5
Shadscale	1,313	3
Total	50,800	100

Source: USDI, BLM, 1983a

There are no known threatened or endangered plant species in the WSA. One Category 2 candidate species, Physaria acutifolia var. purpurea, may occur in the WSA (see Appendix 4 in Volume I).

The WSA is located in the Rocky Mountain Forest Province and the Colorado Plateau Physiographic Province Ecoregions as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types within the WSA are shown in Table 5.

Table 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Mountain mahogany/Oak scrub	9,690	19
Juniper-pinyon woodland	41,110	81
Total	50,800	100

Source: USDI, USGS, 1978.

Water Resources

The Flume Canyon WSA is located within a sub-basin to the Colorado River in the Upper Colorado River Hydrologic Region. The major drainages in this WSA are Diamond, Flume, Westwater, Antone, and Sulphur Canyons. Diamond Creek is a perennial stream, flowing within the WSA for approximately 7.5 miles; other drainages are intermittent. Two of the major drainages, Diamond Creek and Westwater Creek, have been identified as areas damaged by floods and contributing to sediment damage. These drainages have been identified as having potential for watershed treatments to minimize downstream damages. Currently, in-stream drop structures are planned. Adjacent areas contributing to sediment for runoff would also be considered for treatment following detailed inventories.

There are no known springs or wells in the WSA. Water quality data are lacking for the existing water resources. Generalized data indicate that sediment in streams in the vicinity of the WSA varies from less than 500 to 1,000 milligrams per liter (mg/l).

The WSA is located within Water Right Adjudication area 01. The water within the area is not fully appropriated. Consideration may be given for appropriation of isolated springs, but claims may not exceed 0.015 cfs. Temporary and fixed-time applications may exceed 0.015 cfs in this area (UDNRE, DWR, 1988).

Since the waters from this WSA drain into the Colorado River, the water quality standards for the Colorado River apply. The water quality standards for Colorado River and tributaries, from Lake Powell to the state line are as follows: Class 1C (protected for domestic purposes with prior treatment by treatment

processes as required by the Utah Department of Health), Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]), Class 3B (protected for warm water species of game fish and other warm water aquatic life) and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Mineral and Energy Resources

The energy and mineral resource rating summary for the Flume Canyon WSA is given in Table 6. Appendix 5 in Volume I explains the mineral and energy resource rating system.

The WSA may contain deposits of vanadium, currently listed as a strategic and critical material (USDoD, 1988).

Table 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability[a]	Certainty[b]	
Oil and Gas	f 3	c3	10 to 50 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Tar Sand	f 2	c4	Less than 10 million barrels
Oil Shale	f 2	c4	Less than 15 gallons per ton of shale
Coal	f 2	c4	Low tonnage (14 to 26 million metric tons)
Geothermal	f 1	c3	None
Uranium/Vanadium	f 2	c2	Less than 500 metric tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Leasable Minerals

Currently, there are no active drilling, mining, or exploration activities for leasable minerals in the WSA.

- Oil and Gas

The WSA is located along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields produced from the Jurassic Entrada and Morrison formations and the Cretaceous Cedar Mountain and Dakota formations. Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA. Some lie directly adjacent (Diamond Ridge, Pear Park, Book Cliffs). Leasing and drilling activity has been high in the surrounding area. The geologic environment is favorable for oil and gas resources, especially gas. Small structural traps are likely rather than larger features.

The WSA contains portions of three areas formerly designated as KGSs (refer to Table 7). Three of the seven wells drilled in the WSA have gas shows or initial production of gas. Several holes within 3 miles of the WSA contain fluid hydrocarbon.

Table 7
Special Mineral Designation Areas

Type	WSA Acres	Percent of WSA
Known Geologic Structures A	6,649	13
Known Geologic Structures B	6,245	12
Known Geologic Structures C	2,640	5
P. R. Spring STSA	1,450	3
Oil Shale Withdrawal Areas	3,800	8
Total	20,784	41

Source: USDI, BLM, 1983a.

Leasing and drilling activity surrounding the WSA has been high. Some of the fields on the perimeter of the tract include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields in the vicinity of the tract are located 10 to 15 miles to the northeast. San Arroyo, the largest, has produced about 89 billion cubic feet of gas through 1984 since its discovery in 1962. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 million cubic feet of gas). Small structural traps are responsible for the production.

A 54,540-acre tract, including the WSA, has been evaluated for oil and gas. The WSA includes over 93 percent (50,722 acres) of the evaluated tract. Small areas east and west of the WSA were also evaluated. The rating of f3 favorability for oil and gas indicates that potential exists in the tract for 10 to 50 million barrels of oil or 60 to 300 billion cubic feet of natural gas (SAI, 1982). The moderate certainty level of c3 indicates that oil and gas resources are present, based on the positive drilling data of nearby holes and the numerous nearby fields. The certainty

rating is conservative and is nearly a c4(SAI, 1982).
The original oil and gas leasing categories (USDI, BLM 1975b) classified the WSA as open (Category 1) with standard stipulations. However, in the Grand RMP the category on 48,800 acres was changed to open with special stipulations (Category 2) restricting winter use to protect critical watershed and elk habitat.

There are presently seven oil and gas leases in the WSA, covering 1,055 acres (four pre-FLPMA leases, 360 acres; and three post-FLPMA leases, 695 acres).

- Oil Shale and Tar Sand

The WSA has some potential for both oil shale and tar sand, although none of the WSA is currently leased for these resources (SAI, 1982). Approximately 3,800 acres in the northern portion of the WSA are included in an oil shale withdrawal. This type of withdrawal, dating to 1930, was made to withdraw oil shale deposits both from oil and gas leases and from mining claim location. The rating for oil shale is f2 favorability with a high certainty of c4 (SAI, 1982). This is based on the appearance of a small part of the Mahogany Zone of the Parachute Creek Member. The Mahogany Zone has been under development for petroleum production in the Grand Junction, Colorado, area, but extraction appears economically infeasible at this time. The f2 rating indicates a potential for thin beds of oil shale, with a yield of less than 15 gallons per ton of shale. Thickness of the zone should be less than 25 feet.

The Parachute Creek and Douglas Creek members could have some potential for tar sand. Approximately 1,450 acres of the WSA are within the P.R. Spring STSA, although there are no lease conversion applications for the portion of the STSA within the WSA. The rating of f2 favorability with a high certainty of c4 for occurrence indicates that resource potential in the WSA would be less than 10 million barrels of oil in-place (SAI, 1982). Individual tar sand beds will be less than 20 feet thick and contain less than 15 gallons of oil per ton.

No oil shale or tar sand development is projected to occur in the WSA in the foreseeable future.

- Coal

The rating of f2 favorability with a high certainty of c4 occurrence for coal indicates that a low tonnage of coal exists within the tract evaluated (approximately 14 to 26 million tons in-place). The WSA represents the northern 24 percent of the coal tract evaluated. The c4 certainty level is assigned based on the hundreds of coal sections measured in and around the tract (SAI, 1982). The highest potential for coal is within the western end of Coal Canyon WSA, about 15 miles southwest of Flume Canyon WSA. The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary formations (Doelling, 1972). Coal in the WSA is found in the Cretaceous Mesa Verde Group. The coal beds outcrop outside of the southeast boundary of the WSA. Most of the WSA lies within the Sego field which comprises only a small part of the demonstrated coal-reserve base of Utah. The Sego field was mined from 1912 to the early 1950s, but not within the WSA. The coal found within the WSA is of poor quality and occurs in thin beds. There are no coal leases within the WSA. Commercial extraction is unlikely.

- Geothermal

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees Centigrade). It seems very unlikely that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low-temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA. The rating is an f1 favorability with a moderate certainty that geothermal resources do not exist (SAI, 1982).

- Locatable Minerals

There are no known deposits of locatable minerals in the WSA. The 3,800 acres in the WSA covered by the oil shale withdrawal are not available for mineral location. In total, the WSA has three mining claims covering 60 acres.

The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, the other major uranium-producing zone, regionally lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. The Wasatch formation contains small uranium deposits and covers about 250 acres (0.5 percent of the WSA). It may have potential for vanadium associated with the uranium.

The uranium/vanadium potential would be less than 500-metric tons of uranium oxide mill concentrate in a geologic environment only marginally favorable for the resource to occur. The favorability rating is f2 with a low certainty of c2 for occurrence (SAI, 1982).

- Salable Minerals

The only potential salable minerals in the WSA are sand and gravel. Potential markets are very small and sources of supply are more readily available than those in this WSA. There is currently no use of these resources, and it is unlikely they would ever be developed.

Wildlife Including Special Status Species

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, cougar, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food, thermal cover, escape cover, and birthing areas.

The black-footed ferret, which is endangered, may be found in the general area. Five Category 1 and Category 2 candidate species may also occur in or near the Flume Canyon WSA. These are the ferruginous hawk, long-billed curlew, southern spotted owl, western yellow-billed cuckoo, and Great Basin Silverspot butterfly (see Appendix 4 in Volume I). If present, most of these species would be associated with riparian and wet meadow areas or cliff faces and deep canyons, except for the ferruginous hawk. The ferruginous hawk inhabits pinyon-juniper woodland areas where there are ecotones or edges that provide opportunities for nesting, cover, and hunting activities.

The WSA is favorable for wildlife because of its lack of human activity. Several of the species present in the WSA are sensitive to human intrusion, including black bear, cougar, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species. The entire WSA is important wildlife habitat.

The WSA supports moderate to high populations of big game species. The most common is mule deer. A small number of deer can be found in the area yearlong. Most of these deer are found along the lower portions of the riparian-sagebrush canyon bottoms in the WSA. All of the forage in Pear Park (96 percent [13,100 acres] of Pear Park is in the WSA) has been set aside for wildlife (deer and elk). Approximately 100 to 180 deer (200 AUMS) inhabit the WSA during the spring through the fall seasons, moving to lower elevations in the winter.

Elk can be found yearlong in the WSA. About 40 elk (105 AUMs) migrate intoe the area in the winter.

Approximately 25,000 acres are high value winter range for deer and 26,850 acres are crucial deer winter range (USDI, BLM, 1990). Black bear and cougar can also be found yearlong, but are not abundant.

Upland game species within the WSA include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffed grouse, and cottontail rabbits. Mourning dove are common in the WSA during the spring through fall seasons and may nest in the pinyon-juniper woodland. Grouse are present in this WSA yearlong. Blue grouse and ruffed grouse can be found at the higher elevations in the Douglas fir and aspen vegetation communities and along riparian-sagebrush communities in canyon bottoms. Sage grouse are found in sagebrush parks at higher elevations. Cottontail rabbits are found unitwide.

The lower portions of Westwater and Diamond Creeks are perennial streams that have potential for supporting a population of trout. Several species of nongame fish (dace, shiners, suckers, and killifish) are present. No game fish presently inhabit these streams.

Several species of reptiles and amphibians are present. The most common are short-horned lizard, whiptail lizard, northern tree lizard, sideblotched lizard, gopher snake, smooth green snake, striped whipsnake, and midget faded rattlesnake. Several species of amphibians such as red-spotted toad, northern

leopard frog, and Utah tiger salamander could be present in the Diamond Creek drainage.

The most common birds found in the WSA are the red-tailed hawk, golden eagle (a BLM sensitive species), American kestrel, great horned owl, goshawk, Coopers' hawk, sharp-shinned hawk, blue jay, pinyon jay, swift, junco, kingbird, kinglet, nuthatch, magpie, raven, and various species of sparrows and swallows.

There are no transplants or habitat treatments planned specifically for wildlife.

Forest Resources

Only trespass cutting of green pinyon pine trees is known to have occurred within the WSA. The cutting was done along a boundary road. Forested lands, which include pinyon-juniper woodland (35,742 acres) and Douglas fir forests (11,015 acres), cover approximately 92 percent (46,736 acres) of the WSA. Adequate volumes for timber harvest are present and could produce limited amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees. In all, the pinyon-juniper woodland and Douglas fir trees could yield up to 7,289 cords of firewood. However, rugged terrain and steep slopes are prohibitive to production in most of the WSA, accessibility is very poor, and slow growth of trees and distance to possible mill sites are not favorable. More suitable stands are available elsewhere and there is little commercial or noncommercial interest in forest products within the WSA and none is expected in the foreseeable future. Therefore, the forested area of the WSA is considered nonproductive and noncommercial.

Livestock and Wild Horses/Burros

The Flume Canyon WSA contains portions of six grazing allotments used by six permittees. (Refer to Table 8 for data concerning livestock grazing within these allotments.) The Pear Park area of the WSA (13,100 acres) has had no livestock grazing privileges allocated since prior to the passage of FLPMA. Forage (722 AUMs) within the Pear Park area is being managed for big game under the Grand RMP.

Existing range developments in the WSA are limited to several short-gap fences, generally across drainages from rim to rim. The areas above and below these fences serve as livestock management units. Approximately 106 acres in wide canyon bottoms were identified in the RMP for burning and seeding to remove overgrown and decadent sagebrush and produce additional forage. In 1989, wildfire burned about 9,600 acres of the WSA including the area identified for prescribed burning. Favorable areas were reseeded in the fall of 1989, but there has not been sufficient time to evaluate the success of the seeding.

Table 8
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Corral Wash Canyon	25,829	4,950	615	462	97 Cattle	12/01-05/10	1
Sulphur Canyon	25,345	6,850	1,961	470	1,010 Sheep	11/12-05/10	1
Cisco Mesa	48,260	3,700	3,180	190	2,650 Sheep	11/15-05/15	1
Main Canyon	11,980	7,700	450	216	122 Cattle	06/01-09/30	1
Diamond	18,964	10,900	588	311	98 Cattle	05/10-11/10	1
West Water Point	5,595	3,600	426	255	107 Cattle	07/01-10/30	1
Totals	135,973	37,700[a]	7,220	1,904			6

Source: BLM File Data.

[a] Approximately 13,100 acres of the WSA (722 AUMs) are allocated to big game rather than livestock

No wild horses or burros are known to inhabit the WSA.

APHIS conducts predator control in BLM grazing allotments that comprise the WSA. A total of 12 coyotes were taken in the allotments in and surrounding the WSA during 1986-1987 period (USDA, APHIS 1988). Nine coyotes were taken from aircraft and three by steel trap.

The WSA comprises between 7 and 100 percent of the area of any one allotment. It is not known what proportion of the predators were actually taken within the WSA. The combined, confirmed livestock losses for 1986-1987 in these allotments were eight sheep.

Visual Resources

The WSA presents a landscape typical of the Book Cliffs. The steep slopes present sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give a striped appearance to the slopes that is noticeable some miles away. Toward the Roan Cliffs in the northern half of the WSA, rock outcrops shade to reddish-brown, as the name implies. Landforms are more dissected in the Roan Cliffs.

A visual resource inventory was conducted in 1977 (Roy Mann Associates, Inc., 1977). The entire WSA is classified as Class B scenery (scenery that combines some outstanding features with some fairly common to the physiographic region as a whole). The WSA contains all three measurable distance zones: about 31 percent (15,748 acres) is in the foreground-middleground zone visible from boundary roads, 58 percent (29,464 acres) in the background zone, and 11 percent (5,588 acres) in the seldom seen zone. The sensitivity level has been rated as high over about 17 percent (8,636 acres) of the WSA and medium over the remaining 83 percent (42,164 acres), reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors, 64 percent (32,500 acres) of the WSA is within VRM Class II, 31 percent (15,760 acres) is Class III, and 5 percent (2,540 acres) is Class IV. Additional information on BLM's VRM rating system can be found in Appendix 7 in Volume I.

Cultural Resources

Prehistoric cultures represented in the region include the Paleo-Indian, Desert Archaic, Fremont, Anasazi, Ute, and historic European.

The earliest human occupation of the region is by the Paleo-Indian big game hunters. They dated from about 5,500 to 10,000 B.C. and followed migrating herds of giant Pleistocene animals such as mammoths and bison antiguous. Over half the Paleo-Indian points found in Utah are from the Moab vicinity, and research may yield more in the WSA.

Archaic peoples are better represented in the region and possibly were more numerous. Evidence from their broad range of foraging pursuits is found in non-ceramic open campsites and caves and rockshelters. Cave excavations at locations not in the Flume Canyon WSA show a long occupation from about 6,060 B.C. to A.D. 500, depending on interpretation.

The Formative or Sedentary agricultural culture which followed took two forms: the Anasazi and the Fremont. The Book Cliffs in the border area between these two groups, but large numbers of Fremont ceramics at the Turner-Look site located near the WSA suggest their dominance in the area. Both Fremont and Anasazi cultures had ended in the area by about 1,300 A.D.

Evidence for the Ute nomadic foragers follows the end of the Formative cultures in the area. Sites consist of caves and open camps, as well as wickiup pole and brush structures.

European influence in the region dates from the Dominguez-Escalante Expedition of 1776, followed by Mexican traders on the Old Spanish Trail and French fur trappers in the 1810 through 1840 era. The latter are represented by an inscription by Antoine Robidoux, dating to 1837, located in Westwater Canyon to the east. American explorers crossed the region just south of the Book Cliffs in the 1850s just before the first Anglo-American settlement was also attempted at Moab. Permanent American settlement occurred in the late 1870s and early 1880s with ranching spreading to the WSA by that time. Use of the WSA was made mostly from ranches based at Cisco, Thompson, and Green River.

A total of five archaeological sites have been recorded in the WSA (USDI, BLM, 1988). Four of these sites are Fremont sites containing lithic scatters,

rock art, and one dry-land masonry structure. The remaining site consists of buried deposits located in an alluvial terrace and is of unknown cultural or temporal affiliation. One of the five sites is considered to be eligible for nomination to the National Register of Historic Places while the remainder have not been evaluated.

As a result of the Central Coal Project (Hauck, 1977), 320 acres have been intensively surveyed within the boundaries of the WSA, but no sites were recorded. No sites-density estimates can be computed specifically for the WSA; however, average site-density estimates of 78 sites per 23,000 acres were computed for the Book Mountain Planning Unit of which Flume Canyon is a part (Hauck, 1977). These figures indicate that potential for finding additional sites in the WSA is moderate. Most of the additional sites would be prehistoric surface-lithic scatters, but prehistoric habitations, historic sites, and additional rock-art sites may also be present.

Recreation

Possible recreational opportunities include hiking, backpacking, camping, cross-country skiing, horseback riding, sightseeing, and hunting. The total recreational use is less than 350 visitor days annually. The level of use is low due to the remoteness of the WSA and the limited access available.

The primary recreational use in the WSA is hunting. The WSA receives at least 150 visitor days of hunting use annually. About 30 of these visitor days of use are provided by two nonlocal commercial outfitters.

Hunters use four-wheel drive vehicles to travel on 6 miles of vehicular ways. Due to the steep slopes and lack of roads within the WSA, the hillsides are hunted on foot or by horseback. Under the Grand RMP, the entire WSA is open to ORV use under 43 CFR 8340. Currently, recreational ORV use other than for hunting is essentially nonexistent due to the distance of the WSA from population centers and the presence of more attractive and accessible ORV use areas elsewhere. In addition, the rugged terrain presents a natural barrier to ORV use.

Land Use Plans

The current BLM planning document for the Flume Canyon WSA is the Grand RMP (USDI, BLM, 1983a). Wilderness is not addressed the RMP. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

The WSA is BLM-administered public land except for six State sections (3,811.8 acres). The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Volume I, Chapter 1). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. All 3,811.8 acres of in-held State lands are under lease for oil, gas, and hydrocarbons, and 2,567 acres are under lease for grazing. The only current activity on these lands is grazing (UDNRE, DSLF, 1988).

The WSA is contiguous for about 2 miles with a 48,492-acre block of State land designated as a State roadless area, which has not been open to leasing or vehicle use since 1975. In addition to the large State roadless area, six individual State sections and about three sections of private land are adjacent to the WSA. There is no private land located inside the WSA.

BLM has developed a transportation plan (USDI, BLM, 1981b) which indicated engineering feasibility should access roads be proposed in the WSA. The purpose of this plan is to control location of roads and provide construction standards for roads built as a result of oil and gas activities.

There are no existing or pending rights-of-way within the WSA; however, development of pre-FLPMA oil and gas leases could involve right-of-way applications for access roads or oil and gas pipelines. Normally, rights-of-way are not required for on-lease development.

Access to the WSA currently is from I-70 by means of graded dirt county roads (Cottonwood Canyon and Hay Canyon roads). The WSA can be reached within 30 minutes to an hour from three Interstate exits. From the east Cisco exit, it is about 20 miles via Diamond Canyon; from the Harley Dome exit, it is about 20 miles via Westwater Creek Canyon; and from the Bock Cliffs ranch exit, it is about 25 miles via Westwater Creek Canyon. Roads below the Book Cliffs are maintained for oil field operations; above the cliffline they are sometimes impassable during wet weather or heavy snow. The WSA can be accessed from other

unimproved roads: Diamond Ridge road along the northern border, a jeep trail on the Book Cliff bench along the southern border, and the road up Dry Canyon through Pear Park on the northeast. These are generally impassable during wet weather.

The Grand County Master Plan (U of U, BCD, 1979) recognizes mineral potential in the Book Cliffs area but does not make any specific management directives. The WSA is not specifically mentioned in the plan. The plan generally emphasizes continuation of present uses and maximizing mineral development.

The Grand County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

The WSA contains approximately 19.3 acres of pre-FLPMA occupancy trespass ranch structures. The trespass situation will remain unresolved as long as the area is managed as a WSA.

Socioeconomics

- Demographics

The Flume Canyon WSA is located in north-central Grand County. The nearest communities are Thompson (population 200), about 30 miles southwest; and Cisco (population 45), about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado, is about 40 miles east of the Harley Dome exit on I-70 and Green River and Moab, Utah, are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

Grand County can be characterized as rural and sparsely populated. The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area.

From 1970 to 1980, the population of Grand County grew from 6,688 to 8,250, an overall increase of about 23 percent. Table 9 presents baseline and projected population data for Grand County. It is estimated that between 1980 and 1987, population decreased to about 7,250. Population projections for the county indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5-percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

Table 9
Baseline and Projected Population and Employment Growth
Grand Counties

	1980	1990	2000	2010
Grand County				
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900

Source: Utah Office of Planning and Budget, 1987.

- Employment

Grand County is part of the Southeast MCD. Table 10 shows the baseline (1980) and projected employment by source for MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trade (15 percent), and services (8 percent).

Table 10
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

It is projected that by the year 2010, employment in the district will increase by 27 percent and that services will increase to 18 percent and transportation will increase to 17 percent of the total respectively, while government will decline to 15 percent and mining will decline to less than 20 percent of the total district employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent by the year 2010 (Utah Office of Planning and Budget, 1987).

- Sales and Revenues

Economic-related activities in the WSA include leasable mineral exploration, livestock production, and recreation mostly related to hunting. Table 11 summarizes local sales and Federal revenues from the

WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 11
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$300	None
Oil and Gas Leases	0	$2,110
Livestock Grazing	$38,080	$2,933
Recreational Use	$ 1,435	$ 150
Total	$39,815	$5,193

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has three mining claims that appear current in assessment work. Regulations require a $100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy. Three oil and gas wells have been drilled in the WSA over the past few years. This and the geophysical exploration that has been conducted in the WSA has generated some temporary local employment and income.

Six livestock operators have a total estimated grazing privilege of 1,904 AUMs within the WSA. If all this forage were utilized, it would account for $38,080 of livestock sales, including $9,520 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use is low and associated with hunting. Related local expenditures are also low and could only be significant to the two commercial outfitters who currently use the WSA. The WSA's motorized recreational use and related local expenditures are also associated with hunting and are low. They are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton 1982). This study indicates that statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for the Flume Canyon WSA is estimated at about 350 visitor days per year. In addition, the two non-local commercial outfitters would make approximately $7,500 annually in sales based on the land-based commercial average of $50.00 per user day.

Seven leases in the WSA cover approximately 1,055 acres. At $2 per acre, lease rental fees generate up to $2,110 of Federal revenues annually. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 1,904 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $2,933 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland developments.

Commercial recreation permitting generates about $150.00 of Federal revenues annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Flume Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy. Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management on 32,500 acres and withdrawal from mining claim location on 3,800 acres).

In the foreseeable future, disturbance of approximately 184 acres from oil and gas exploration and development, from watershed treatments, and from providing access to State in-holdings, would result in a loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Special features including

archaeological values, endangered and sensitive species, scenic and geological features, wildlife associated with wilderness, and perennial streams, would not be significantly affected because the disturbance would involve only 0.4 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species and archaeological values prior to any surface-disturbing activity. Refer to the Wildlife and Vegetation sections for more information.

During the period of activity, the visual and audible disturbance from mineral exploration and development, and other disturbance would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also on adjacent portions of the WSA. As much as 15 percent (7,620 acres) of the WSA could be so affected in the foreseeable future. Wildlife associated with wilderness would leave the area of direct and indirect disturbance during the period of activity.

Because future vehicular use would generally be limited by terrain, no additional disturbance from ORV activity is anticipated in the future. The continued vehicular use of existing ways and future mineral and access roads would detract from opportunities for solitude and primitive recreation.

The increased visitor use that would occur over time would not be expected to significantly reduce the quality of wilderness values because the additional use is expected to be small, and the WSA is large enough to incorporate the additional use adequately, particularly in conjunction with adjacent WSAs.

The extent that disturbance would occur over the long term, and therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur, however, as intrusions increase.

Because the 19.3 acres with pre-FLPMA human habitation structures could not be managed as wilderness, this alternative would not have the administrative problems that would result if these acres were designated.

Conclusion: Wilderness values would not be protected by wilderness management and loss would occur as intrusions increase. In the foreseeable future naturalness and opportunities for solitude and primitive recreation would be directly lost on 184 acres, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 7,620 acres. Most special features would not be significantly affected. Wildlife associated with wilderness would leave disturbed areas during the period of activity.

- Impacts on Vegetation

A total of 184 acres of surface disturbance is projected to occur in the WSA in the foreseeable future. The anticipated disturbance (0.4 percent of the WSA) would not result in any major change in vegetation types.

The 22 acres of disturbance resulting from access road construction to State lands would remain over the long term. The majority of the 160 acres of disturbance resulting from oil and gas exploration and development activities would also remain over the long term. The majority of this disturbance would occur in the sagebrush and pinyon-juniper woodland communities.

The Category 2 candidate species that may occur in the WSA (Physaria acutifolia var. purpurea), could be located in the drier areas of the WSA, e.g., pinyon-juniper woodland or Douglas fir communities. Before authorizing any surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Because necessary measures would be taken to protect these species, individual plants may be inadvertently destroyed but the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 0.4 percent of the vegetation in the WSA would be modified. Special status species would not be significantly affected.

- Impacts on Mineral and Energy Exploration and Production

About 3800 acres would continue to be closed to locatable mineral entry due to an oil shale withdrawal. However, the remainder of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources

would not be significantly affected by the No Action/ No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

The entire WSA is important wildlife habitat, including elk yearlong range and 26,850 acres of crucial deer winter range. The WSA also provides habitat for black bear and cougar, species sensitive to human presence. These species would be adversely affected by the anticipated 182 acres (including 22 acres for access to State land) of surface disturbance from oil and gas exploration and development because habitat would be altered and the level of human activity in the area would increase. Category 2 oil and gas leasing stipulations would provide protection for animals and their habitat by prohibiting human activities during critical periods of the year and by selective placement of drill pads, roads and other facilities. The animals may move into adjacent areas because the WSA encompasses only a small part of their recognized habitat and the adjacent areas include portions of WSAs proposed for wilderness and the State roadless area. Overall, effects on populations of deer and elk would probably be small because only 0.4 percent of the habitat in the WSA would be disturbed and mitigation would be required. Increased use of vehicles on new access roads for oil and gas activities and recreation would reduce the value of the area for cougar and black bear.

Disturbance of 2 acres for watershed projects would not significantly affect wildlife species because they would be completed in a short period of time and would require only periodic maintenance.

Prior to surface disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas. If the endangered black-footed ferret or any other special status species could be affected, BLM would initiate consultation with the FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Volume I, Appendix 4). Because necessary measures would be taken to protect these animal species, the viability of populations of special status species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Approximately 0.4 percent (184 acres) of the habitat in the WSA would be disturbed by oil and gas exploration and production, and watershed projects. Disturbance would displace some species including deer and elk. Increased human activity would reduce the value of the WSA for black bear and cougar. Special status species would not be significantly affected.

• Impacts on Livestock Management

Few, if any, changes in livestock use or management techniques are expected with this alternative. Domestic livestock grazing would continue as authorized (approximately 1,904 AUMs involving six permittees). Existing range developments (short-gap fences) could be used and maintained as in the past. Vehicular use of the 6 miles of way for livestock management purposes would continue. Predator control would continue as in the past. The projected 182 acres of disturbance resulting from oil and gas exploration and development including access to State land, would not significantly reduce livestock forage because it would involve only 0.4 percent of the WSA. The acreage affected would produce about 7 AUMs.

Conclusion: Livestock management would not be adversely affected by implementation of the No Action/ No Wilderness Alternative.

• Impacts on Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil and gas in the WSA were developed, it would lead to increased employment and income for Grand County. Total employment resulting from projected oil and gas exploration and development would not exceed 40 employees at any one period of time. This would represent about 0.1 percent of the projected employment in the Southeast MCD workforce in the year 2010 and only 1.0 percent of the projected Grand County employment in the year 2010. There would be minor increases in local sales in communities such as Green River (in Emery County) and Thompson.

There would be no livestock-related economic losses because the existing grazing use (1,904 AUMs available) and ability to maintain, replace, and build new range improvements would remain as at present (see Table 11).

Recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 to 7 percent per year over the next 30 years. Recreational use in 30 years could thus increase from the current 350 visitor days to be between 665 and 3,045 visitor days per year. Since the recreation-related local expenditures average $4.10 per visitor day, recreation-related annual expenditures of between $2,727 and $12,485 would accrue to the local economy.

Existing Federal and State revenues would not be reduced by this alternative. The existing $2,110 in Federal lease revenues would continue. In addition, there are 49,745 acres in the WSA open to oil and gas leasing that are currently not leased. If leased, they would bring up to $99,490 additional Federal lease fee revenues per year in addition to possible new royalties from lease production. Depending on the number of production wells, royalties could range from about $20,000 to well over $100,000 per year. Half of the Federal revenues would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently up to $2,933 per year) would continue.

Federal revenues provided by commercial recreation use ($150 annually) would continue.

All Wilderness Alternative (50,800 Acres)

- Impacts on Wilderness Values

Designation and management of all 50,800 acres as wilderness would contribute to the preservation of the wilderness values in the Flume Canyon WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness values would be protected on approximately 50,781 acres that meet the criteria for naturalness and on 19 acres that do not meet naturalness criteria. Opportunities for solitude and primitive recreation exist and would be protected on all 50,800 acres. Resources that could be considered as special features in the WSA, including endangered and sensitive species, scenery, geologic features, wildlife associated with wilderness, and archaeological values, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of the existence of valid existing rights. In the foreseeable future, direct disturbance of up to 34 acres is anticipated from exploration and development of pre-FLPMA leases, from providing access to State in-holdings, and from watershed projects. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be lost on the disturbed areas. Opportunities for solitude and primitive recreation would also be reduced in quality on adjacent portions of the WSA. As much as 3 percent (1,524 acres) of the WSA could be so affected. Special features would not be significantly affected because the direct disturbance would involve only 0.07 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species, and archaeological values prior to any surface-disturbing activity. Refer to the Wildlife and Vegetation Including Special Status Species sections for more information.

Mitigation to protect wilderness values would be applied, but loss of wilderness values would be allowed if development involving valid existing rights could not be otherwise achieved. Watershed projects, on the other hand, would be designed to meet wilderness management criteria and, upon completion, would not be substantially noticeable in the area as a whole. All in all, the foreseeable disturbance would not be substantially noticeable in the area as a whole.

Vehicular use of existing ways would cease with ORV closure, improving opportunities for naturalness, solitude, and primitive recreation.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for long-term development of existing mining claims, pre-FLPMA leases, and State in-holdings is not accurately known but would be less with this alternative than with No Action/No Wilderness due to application of mitigation that would protect wilderness values subject to valid existing rights.

Increased visitor use that would occur with time would be primitive in nature and would be managed so as to not result in loss of wilderness values. The WSA is adjacent to other BLM WSAs and a State roadless area. The recreational values of horseback riding, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness. This alternative would complement and enhance wilderness values and uses of contiguous WSAs.

The 19.3 acres with pre-FLPMA substantially noticeable human habitation structures could not be managed as wilderness. Administrative problems would result if these acres are designated.

Conclusion: Wilderness designation would protect wilderness values in the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 34 acres, and opportunities for solitude and primitive recreation would be indirectly and temporarily reduced on up to 1,524 acres.

- Impacts on Vegetation Including Special Status Species

Disturbance would be limited to only 34 acres (0.7 percent of the WSA) with this alternative. Therefore, wilderness designation would provide additional protection for threatened, endangered, or other special plant species. Vegetation types would not be significantly altered.

Conclusion: Implementation of the All Wilderness alternative would protect the vegetation types and special status species in the WSA.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

  Approximately 1,055 acres are under oil and gas lease. Existing pre-FLPMA leases (695 acres) could be developed subject to the stipulations issued at the time of leasing. Expired leases will not be reissued and new leasing would not be allowed.

  A potential resource of between 10 and 50 million barrels of oil or 60 to 300 billion cubic feet of natural gas could exist in the WSA. Only the portion of the oil and gas in pre-FLPMA leases could be recovered. Therefore, an unknown but locally significant amount of oil and gas, not in producing leases prior to designation, would be foregone.

  - Locatable Minerals

  Because of the low potential of the deposit and unfavorable economic conditions (high transportation costs, poor market conditions, etc.), no exploration or development of locatable minerals is anticipated in the foreseeable future with or without wilderness designation. Therefore, significant locatable mineral production would not be foregone.

  - Salable Minerals

  No exploration or development of salable minerals is anticipated. Because of low potential of the deposit, and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Wilderness designation would preclude or severely constrain potential exploration and development of significant deposits of oil and gas. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Overall, wildlife would benefit from the reduction of potential surface disturbance (from 184 acres with the No Action/No Wilderness Alternative to 34 acres with the All Wilderness Alternative) and from preservation of solitude. Some wildlife could be affected as a result of oil and gas activities on leases with prior existing rights. Habitat for the black-footed ferret (endangered), any other special status species that may be in the WSA, and habitats for elk, black bear, and cougar would receive additional protection from surface disturbance with this alternative. Prior to any mineral development, BLM would conduct site-specific clearances of potentially disturbed areas as discussed in the No Action/No Wilderness Alternative.

Conclusion: Only about 0.7 percent of the habitat in the WSA would be disturbed. Most wildlife species would benefit due to the preservation of solitude and crucial habitat. Threatened, endangered, and other special status species would be protected.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized. The estimated 1,904 AUMs currently allocated in the WSA would remain available for livestock.

Existing short-gap fences would be maintained as in the past, based on practical necessity and reasonableness. Predator control efforts would be restricted. Since little use of the 6 miles of ways by motorized

vehicles is currently taking place to manage livestock little effect on livestock grazing is expected. Restriction on predator control could increase management costs for 2 operators which would increase sheep and lamb losses on two allotments.

Conclusion: Wilderness designation would not significantly affect current livestock management practices. Restrictions on predator control may increase sheep and lamb losses in the allotments and result in slight increase in the cost of livestock management for two permittees.

- Impacts on Economic Conditions

Overall, there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources with wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11), as well as loss of potential increases in income and Federal revenues that could occur with the No Action/No Wilderness Alternative.

Existing pre-FLPMA oil and gas leases and valid mining claim could be developed, but designation would preclude new leases and claims from being established in the WSA. Exploration and development of potentially recoverable oil and gas would be foregone on about 99 percent of the WSA. This would not alter existing economic conditions, but could alter future economic conditions from those that could otherwise occur with the No Action/No Wilderness Alternative. The potential for 30 jobs, 0.75 percent of the Grand County employment projected for the year 2010 would be foregone. Any local income related to assessment of future mining claims would be lost.

Many oil and gas field services would be provided by local businesses, and some of the wages earned by the oil and gas workers would circulate through the local economy. Exploration and development of an area's oil and gas resources is the most labor intensive phase of oil and gas production, but is of relatively short duration.

Recreation expenditures from the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of the WSA and the adjoining WSA in the past. With designation, they could probably charge more per trip. It is also probable that additional outfitters would use the area if it were designated wilderness, both for hunting and other primitive recreational uses. Hunter pressure on the South Book Cliffs Deer Herd Unit and related local expenditures likely would remain unchanged.

Livestock use and ranchers' income would continue as at present with $38,080 of livestock sales, including $9,520 of ranchers' return to labor and investment. Livestock grazing would continue to provide $2,933 per year in Federal grazing fees.

Non-motorized recreation use would likely increase at a rate of 2 to 7 percent annually following wilderness designation. Related local expenditures would be small (average of $4.10 per visitor day Statewide). Motorized recreational use of the WSA would be curtailed, but use is light and primitive recreation would eventually replace motorized use. Changes in related local expenditures would be small and would be distributed among businesses in Green River and Moab, Utah, with some spillover into western Mesa County, Colorado. As a result, other than to recreation outfitters, any change in recreation expenditures would be locally and regionally insignificant.

The 695 acres of pre-FLPMA leases could be developed. There would be a potential loss of $99,490 annually in Federal revenues from the 49,745 acres not currently leased, that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone. Annual Federal revenues of $150 per year from commercial recreation fees would continue and probably increase.

Conclusion: Present economic trends and conditions would not be significantly affected. Employment for oil and gas exploration and development would be reduced by 30 jobs, 0.75 percent of the projected Grand County employment in the year 2010, as compared to the No Action/No Wilderness Alternative. Potential annual local sales and revenues related to livestock grazing would continue at $30,080 and $2,933 respectively. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $99,490 and potential royalties of up to $100,000 per year from wells on 99 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues

from commercial recreation fees (currently $150 annually) would continue and probably increase.

Partial Wilderness Alternative (Proposed Action) (16,495 Acres)

- Impacts on Wilderness Values

Wilderness designation of 16,495 acres would contribute to preservation of the area's wilderness values. Although the overall disturbance would involve about 67 percent (124 acres) of the area identified for the No Action/No Wilderness Alternative, this Partial Wilderness Alternative would protect wilderness values in the designated area which is about 32 percent of the WSA. Protection in the designated area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure (including closure of 1.5 miles of way), and closure to future mineral leasing and location. Naturalness, outstanding opportunities for solitude and primitive recreation, and special features, including scenic geologic features and perennial streams, would receive additional protection in the designated area. Wildlife associated with wilderness and special status species would also receive additional protection in the designated area.

In the foreseeable future, loss of naturalness and opportunities for solitude and primitive recreation due to allowable surface disturbance from oil and gas exploration and development, from providing access to State in-holdings, and from watershed projects would occur on up to 7 acres within the designated portion and on up to 117 acres within the nondesignated portion. Special features would be largely unaffected because direct disturbance would involve only 0.2 percent of the WSA. In addition, appropriate measures would be taken to protect special status species and cultural values prior to any surface-disturbing activity. (Refer to the Vegetation and Wildlife analyses.)

Sights and sounds from foreseeable development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas, including up to 12 percent (6,096 acres) of the WSA. Wildlife associated with wilderness would leave the area of direct and indirect disturbance during the period of activity. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation somewhat, although vehicular use of 4.5 miles of way and of future exploration and access roads in the nondesignated area would detract from these opportunities during the period of activity.

The extent that disturbance would occur over the long term, and, therefore, the long-term loss of wilderness values that would occur, is not accurately known, but would be less than with the No Action/No Wilderness Alternative. This would be due to application of mitigation to the designated area that would limit development subject to valid existing rights.

This alternative would complement and enhance wilderness uses, values, and management of adjacent WSAs.

The 19.3 acres with pre-FLPMA substantially noticeable human habitation structures that are not manageable as wilderness would not be designated with this alternative. The potential administrative problems that would result if these lands were designated would be avoided.

Conclusion: Wilderness values would be protected in the designated area which is approximately 32 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 124 acres, and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 6,096 acres. Almost all of the impact would be in the nondesignated area. Special features in the designated area would be given additional protection. Wilderness dependent species would leave the area of direct and indirect disturbance during the period of activity.

- Impacts on Vegetation Including Special Status Species

Approximately 124 acres of surface-disturbing activities would occur in the WSA. Projected impacts to the vegetation resource would be essentially the same as described in the No Action/No Wilderness Alternative.

The total area disturbed in the foreseeable future would be about 0.2 percent (124 acres) would be less than 1 percent of the WSA. No significant impacts to vegetation types are anticipated in either the designated or nondesignated portions of the WSA. As discussed for the No Action/No Wilderness Alternative,

prior to any surface-disturbing activities BLM would conduct site-specific clearances, initiate consultation with FWS, if necessary, and take appropriate mitigation measures where needed. Nevertheless, some inadvertent loss of individual special status plants may occur. However, the existence of any of population of special status species would not be threatened.

About 100 acres of surface disturbance is projected for oil and gas exploration and development in the nondesignated portion of the WSA. While no significant impacts on any vegetation type are anticipated, this disturbance would remain for the life of the operations.

Conclusion: About 0.2 percent (124 acres) of the vegetation in the WSA would be disturbed. Vegetation types and special status species would not be significantly affected.

- Impacts on Mineral and Energy Exploration and Production

  - Leasable Minerals

The nondesignated and most accessible portion of the WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values as discussed in the No Action/No Wilderness Alternative. Therefore, mineral and energy resources located in the nondesignated portion (68 percent of the WSA) would not be affected by implementation of the Partial Wilderness Alternative.

The designated portion of the WSA would be placed in Category 4 status (no leasing). There are two leases (180 acres) located in the designated portion of the WSA. About 20 acres, are under pre-FLPMA lease and the remaining 160 acres are under post-FLPMA lease. The pre-FLPMA leases could be developed per stipulations issued at the time of lease issuance. New leasing would not be allowed. Because only 20 acres of pre-FLPMA leases are in the designated portion, no oil and gas development is projected. Because the potential for oil and gas exploration and production in the designated area would be restricted to existing pre-FLPMA leases, implementation of the Partial Wilderness Alternative could result in the loss of production of an unknown but locally significant amount of oil and gas on 32 percent (16,475 acres) of the WSA.

  - Locatable Minerals

No mining claims are currently located within the area that would be designated wilderness. Development work, extraction, and patenting could occur on valid claims located prior to wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to mineral location (USDI, BLM, 1981a.). BLM does not project exploration or development in the designated portion because locatable mineral resources are not sufficient to support a development assumption.

The nondesignated portion of the WSA would remain open to mineral location as discussed in the No Action/No Wilderness Alternative. However, because locatable minerals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable development is not likely in the foreseeable future. Therefore, implementation of this alternative would not prevent recovery of significant amounts of locatable minerals.

  - Salable Minerals

No exploration or development of salable minerals is anticipated in either the designated or nondesignated portions of the WSA. Because of low potential of the deposit and the availability of better sources of material outside of the WSA, any loss of salable mineral products would be insignificant.

Conclusion: Partial wilderness designation would preclude or severely constrain potential exploration of leasable minerals not under pre-FLPMA lease in the designated portion of the WSA. Production of an unknown portion of the oil and gas in the WSA would be foregone because 32 percent (16,475 acres) of the WSA could not be leased or developed. Loss of exploration and development opportunities for other mineral and energy resources would not be significant.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

Wildlife would benefit from preservation of solitude and the reduction of potential mineral-related disturbance from 184 acres with the No Action/No Wilderness Alternative to 124 acres with this alternative.

In the designated area 7 acres would be disturbed by construction of access to State land and watershed projects. This disturbance would have only a short-term impact on wildlife species while work was ongoing. Thus with this alternative, wildlife species would benefit through provision of solitude on 32 percent (16,495 acres) of the WSA.

Up to 117 acres of disturbance would occur in the nondesignated area as a result of oil and gas exploration and production activities, provision of access to State land and watershed projects. At least some of the disturbance would occur in crucial habitat. Noise and increased access due to development of roads could, in combination with loss of habitat, cause deer, elk, bear, and cougar to leave the area at least for the duration of the activities. Category 2 stipulations would limit oil and gas activities during critical periods and would protect animals through selective placement of facilities.

In the designated area, the one endangered and five candidate species, if present, would receive added protection by wilderness restrictions, while in the nondesignated area these species would not have this added protection. The Endangered Species Act and BLM policy would provide protective provisions for such species in all areas.

Conclusion: About 0.2 percent of the habitat in the WSA would be disturbed. Wildlife would not receive the additional benefit of solitude on the 34,305 acres not designated wilderness. Special status species would not be significantly affected.

- Impacts on Livestock Management

Designation of 16,495 acres of the WSA as wilderness on domestic livestock grazing would not significantly affect existing livestock management practices in the WSA. Of the estimated 1,904 AUMs allocated, 610 would be within the designated portion of the WSA and 1,294 within the nondesignated portion. The existing gap fences would be located in both the designated and the nondesignated portion of the WSA. Motorized vehicles are used on a limited basis for livestock management. The 4.5 miles of way located in the nondesignated portion of the WSA would continue to be available for vehicular use. The 1.5 miles of way located in the designated portion would not be available for vehicular use.

Predator control efforts would be restricted in the designated portion but could continue in the nondesignated portion. Because only 32 percent of the WSA would be designated wilderness, predation would probably not increase.

Conclusion: Implementation of the Partial Wilderness Alternative would not result in a change in the level of livestock use or significantly affect livestock management practices.

- Impacts on Economic Conditions

Partial wilderness designation is not expected to result in any changes in existing patterns or trends in population, employment, and local income distribution. The estimated 1,904 AUMs would remain available to cattle in the six allotments. The revenues, sales, and returns to ranchers would continue as discussed in the No Action/No Wilderness Alternative.

Restrictions on oil and gas leasing on 32 percent of the WSA would not alter existing economic conditions, but could alter future economic conditions from those that would occur with the No Action/No Wilderness Alternative. The level of employment in the WSA, 40 jobs, would be the same, but the length of employment would be reduced because oil and gas could not be developed on 32 percent of the WSA.

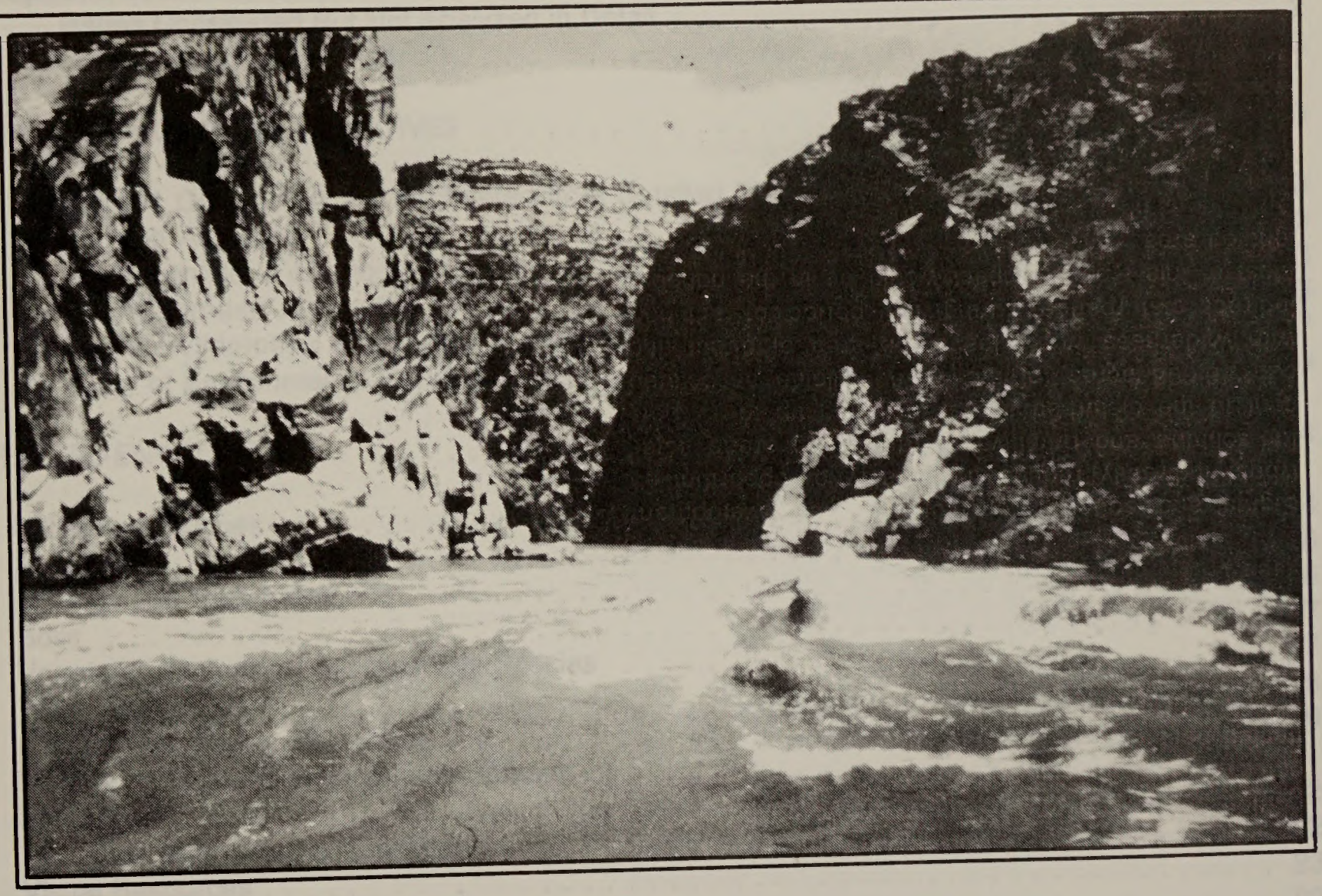
No oil and gas exploration or development is projected in the designated portion because only 20 acres are under pre-FLPMA lease; therefore, no revenue loss from expiration of existing leases would occur. However, up to $3,350 annual leasing revenues from existing post-FLPMA and potential future leases in the designated are would be foregone. Potential royalties could also be foregone. All 34,305 acres in the nondesignated area could be leased for oil and gas at up to $68,610 per year. No exploration or development of locatable or salable minerals is projected in either the designated or nondesignated portions of the WSA.

As with both the No Action/No Wilderness and the All Wilderness Alternatives, recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation fees (currently about $150 annually) would continue and probably increase.

Conclusion: Present economic trends and conditions would not be significantly affected. The length of oil and gas employment in the WSA would be reduced because oil and gas could not be developed on 32 percent of the area. Livestock sales and grazing fees would

not be affected. Potential annual Federal and State revenues from oil and gas leasing fees could be reduced by $3,350. Annual royalty payments from leases in the nondesignated area and on pre-FLPMA leases in the designated area would not be reduced, but potential royalties of up to $100,000 per year from wells on 32 percent of the WSA would be foregone. Recreation-related local sales could contribute up to $12,485 annually to the local economy by the year 2020. Federal revenues from commercial recreation fees (currently $150 annually) would continue and probably increase.

Westwater Canyon WSA



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WESTWATER CANYON WSA

(UT-060-118)

INTRODUCTION

General Description of the Area

Westwater Canyon WSA is just west of the Utah-Colorado state line in east-central Grand County, Utah. It spans the Colorado River with the eastern two-thirds of the WSA located in the Dolores Triangle (the area bordered by the Colorado River, Dolores River, and the Colorado-Utah state line). The WSA is about 8 miles across both north-south and east-west. It contains BLM-administered lands plus portions of the surveyed bed of the Colorado River managed by BLM for a total of approximately 31,160 acres. In addition, 1,120 acres of State land in two tracts are located within the WSA. The BLM Intensive Wilderness Inventory (USDI, BLM, 1980) indicated the WSA contained approximately 30,800 acres. The difference in acreage figures is attributable to Master Title Plat checks and a minor realignment of the northwestern boundary due to mapping error. The WSA is located in BLM's Moab District and is administered by the Grand Resource Area.

The WSA is the western most of three contiguous BLM WSAs. Black Ridge Canyons West WSA (CO-090-113A/UT-060-116/117), which straddles the Utah-Colorado state line to the east, contains 54,290 acres. Black Ridge Canyon WSA in Colorado (CO-070-113) contains 18,150 acres and is adjacent to Colorado National Monument near Grand Junction. It is located 1 mile from the Monument's proposed wilderness area.

Although it is located only 7 miles southeast of Interstate 70 (I-70), the WSA is difficult to reach. The nearest community is Cisco (population is less than 50) which lies about 5 miles to the west of the WSA. The nearest towns of any significant size are Grand Junction, Colorado (about 25 miles east), and Moab, Utah (about 30 miles southwest of the WSA).

The WSA has a semiarid climate characterized by very hot summers and moderately cold winters. Annual temperatures range from 120 degrees Fahrenheit (F) to 10 degrees F. The approximate average annual precipitation is 7 to 10 inches, mostly occurring as late summer thunderstorms. Annual snowfall averages 20 to 40 inches.

The principal feature of the WSA is the highly scenic Westwater Canyon of the Colorado River, famous for its whitewater rapids and river running opportunities. The river within the WSA is being studied and recommended for inclusion in the Wild and Scenic Rivers System. The final decision by Congress is pending. The remainder of the WSA consists of rolling tablelands, cut by deep side canyon systems in the southeastern portion. Elevation ranges from 4,100 feet to 6,500 feet above sea level. The WSA is dominated by pinyon pine, juniper, sagebrush, blackbrush, and riparian vegetation.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

1. A small portion of the boundary of the WSA (T. 21 S., R. 24 E., sec. 13; and T. 21 S., R. 25 E., secs. 7, 8, and 18) has been redrawn to correct an error in the Draft EIS maps. This change did not require acreage adjustments because acreage calculations were based on the boundaries as shown in the inventory document and Final EIS.

2. The anticipated surface disturbance presented in the Draft EIS (523 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 523 acres reported in the Draft EIS to 500 acres of surface disturbance for the Final EIS.

STATEWIDE
POCKET MAP
WSA
NO. 72
SEE VOL.I

WESTWATER CANYON WSA

Specific Issues Identified Through Scoping and Public Comment

• Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below.

1. Soils: The public is concerned that without wilderness designation future activities in the WSA would result in soil disturbance and increases in soil erosion and loss of soil fertility. Because the mineral-related surface disturbance estimate for the WSA has been reduced from 23 acres to no acres of surface disturbance in the Final EIS, none of the WSA would be disturbed by mineral activities and no reclamation would be required.

The Draft EIS analyzed 500 acres of prescribed burn and seeding. The proposed vegetation treatment would result in short-term increases in soil loss; however over a period of 3 to 5 years, soil loss would be reduced as a result of the seeding project. Consequently, there would not be long term increases in erosion from the proposed vegetation treatment. Therefore, impacts on soils are not significant for the Final EIS.

2. Water Resources: The public is concerned that wilderness designation would interfere with development of water. There is also some concern that future surface disturbance could increase sediment yield and affect water quality. A proposed 500-acre burning and seeding would eventually reduce sediment yield from the WSA. No mineral-related surface disturbance is anticipated in the foreseeable future. Most erosion within the WSA is natural rather than caused by human activity. The Colorado River corridor is temporarily segregated from mining claim, eliminating a 4,610-acre area from any potential mining actions that would add sediment or salinity to the river. Recreational use of the river is currently managed to minimize water quality impacts from human waste disposal. Potential uses of water in the WSA include livestock, recreation, and wildlife. These uses would be compatible with wilderness management. Thirteen miles of the Colorado River pass through the WSA. The Colorado River originates in Colorado and flows through Colorado and Utah before entering the WSA. There are many consumptive uses of water upstream of the WSA and there will be additional diversions and uses upstream in the future. The water in the Colorado River has been fully allocated between states through acts, compacts, decrees and an international treaty. Because of requirements for flows to areas and states downstream of the WSA and because of present constraints on water management including releases for operation of downstream dams, protection of National Parks, and consideration of endangered fish species (see Volume I, Chapter 3, Water Resources) it is unlikely that upstream diversion would reduce flows through the WSA to a point that would conflict with recreation or other water uses and values, or that upstream uses would have to be restricted to protect water uses in the WSA. Therefore, impacts of wilderness designation on water quality and uses would be insignificant for the Westwater Canyon WSA and they are not discussed in detail in the Final EIS.

3. Forest Resources: The only forest resources in the WSA are 29,190 acres of scattered pinyon and juniper trees. Demand is low, there is limited access, and the WSA is in a remote location. For these reasons, impacts on forest resources are not significant for analysis in the Final EIS.

4. Mineral Resources: The public has expressed concern that wilderness designation would interfere with or prevent mineral exploration, development, and production.

There are no oil and gas leases within the WSA. Potential oil and gas deposits are very small with a moderate certainty that they do not exist.

Even though there are 15 mining claims in the WSA, the projected uranium and other locatable mineral deposits are small and/or could not be economically developed in the foreseeable future (see Appendix 6 in Volume I for exploration and development projections). More accessible deposits of salable minerals exist outside the WSA. For these reasons, mineral exploration or development would not occur in the foreseeable future with or without wilderness designation. Therefore, impacts on mineral and energy exploration and production are not analyzed in detail in the Final EIS.

5. Visual Resources: The 500 acres of surface disturbance projected to occur in the foreseeable future would affect only about 1.6 percent of the WSA. Impacts on visual resources are considered in the Final

EIS as part of the discussion of naturalness and special features in the Wilderness Values section.

6. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles or vandalism. However, only nine prehistoric on four historic cultural resource sites have been recorded in the Westwater Canyon WSA. No mineral-related surface disturbance is projected. Although visitation is heavy (approximately 14,470 visitor days per year), the majority of the use (14,000 visitor days) is associated with river activities. Terrain, surface features, and ORV restrictions limit most vehicle use to the 22.5 miles of ways inside the WSA. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, BLM does not believe that impacts on cultural resources are not significant for the Westwater Canyon WSA.

- Issues Analyzed in Detail

The significant issues for the Westwater Canyon WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

2. Impacts on vegetation including special status species.

3. Impacts on wildlife including special status species.

4. Impacts on livestock management.

5. Impacts on recreational use of the WSA.

6. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS centered mainly on the need for, and adequacy of, the rationale for the BLM Proposed Action; the need for further inventories of resource values; the manageability of the WSA; and BLM's assessments of wilderness values, visual resources, mineral values, water resources, recreational values, endangered species habitat, wildlife resources and their habitat, and socioeconomic values.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 72, for responses to specific comments about the Westwater Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during the initial scoping other than those analyzed.

An alternative that would add Federal and State lands on the Southwestern boundary of the WSA was suggested in the public comments. This alternative is not analyzed because the inclusion of State lands is not consistent with BLM's wilderness review guidelines (refer to Volume VII-B, General Comment Response 6.4) and because other public lands were dropped from study during the inventory phase (refer to Volume VII-B, General Comment Response 3.1)

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness; (2) All Wilderness (31,160 acres); and (3) Partial Wilderness (Proposed Action) (26,000 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case. The assumed management actions presented in the Introduction to Volume VI are also applicable.

- No Action/No Wilderness Alternative

With this alternative, none of the 31,160-acre Westwater Canyon WSA would be designated by Congress as part of the NWPS. The area would continue to be managed in accordance with the Grand RMP (USDI, BLM, 1983a) and subsequent BLM planning activities. The 1,120 acres of State land within the WSA (refer to Map 1) have not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership. No private or split-estate lands are located in the WSA.

- Management Conditions and Constraints

All 31,160 acres would remain open to mineral location with the exception of a temporary withdrawal (4,160 acres) along the Colorado River associated with wild and scenic river studies.

Map 1

LAND STATUS

Westwater Canyon WSA
UT-060-118

Legend

WSA Boundary

State Boundary

State Land Within or Adjacent to WSA

Private Land Within or Adjacent to WSA

BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

T. 20 S.

T. 21 S.

R. 24 E.

R. 25 E.

WESTWATER CANYON WSA

This withdrawal was lifted on April 25, 1988, however a temporary segregation (2 years) was placed on mining claim entry on the 4,160 acres until another proposed withdrawal (20 years) can be finalized and re-issued on 4,707 acres. Wild and scenic river status would continue the withdrawal. Development of 15 existing mining claims (300 acres) and any future claims would be regulated by unnecessary or undue degradation regulations (43 CFR 3809). The WSA would also remain open to mineral leasing and sale. The entire WSA would be managed under the following oil and gas leasing categories: Category 1 (standard stipulations) on 15,546 acres; Category 2 (standard and special stipulations) on 820 acres; Category 3 (no surface occupancy) on 14,043 acres; and Category 4 (no leasing) on 751 acres (USDI, BLM 1983a).

Although minerals would be managed as described, mineral exploration and development are not anticipated in the foreseeable future because the level of known resources and the probability of their development is too low to support a development assumption. Appendix 6 in Volume I explains the methodology for mineral exploration and development assumptions.

The present domestic livestock grazing use on five allotments of the 31,160-acre area of the WSA would continue as authorized in the RMP (about 545 AUMs). Existing range developments (three reservoirs and several short-gap fences) could be maintained by mechanical methods. A proposed 500-acre burning and seeding project would be allowed without wilderness consideration.

Three existing wildlife enclosures could be maintained without concern for wilderness values. The Colorado River would continue to be designated critical habitat for four endangered or proposed threatened or endangered fish species.

About 17,570 acres would remain open for vehicular use in accordance with the RMP. ORV use would be limited to existing roads and trails on 5,510 acres, and about 8,080 acres would be closed to ORV use. The limited use and closed areas are adjacent to the Colorado River. About 22.5 miles of existing ways would continue to be available for vehicular access. About 2 miles of ways would be closed.

The entire 31,160-acre area would continue to be open to woodland product harvest. However, harvest is not expected because there is no harvest of forest products at the present time, nor is any expected.

About 25,040 acres of the Westwater Canyon WSA would continue to be managed under VRM Class II; 5,120 acres under Class III; and 1,000 acres under Class IV.

The 13-mile segment of the Colorado River within the WSA could be designated as part of the National Wild and Scenic River System. Such a designation could occur with any of the alternatives and therefore, the affects of such designation is not analyzed as part of the wilderness study.

- Action Scenario

Given BLM management actions described above and the resources described in the Affected Environment, it is anticipated that implementation of the No Action/No Wilderness Alternative would result in approximately 500 acres of surface disturbance associated with a proposed prescribed burn and subsequent seeding. No locatable, leasable, or salable mineral resource exploration or development is anticipated in the foreseeable future. No wildlife habitat or watershed improvement projects are planned. No disturbance is anticipated from ORV activity due to management constraints and rugged terrain.

Recreation use is projected to increase over the current estimated use of 14,470 annual visitor use days. The 14,000 visitor use days currently attributed to river use will not be allowed to increase due to management limits. The remaining 470 land-based use days will increase at a rate of 2 to 7 percent annually. About 13 percent of the land-based use would continue to be attributed to vehicular access on about 20.5 miles of existing ways.

- All Wilderness Alternative

With this alternative, all 31,160 acres of the Westwater Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character. The policy of the State is to reserve its position regarding exchange of

Map 2
ALL WILDERNESS ALTERNATIVE
Westwater Canyon WSA
UT-060-118

Legend

All Wilderness Alternative (31,160 acres)

State Boundary Line

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

N

ELEVATION EXPRESSED IN METERS

T. 20 S.

T. 21 S.

R. 24 E.

R. 25 E.

in-held lands within any particular WSA (see Chapter 1 in Volume I). Based on this policy regarding exchange of State lands, it is assumed that State lands would remain under existing ownership. There are two State sections (1,120 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). The figures and acreages given with this alternative are for Federal lands only. Private lands in four locations adjacent to the WSA would not be affected by wilderness designation. No private or split-estate lands are located within the WSA.

- Management Conditions and Constraints

After wilderness designation, all 31,160 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed on that portion of the 300 acres of the 15 existing mining claims that may be determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. New oil and gas leases would not be issued.

Present domestic livestock grazing would be allowed to continue as authorized. The estimated 545 AUMs on five allotments in the WSA would remain available to livestock as presently allotted. After designation, existing developments (three stock reservoirs and several short-gap fences) would be used and maintained in the same manner as in the past, based on practical necessity and reasonableness. The proposed 500-acre burning and seeding project would not be allowed.

Three existing wildlife enclosures would continue to be maintained.

The entire 31,160-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions. About 22.5 miles of existing vehicular ways in the WSA would not be available for vehicular use except as indicated above. The WSA boundary follows about 13 miles of existing gravel and dirt roads which would remain open to vehicular travel.

Visual resources on 31,160 acres would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

River recreation would be allowed to continue on the Colorado River through the WSA by a BLM permit system as presently occurs. Low speed, wakeless, downstream use of small outboard motors would be allowed to continue.

- Action Scenario

With the BLM management actions described above and the resources described in the Affected Environment, no surface disturbance is expected in the foreseeable future with this alternative. It is projected that no valid discoveries of mineral resources will be located prior to wilderness designation. The 500 acres prescribed burn and subsequent seeding would not be allowed. No other rangeland, wildlife, or watershed improvement projects are planned for the WSA. No disturbance would result from ORV activity.

Recreation use is projected to increase over the current estimated use of 14,470 visitor use days. The 14,000 visitor days of river use would not be allowed to increase due to management limits. The remaining 410 visitor days attributed to primitive-type recreation would increase at a rate of 2 to 7 percent per year. No ORV activity (currently 60 annual visitor days) would occur.

- Partial Wilderness Alternative (Proposed Action) (26,000 Acres)

With this alternative, 26,000 acres of the Westwater Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics. The 26,000 acres analyzed as wilderness with this alternative includes both the Colorado River and the most varied terrain in the WSA. The remaining 5,160 acres in four locations within the WSA, but outside of the area designated as wilderness, would be managed in accordance with the Grand RMP as described for the No Action/No Wilderness Alternative. The 5,160 acres are comprised of 130 acres near Picture Gallery Ranch, 500 acres southeast of Snyder Mesa, 1,660 acres southwest of Big Hole, and 2,870 acres in the southwest corner of the WSA. The 26,000-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy as described in the All Wilderness Alternative.

Because the policy of the State is to reserve its position regarding exchange of in-held lands within any

Map 3
PARTIAL WILDERNESS ALTERNATIVE
Westwater Canyon WSA
UT-060-118

Legend

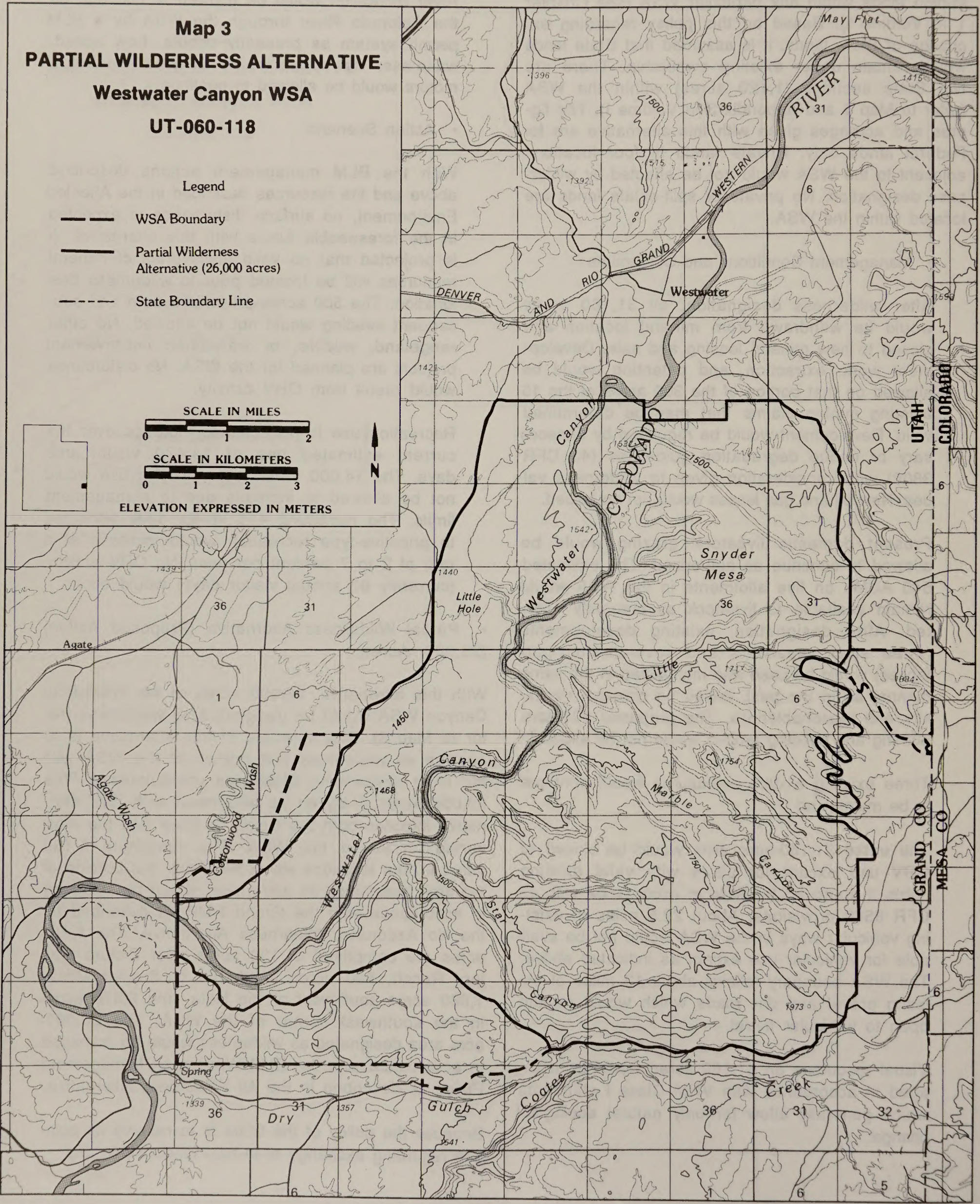
- WSA Boundary
- Partial Wilderness Alternative (26,000 acres)
- State Boundary Line

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N



particular WSA, it is assumed that State lands would remain under existing ownership. There are two State sections (1,120 acres) within the WSA (refer to Map 1 and Volume I, Appendix 3). The figures and acreages given with this alternative are for Federal lands only.

Private lands in four locations adjacent to the lands designated in this alternative would not be affected. No private or split-estate lands are located in the designated portion of the WSA.

- Management Conditions and Constraints

The 26,000-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed on portions of 260 acres of existing mining claims that may be found to be valid. Development would be regulated by unnecessary or undue degradation guidelines with consideration given to wilderness values. New oil and gas leases would not be issued in the 26,000-acre area. The 5,160-acre area not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of future claims, if any, could occur in the 5,160-acre area. The area not designated would be managed as leasing Category 1 (standard stipulations) on 4,220 acres; Category 2 (standard and special stipulations) on 820 acres; and Category 3 (no surface occupancy) on 120 acres. Future leases in this area could be developed without concern for wilderness values.

Domestic livestock grazing would continue to occur in the 26,000-acre wilderness area. The estimated 520 AUMs in the 26,000-acre area would remain available to livestock as presently allotted. Existing range facilities (one reservoir and short-gap fences) could be maintained based on practical necessity and reasonableness. In the 5,160-acre nonwilderness area, livestock grazing would be allowed (about 25 AUMS) without wilderness considerations. In this area, the 500-acre burning and seeding project could be carried out. The two reservoirs and short-gap fences located in the nondesignated area would be maintained as necessary without concern for wilderness values.

The area that would comprise the 26,000-acre wilderness would be closed to ORV use. About 10 miles of existing ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. About 12 miles of road and other road segments that border the WSA would remain open to vehicular travel. On the remaining 5,160 acres, 4,810 would be open to ORV use and vehicles would be restricted to existing ways on 350 acres.

Visual resources on the 26,000-acre wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The remaining 5,160 acres would be managed as VRM Class II on 3,760 acres, Class III on 1,050 acres, and Class IV on 350 acres.

In the 26,000-acre wilderness, river recreation on 13 miles of the river would be allowed by permit, and low speed, wakeless downstream use of small outboard motors would be allowed to continue.

- Action Scenario

The designated portion of the Partial Wilderness Alternative would be managed as described for the All Wilderness Alternative. Actions in the nondesignated portion of the Partial Wilderness Alternative would be similar to those described for the No Action/No Wilderness Alternative. The 500-acre proposed prescribed burn and seeding would be allowed with this alternative. No disturbance is projected to result from ORV activity due to management constraints and rugged terrain.

Recreation use is projected to increase over the current estimated use of 14,470 annual visitor days. The 14,000 visitor use days attributed to river use will not be allowed to increase due to management limits. The remaining 410 visitor use days attributed to primitive recreation will increase at a rate of 2 to 7 percent per year. Visitor use attributed to ORV activity (currently 60 visitor days annually) would be reduced to about half of what it would be with the No Action/No Wilderness Alternative. Therefore, about 30 visitor days of vehicular-based use would increase at a rate of 2 to 7 percent per year.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of the alternatives analyzed in detail.

WESTWATER CANYON WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (31,160 Acres)	Partial Wilderness (26,000 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation, loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on about 500 acres and indirectly and temporarily reduced in quality on up to 1,246 acres of the WSA due to a prescribed burning and seeding project. Most special features (with the exception of 50 acres of Class A scenery which would be disturbed) would not be significantly affected. Continued vehicular use of 20.5 miles of ways would detract from opportunities for solitude and primitive recreation.	Wilderness designation would preserve the wilderness values in the WSA because surface disturbing activities would not occur following wilderness designation.	Wilderness values would be preserved in the designated area which is approximately 83 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 500 acres and indirectly and temporarily reduced in quality on up to 1,246 acres. All of the impact would be in the nondesignated area. Special features would be preserved with the exception of 50 acres of Class A scenery that would be burned and reseeded.

WESTWATER CANYON WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (31,160 Acres)	Partial Wilderness (26,000 Acres) (Proposed Action)
Impacts on Vegetation	Vegetation would be altered on 1.6 percent of the WSA because this alternative would allow 500 acres of prescribed burn and seeding. This would change pinyon and juniper woodland and sagebrush vegetation into grass-shrub vegetation. Threatened and endangered or other special status plant species would not be significantly affected because only one endemic plant species is known to grow in the WSA and protective measures would be required.	Vegetation types and special status plant species would be protected and preserved because no surface-disturbance is projected following wilderness designation.	Impacts would be about the same as with the No Action/No Wilderness Alternative because approximately 500 acres of prescribed burn and seeding would be allowed. About 1.6 percent of the vegetation in the WSA would be allowed under this alternative.
Impacts on Wildlife Habitat and Populations	Burning and seeding would disturb 1.6 percent (500 acres) of wildlife habitat in the WSA. Implementation of the 500-acre land burning and seeding project would benefit some wildlife species and population levels by providing additional forage and ecotones. Endangered, threatened, or other special status animal species would not be significantly affected because they generally are not found in the area that would be burned, and protective measures would be required.	None of the wildlife habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed burning and seeding project and the potential wildlife benefits from additional forage and ecotones would be foregone. Most wildlife species would benefit from provision of solitude and elimination of ORV use and surface-disturbance. Threatened, endangered and other special status species would be preserved.	Implementation of the 500-acre burning and seeding project would disturb 1.6 percent of the wildlife habitat in the WSA. Some wildlife species would benefit from additional forage and ecotones. Vegetation types and special status species would receive additional protection on 83 percent of the WSA.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (31,160 Acres)	Partial Wilderness (26,000 Acres) (Proposed Action)
Impacts on Livestock Management	Livestock grazing levels and management practices would not be affected because grazing would continue without restriction for protection of wilderness values. The proposed 500-acre burning and seeding would provide 63 additional AUMs.	The WSA has approximately 22.5 miles of ways; three to 4 miles of these ways on the east side of the Colorado River are used by permittees for livestock management during the grazing season, for distribution of salt, and to do maintenance on existing rangeland improvement projects. Restrictions of vehicle use on these ways would be an inconvenience to permittees. Five permittees would be adversely affected by increases in cost and time to manage livestock. Predator control is important to the five permittees, approximately 70 percent of past predator control has been done with cyanide guns (M-44s), which are prohibited in wilderness areas. The prohibition of this control method may increase livestock losses, mainly for three permittees that graze sheep in the WSA. The loss of the 500-acre seeding would mean the loss of 63 AUMs of forage on the public land.	Impacts on access for livestock management and predator control would be about the same as with the All Wilderness Alternative because access would be restricted on the 3 to 4 miles of ways used for livestock management on the east side of the river, and restrictions would be placed on methods of predator control on 83 percent of the WSA. An estimated 63 AUMs of additional forage could be produced because 500 acres would be burned and seeded in the nondesignated area.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (31,160 Acres)	Partial Wilderness (26,000 Acres) (Proposed Action)
Impacts on Recreation	Recreational use of the Colorado River would be controlled by BLM and would continue at about 14,000 visitor days per year. Annual land-based recreational use in the WSA would increase from the present 470 visitor days to be between 980 and 2,820 visitor days by the year 2020. About 13 percent of the land-based recreation use would involve vehicle access on about 20.5 miles of existing ways.	River-based recreation on the Colorado River in the WSA would continue at about 14,000 visitor days per year because use is near maximum levels and would be controlled by BLM. The wild and scenic values of this portion of the Colorado River would receive additional protection. Land-based primitive recreation in the WSA is expected to increase to be between 855 and 2,260 annual visitor days by the year 2020. The present 60 visitor days of ORV use and the potential for increases in ORV use would be elimintated. ORV use would not decline on a regional basis.	River-based recreation use would remain constant. The wild and scenic values of the portion of the Colorado River that flows through the WSA would be in the designated area and would receive additional protection. Approximately 30 visitor days of present ORV use would be precluded initially. This would not significantly reduce ORV use on a regional basis. Overall, land-based recreation would increase to be between 917 and 2,640 visitor days per year by the year 2020.
Impacts on Local Economic Conditions	Present economic conditions would not be affected. Recreation-related sales including commercial river based recreation could contribute up to $1,511,562 annually to the local economy by the year 2020. The WSA could contribute up to $12,100 annually in local livestock sales and $932 in Federal grazing fees. Although unlikely, oil and gas leasing revenues could contribute up to $60,818 per year in Federal and State revenues. Federal fees collected from private and commercial river use would continue to be about $32,217 annually.	Present economic conditions would not be significantly affected. Recreation-related sales, including commercial river-based recreation, could contribute up to $1,510,086 annually to the local economy by the year 2020. The WSA would continue to contribute up to $10,900 annually in local livestock sales and $840 in Federal grazing fees. Potential for $1,260 in livestock sales and $315 in Federal grazing fees would be foregone. Although unlikely, potential annual Federal and State oil and gas leasing revenues of up to $60,818 per year could be foregone.	Economic trends and conditions would not be significantly affected. Recreation related sales, including commercial river-based recreation, could contribute up to $1,510,824 annually to the local economy by the year 2020. The WSA could contribute up to $12,100 annually in local livestock sales and $932 in Federal and State oil and gas leasing revenues of up to $50,498 per year could be foregone. Recreational river use would continue to provide about $32,217 in Federal revenues annually.

WESTWATER CANYON WSA

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines, and provides a data base for the cumulative statewide analysis found in Volume I, as well as the Environmental Consequences of Alternatives in this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA is 31,160 acres. It is about 8 miles across both north-south and east-west. The WSA is part of a group of three contiguous WSAs totalling 103,600 acres.

- Naturalness

Since establishment of the WSA, two IMP activities have occurred within the WSA as follows:

1. A 20-acre wildlife habitat exclosure fence (for riparian study) was constructed by BLM in May, 1982. The exclosure is located on the south side of the Colorado River near the WSA's western boundary in T. 21 S., R. 24 E., sec. 24, and is nonimpairing.

2. A small amount of pick and shovel work was completed on a placer gold claim in T. 20 S., R. 25 E., sec. 22. The sampling work was observed and there was not enough surface disturbance done to warrant a reclamation plan. The claims are still considered active.

The following imprints are pre-FLPMA:

A vehicle way (constructed but not maintained) south of the Colorado River and west of Star Canyon, which runs for 7 miles, sometimes over rock ledges;

A vehicle way (not constructed and less than 1 mile long) that runs through a post-FLPMA exclosure on the south edge of the Colorado River at the west end of the WSA;

A vehicle way (not maintained and presently revegetating) that runs west of Picture Gallery Ranch for about 3 miles;

A vehicle way (constructed but not maintained) about 2 miles long that runs across a sandy area (presently revegetating) to Miner's Cabin and has been used recently for access to placer claims;

A vehicle way (not constructed) that runs for 2 miles to Little Hole and shows evidence of some revegetation;

A vehicle way (not constructed) that runs for 2 miles to the canyon rim south of Little Hole;

A vehicle way (constructed but not maintained) that runs for about 1 mile to the north end of Big Hole and is presently revegetating;

A vehicle way (constructed but not maintained) that crosses slickrock and sands in a 4-mile extension of the WSA's northwest boundary road and shows evidence of some revegetation, with a 0.50-mile unconstructed spur vehicle way leading south to the canyon rim;

A 15-foot square fence exclosure near the head of Big Hole, covering less than one acre;

An 8-foot square fenced exclosure near the western boundary of the WSA south of the Colorado River, covering less than 1 acre;

Miner's Cabin, a historic site at the north end of the WSA near the river, covering less than 1 acre;

Evidence of historic placer claims, consisting of old equipment and rubble, covering about 5 acres in the vicinity of Miner's Cabin;

Outlaw Cave, a historic site on the Colorado River covering less than 1 acre; and

Three livestock reservoirs covering less than 1 acre.

Imprints cover a total of less than 50 acres. These imprints, both pre-FLPMA and post-FLPMA, are not substantially noticeable within the unit as a whole. Thus, the entire WSA meets the standard for naturalness.

- Solitude

The size and configuration of the WSA are sufficient to give visitors a feeling of vastness.

Topographic screening is the primary factor leading to outstanding opportunities for solitude. Screening is excellent within the several canyon systems and Big Hole. Within canyons, parties traveling in opposite directions might encounter sights or sounds of one another, but diversity of travel routes into side canyons or alcoves would tend to dissipate encounters. Closely-spaced parties boating or camping on the Colorado River would tend to be aware of each other, but the winding nature of Westwater Canyon and the rapids tend to minimize contacts while floating the river. Downstream, parties are more likely to be aware of each other because of the longer lines of sight as the river broadens. Topographic screening is not as pronounced north of the river and along the southwestern boundary. Both of these areas consist of rolling uplands or mesa tops.

Vegetation alone does not provide significant screening within the WSA, but it enhances topographic screening in some areas. Much of the WSA is rock outcrop or has sparse pinyon-juniper vegetation. In riparian areas or on ridge top areas that have dense pinyon-juniper woodland, screening potential is greater. Vegetation and topographic screening are sufficient on a majority of the WSA to provide visitors with opportunities for seclusion.

Screening is insufficient to provide seclusion on 10,560 acres or 34 percent of the WSA in the following areas: (1) the 6,200-acre area north of the Colorado River Canyon rim; (2) the 3,700-acre area south of the canyon rim and west of Star Canyon; (3) the 160-acre flats near Picture Gallery Ranch; and (4) the 500-acre area southeast of Snyder Mesa near the Colorado state line.

The major limiting factor to finding a secluded spot is the heavy recreation use concentrated within Westwater Canyon during the river season. Campsites are assigned by BLM rangers, and often different parties have to share an area. Crowding occurs throughout the summer season and is increased at times of high water, when some of the available campsites are flooded. The Little Dolores, Star, and Marble side canyons provide limited dispersion opportunities to alleviate crowding along the river corridor. The number of permits issued by BLM could be reduced to protect solitude if necessary.

The WSA is remote, with few significant human intrusions nearby. Irrigated fields can be seen from the perimeter of the WSA, but would not represent significant visual intrusions. Solitude in portions of the WSA near Picture Gallery, Wild Ass, Westwater, Rose, and Shield ranches could be adversely affected by sights and sounds of ranch activities. Solitude along the northern boundary of the WSA would be affected in areas by sounds of the railroad, which runs about 1 mile north of the WSA, and the railroad would be visible from a few points on the north side of the WSA. Interstate 70 can be viewed from a few places in the north end of the WSA, but the highway is about 4 miles distant and is not considered a significant limiting factor for solitude in the WSA.

Vistas from the WSA to distant scenic areas are possible, but the majority of recreational use is in canyon systems where views are confined. Probable vistas from such high points as the north rim of the Colorado River Canyon or Snyder Mesa would include the Uncompahgre Uplift (in Colorado) to the east, Book Cliffs to the north, and the LaSal Mountains to the southwest.

All in all, the majority of the WSA has opportunities for solitude that meet the outstanding criterion for lands under wilderness review. This applies to about 20,600 acres (66 percent) of the WSA, and includes the canyon systems of the WSA, where topographic screening provides excellent opportunities for seclusion. The remainder of the WSA, about 10,560 acres (34 percent), does not meet the outstanding criterion.

- Primitive and Unconfined Recreation

Opportunities for primitive and unconfined recreation are outstanding within parts of the WSA, primarily because of the whitewater river running potential and related camping and hiking activities. Outstanding opportunities for challenging hiking, rock scrambling, and primitive camping also exist in side canyons. These are derived from the rugged topography, sheer cliffs, and dissected terrain which allow numerous alternate hiking routes.

These opportunities are not outstanding in areas north of the Colorado River Canyon rim (6,200 acres); south of the canyon rim and west of Star Canyon (3,700 acres); in the vicinity of Snyder Mesa (3,800 acres); nor on the mesa tops between Star and Marble Canyons and the flat areas near ranches (9,700 acres). These areas comprise 23,400 acres, or 75 percent of the WSA. The remaining 7,760 acres, or

25 percent, meet the requirement for outstanding opportunities for primitive and unconfined recreation.

- Special Features

The Colorado River through Westwater Canyon has been studied and recommended for inclusion in the Wild and Scenic Rivers System. Westwater Canyon displays high scenic quality and unique geologic features. Approximately 80 percent (25,040 acres) of the WSA is rated Class A for scenic quality. The WSA has approximately 13 miles of perennial streams. Two prominent geologic features are found in the WSA; the black pre-Cambrian gneissic rock and a large fault that runs across the head of Westwater Canyon. The WSA exhibits several rock formations including Smokey Bear Point and Wingate Arch. Similar exposure of pre-Cambrian rock is found only within the Grand Canyon. The geologic display viewed from the river is not only scenic, but also educational. The WSA has archaeological and historical sites that are considered special features.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are six animal species (black-footed ferret, peregrine falcon, bald eagle, Colorado squawfish, humpback chub, and bonytail chub) listed as endangered that occur, or may occur, in the WSA (USDI, FWS, 1989). There are eight animal species and one plant species that are considered sensitive that occur, or may occur, in the WSA. One of these federally listed sensitive species, the razorback sucker, has been designated by the State as endangered in Utah. The WSA has year-round populations of cougar and possibly desert bighorn sheep, which are wildlife species associated with wilderness. Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.)

- Diversity

This WSA is in the Colorado Plateau Province Ecoregion and has the PNV types, of juniper-pinyon woodland and saltbush-greasewood. Refer to the Vegetation Including Special Status Species section for more discussion of ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour driving time from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA has is in a PSD Class II air quality classification area under the 1977 Clean Air Act amendments and currently meets national air quality standards. The nearest Class I area is Arches National Park, located about 20 miles southwest of the WSA. Colorado National Monument, about 15 miles east of the WSA, has been classified by the State of Colorado as a Category 1 area which is equivalent to PSD Class I. No significant sources of air pollution are close enough to affect this WSA. Visual range in the general vicinity is good and averages between 100 to 132 miles during the summer (Aerocomp, Inc., 1984).

Geology and Topography

Westwater Canyon WSA lies on the western edge of the Uncompahgre Uplift within the Canyonlands section of the Colorado Plateau Physiographic Province. The canyon was formed by the north to south flowing Colorado River. Exposed within the study area is a thick sequence of Triassic to Jurassic sedimentary rocks which were deposited on a flat-lying surface of Precambrian rocks. The sedimentary rocks include sandstones, siltstones, and shales of the Chinle, Wingate, Kayenta, Entrada, and Summerville formations. The dark Precambrian gneissic rocks contain bands of white quartz and dark granite. The gneisses are 1.7 billion years and are exposed in the bottom of the canyon.

The sedimentary rocks were fractured and folded by the reactivation of Precambrian age faults during the near-vertical uplift of the Uncompahgre Plateau (Stone, 1977). Numerous northwest-trending normal faults are exposed in the WSA. One prominent fault cuts across the head of Westwater Canyon marking an abrupt boundary between the Precambrian gneiss and much younger red Jurassic-Triassic sandstones.

Three major side canyons enter Westwater from the east: Little Dolores, Marble, and Star Canyons. A short box canyon, Little Hole, and a rincon, Big Hole, are the main features northwest of the river. Elevation ranges from approximately 6,500 feet in the southeastern corner of the WSA and about 5,000 feet at the cliff top east of the river to about 4,100 feet where the Colorado River leaves the WSA.

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Westwater is a canyon within a canyon. The narrow inner gorge is rimmed by a wide shelf or the floor of the upper canyon. The side canyons of Little Dolores, Marble, and Star meet this upper canyon floor 100 to 200 feet above the Colorado. Sheer red sandstone cliffs form the walls of the upper canyon, rising to rolling mesa tops some 600 feet above the river.

The WSA contains several rock formations of scenic interest. Alcoves and pinnacles have formed in the Wingate cliffs throughout the WSA. Smokey Bear Point and Wingate Arch near Marble Canyon are two features of note.

Soils

The Westwater Canyon WSA is characterized by broad cuestas and/or structural benches cut by deep canyons. About 40 percent (12,464 acres) of the area is composed of rock outcrop occurring as slickrock on the cuesta and canyon walls. About 30 percent (9,348 acres) of the area is composed of shallow or deep sandy soils on the surface of the cuesta. About 20 percent (6,232 acres) is moderately deep to very deep stony soils on steep sides of canyons. About 10 percent (3,116) are very deep loamy soils on gently sloping alluvial fans and along drainages on canyon floors. Table 2 shows soil characteristics and land types and Table 3 describes erosion conditions.

Soil salinity class estimates indicate that the area is 50 percent strongly saline and 50 percent nonsaline with an estimated average salinity production of 66 lbs of salt per acre per year.

Table 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of the Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year) Present Condition	Bare Soil Surface
Rock outcrop	40	12,464	0.0	0
Shallow or deep sandy soils on sloping cuestas and structural benches	30	9,348	1.0	5
Very deep loamy soils on gently sloping alluvial fans and floodplains	10	3,116	0.1	10
Moderately deep to very deep stony soils on steep canyon sides	20	6,232	1.0	10
Totals	100	31,160		

Source: Hansen, 1985.

Seeding potential varies from unsuited to seeding to poor suitability on 90 percent (28,044 acres) of the WSA due to steep slopes with stony soils, rock outcrops, sandy (droughty) and shallow soils. Seeding potential is fair to good on 10 percent (3,116 acres) of the WSA because soils are deep loams and the gentle slopes would not preclude equipment from working in the area.

Vegetation Including Special Status Species

The WSA consists of six major vegetation types as shown on Table 4. The majority of the WSA is covered by pinyon-juniper woodland of varying density and associated species (USDI, BLM, 1983a).

Table 3
Erosion Condition

Erosion Class	Erosion Rate cubic yards/ acre/year	Annual Soil Loss Under Present Conditions: Percent of Area	Acres	Cubic Yards	Annual Soil Loss if Disturbed: Percent of Area	Acres	Cubic Yards
Very High	20.0	-	-	-	-	-	-
High	10.0	-	-	-	20	6,232	62,320
Medium	5.0	-	-	-	30	9,348	46,740
Low	1.0	50	15,580	15,580	10	3,116	3,116
Very Low	0.1	10	3,116	312	-	-	-
None	0.0	40	12,464	-	40	12,464	-
Totals		100	31,160	115,892[a]	100	31,160	112,176[a]

Source: Hansen, 1985.

[a]Average annual soil loss in cubic yards per acre (0.51 under present conditions; 3.60 if disturbed).

Other woodland species include single-leaf ash, mountain mahogany, and a few isolated aspen in protected areas. Short grasses grow throughout the WSA mixed with small sagebrush (black sage). Riparian areas occur intermittently in a narrow band along the Colorado River (13 miles total length in the WSA), in spots along the Little Dolores River (4.5 miles), along Cottonwood Wash (2.5 miles), and along other washes. Riparian species include cottonwood, tamarisk, shrub willow, and sedges; sage grows along washes in drier areas. Portions of the WSA with rock outcrops have little or no vegetation.

Table 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	16,726	54
Pinyon-juniper-sagebrush	7,790	25
Pinyon-juniper/blackbush	4,674	15
Sagebrush	1,558	5
Rockout crop	312	1
Riparian	100	Less than 1
Total	31,160	100

Source: USDI, BLM, 1983a

No threatened, endangered or candidate plant species are known to occur in the WSA. One endemic plant species (Cryptantha elata) may occur in the WSA (see Appendix 4 in Volume I).

The Westwater Canyon WSA is in the Colorado Plateau Ecoregion Province as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV types of the WSA are saltbush-greasewood and juniper-pinyon woodland, as listed on Table 5.

Table 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	21,812	70
Saltbush-greasewood	9,348	30
Total	31,160	100

Source: USDI, USGS, 1978.

Water Resources

The Westwater Canyon WSA spans the Colorado River near the Utah-Colorado border in the Upper Colorado River hydrologic region. The predominant water feature of the WSA is the Colorado River. Approximately 13 miles of the river are within the WSA. The Little Dolores, a perennial stream outside the WSA, is depleted by agricultural use before entering the WSA. There are also four intermittent streams in the WSA. The WSA contains two undeveloped springs and three livestock reservoirs.

The WSA is within Water Right Adjudication Area 01. The water within the area is not fully appropriated. Consideration may be given to isolated springs for appropriation, but claims may not exceed 0.015 cfs. Temporary and fixed time applications may exceed 0.015 cfs in this area (UNDRE, DWR, 1988).

The waters from this WSA drain into the Colorado River besides having the Colorado River traverse through it and the water quality standards are applicable. The water quality standards for Colorado River and tributaries, from Lake Powell to state line are as follows: Class 1C--protected for domestic purposes with prior treatment by treatment processes as required by the Utah Department of Health; Class 2B (protected for boating, water skiing, and similar uses, excluding recreational bathing [swimming]), Class 3B (protected for warm water species of game fish and other warm water aquatic life), and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering).

Water quality of the Colorado has been adversely affected by erosion. Sedimentation and salinity have increased dramatically over the past several years. Reduction of erosion and sedimentation is of the utmost importance along the Colorado. Besides the high water quality value for recreational use in Westwater Canyon, downstream water users require high priority.

Water quality data have been collected for the Colorado River at a gauging station near Cisco, 16 miles downstream from the WSA. Between 1929 and 1957, this station recorded an average annual discharge of 5,255,000 acre-feet, with an average annual salt yield of 4,363,000 tons (a TDS concentration of 610 mg/1). Between 1966 and 1975, the average annual discharge was 4,569,000 acre-feet, with an average annual salt yield of 3,816,000 tons (a TDS concentration of 614 mg/1) (USDI, 1987). This is not a higher rate of sedimentation or salinity than recorded elsewhere in the State of Utah.

There are no irrigation use rights within the WSA, but irrigated agricultural areas are adjacent to the WSA to the north and west. Irrigation water for these areas is taken directly from the Colorado.

There are no water wells in this area, therefore, no direct groundwater quality data are available. However, the sedimentary sandstones and siltstones situated in this WSA characteristically have been found elsewhere to yield fresh water to springs and wells. The Kayenta Formation, the dominant surficial bedrock unit of the WSA, generally acts as an aquitard by restricting the downward movement of groundwater to the lower sedimentary formations. This reduced recharge will generally result in low yields from all underlying sedimentary formations. The older pre-Cambrian crystalline rocks, located mainly in Westwater Canyon and in the adjacent side canyons, are not considered water-bearing formations. No data are available for these crystalline rocks. Water quality should be acceptable for recreation, wildlife, livestock, and agricultural uses, especially in the absence of the highly saline Mancos Shale.

Mineral and Energy Resources

The energy and mineral resource rating for the Westwater Canyon WSA is given in Table 6. Appendix 5 in Volume I explains the mineral and energy resource rating system.

The WSA could contain deposits of manganese that are currently listed as a strategic and critical material (USDoD, 1988).

Restrictions on mineral development within the WSA are currently in effect along the Colorado River. The Wild and Scenic Rivers Act Amendment of 1975 temporarily withdrew a corridor 0.25 mile wide on each side of the river from mineral mining and other uses, but not from mineral leasing. This withdrawal covers a total of 4,160 acres within the WSA and will remain in effect until Congress acts on study recommendations. Bureau of Reclamation withdrawals along the river, dating to 1910 for a Dewey reservoir site, did not include mineral leasing or salable minerals; since 1955 these areas have been open to location of mining claims subject to the terms of the withdrawal. The BOR applied in 1971 to revoke the withdrawals, but final action has not been taken on these applications.

Table 6
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 1	c3	None
Coal	f 1	c4	None
Potash	f 1	c4	None
Geothermal	f 1	c3	None
Uranium/Vanadium	f 1	c4	None
Manganese	f 2	c1	Less than 100,000 tons of 40 percent manganese
Gold	not rated		Subeconomic place deposits

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Leasable Minerals

There are no known deposits of any leasable minerals in the WSA. Currently, there are no active drilling, mining, or exploration activities for leasable minerals.

- Oil and Gas

There appears to be no favorability for oil and gas within the WSA. Because the younger Triassic formations lie uncomformably on the ancient Precambrian rocks, there has been no deposition of the Paradox Basin formations (Devonian, Mississippian, and Pennsylvanian) that serve as host rock in the vicinity for hydrocarbon resources. Oil and gas are produced from the Morrison Formation (Jurassic), the Cedar Mountain Formation (Cretaceous), and the Dakota Sandstone (Cretaceous) within the Uncompahgre Uplift north and northwest of the WSA. These sediments are younger than those occurring in the WSA. Strata known to produce oil and gas in the general region do not occur in the WSA.

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The tract evaluated contains 37,460 acres, somewhat larger than the WSA (the WSA represents about 83 percent of the tract evaluated). The rating of fl favorability indicates that known source rocks do not exist within the tract. The certainty rating of c3 indicates, based on available data, that there is a moderate chance that oil and gas resources do not exist within the WSA (SAI, 1982).

There is a theory that the Uncompahgre Uplift may overthrust younger Paleozoic rocks at great depth, and that favorable structural traps may occur in the Entrada Sandstone which has yielded shows and production in other areas (Stone, 1977). The WSA is unexplored at depth and there are no available data to appraise this theory.

With the BLM oil and gas leasing category system (USDI, BLM 1975b and 1983a), the central part of the WSA is closed to leasing or has no surface occupancy. Perimeter areas are open to leasing. Most open areas in the eastern half are open with special stipulations to protect wildlife habitat. There are presently no oil and gas leases in the WSA. Table 7 indicates leasing categories for the WSA.

Table 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open to leasing	15,546	50
2. Open with special stipulations	820	3
3. Open with no surface occupancy	14,043	45
4. No leasing	751	2
Total	31,160	100

Source: USDI, BLM, 1983a and 1983b.

- Coal and Potash

Coal-bearing strata found in the Bock Cliffs, about 15 miles north and northwest of the WSA, are younger Cretaceous rocks that were either not deposited within the vicinity of the WSA or have weathered away. Potash is produced about 40 miles to the southwest of the WSA from the Texas gulf plant near Moab. Production is from Paradox Basin salts, and the entire Paradox Basin is considered generally favorable for potash and other salts. The WSA is northeast of the limits of the Paradox Formation and the salt-bearing strata were not deposited within the WSA.

Both potash and coal have been assigned an f1 rating which indicates that the target strata are not present. Both have been assigned a certainty rating of c4, which indicates a high degree of certainty that coal and potash do not occur within the WSA (SAI, 1982). With the Grand RMP, potash leasing is closed within the WSA.

- Geothermal

There is low potential for geothermal resources on the Colorado Plateau as a whole, and particularly in Westwater Canyon, because of (1) high drilling costs; (2) the great depth to the resource; (3) the small number of potential users, due to the area's remoteness; and (4) the low temperature (20 to 90 degrees Centigrade) of any geothermal steam present, which would probably be suitable only for space heating. The rating is an fl favorability with a moderate certainty that geothermal resource do not exist (SAI, 1982).

- Locatable Minerals

There are presently 15 mining claims covering 300 acres.

- Uranium

Uranium, with associated vanadium and copper, occurs in the Chinle and Morrison Salt Wash formations. The Morrison occurs only peripherally within the WSA. The Chinle, while present within most of the WSA, does not contain the basal sandstone members which are the targets for uranium exploration. These three minerals have all been rated f1, which indicates an extremely unfavorable geologic environment for deposition of uranium and related minerals. All are given a certainty rating of c4, which indicates a high degree of knowledge of the underlying geology and the WSA, based on drill data in the vicinity (SAI, 1982).

- Manganese

Manganese is found in the Morrison and Summerville formations, both absent in the WSA, and in the Chinle, present in the WSA. The upper part of the less favorable Chinle Formation lies at depth generally less than a few hundred feet below the surface. Since the Chinle is slightly favorable for manganese throughout the region, it has been assigned a favorability of f2 with a very low cer-

tainty of c1 for occurrence (SAI, 1982). The area is favorable for only very small accumulations.

- Gold

Placer gold deposited by the Colorado River is found in gravel bars and gravel terraces in the WSA. The gold occurs as small, thin flakes, usually less than 1/2 mm across. The Pussycat claim group is the only claim within the WSA with indicated subeconomic resources. It contains about 24 ounces of gold in 5,000 cubic yards of sediments.

No lode mineral resources were delineated; however some fractures in the Precambrian rocks contain minor concentrations of copper, gold, and silver. Dry Gulch contains four silicified fractures with trace amounts of gold. This zone is partially within the WSA but also extends to the south suggesting a possible larger system. More data are needed to determine if adequate tonnage and grade are present.

- Salable Minerals

Small sand and gravel deposits are found in bars along the Colorado River in Utah. Virtually no sand and gravel resources occur within the WSA, although one small terrace deposit has been identified in the vicinity of Big Hole. There has been no interest in this deposit to date because of its small size and inaccessible location. The WSA would be expected to have a low favorability for sand and gravel extraction.

Wildlife Including Special Status Species

The Westwater Canyon WSA provides habitat for a variety of wildlife species. Currently, the area provides winter range for mule deer, year-round habitat for coyote, cougar, bobcat, cottontail rabbit, various other small mammals, birds (including several raptors), fish, reptiles, and amphibians. Year-round habitat is also provided for re-established desert bighorn sheep. The current bighorn sheep population is very small, possibly non-existent. There have not been any reported sightings since 1985.

About 35 mule deer (72 AUMs) inhabit the area. The best habitat for desert bighorn sheep is found on Snyder Mesa, Big Hole, Star and Marble Canyons. At one time, approximately 20 bighorn sheep (42 AUMs) inhabited these areas. Cougar inhabit the same areas as mule deer.

Upland game include mourning dove and cottontail rabbit. Mourning dove are common in the WSA in late spring and summer. It is believed that nesting areas are concentrated around cultivated areas outside of the WSA such as the Rose Ranch, Westwater Ranch, and along the river systems. Cottontail rabbits can be found throughout the WSA.

The WSA provides habitat for several bird species. The most common are canyon wrens, rock wrens, killdeer, rock dove, red-tailed hawks, golden eagle (BLM sensitive species), marsh hawks, kestrels, and ravens. Great blue herons nest along the Colorado just west of the WSA and may be found within the WSA boundary. Several raptor nests are located in Westwater Canyon. Waterfowl habitat is located primarily in the Colorado and Little Dolores river systems. Mallards, blue-winged teal, mergansers, shovelers, and Canada geese commonly winter along the river. Year-round habitat is provided a few resident waterfowl. A substantial population of Canada geese winter on the farms adjacent to the WSA.

Several species of fish inhabit the Colorado and Little Dolores Rivers. Most common are carp, channel catfish, bluegill, flannelmouth sucker, red shiner, and speckled dace. The WSA contains approximately 13 miles of fish habitat. Common species of reptiles and amphibians present are the red-spotted toad, bullfrog, side-blotched lizard, stripped whipsnake, and gopher snake.

Two endangered raptors can be found in the WSA: the bald eagle and American peregrine falcon. Both have been sighted along the Colorado River in Westwater Canyon and, they may use the entire WSA. Nest locations have not been documented within the WSA. The only two known bald eagle nest sites in Utah are located near the Westwater Canyon WSA. One nest site has been active since its location was identified in 1983. The second nest site was located in 1987. The black-footed ferret, which is an endangered species, may be found in the general area (see Appendix 4 in Volume I).

Three listed or proposed endangered aquatic species are known to occur in the Colorado River within the WSA: the Colorado River squawfish, the humpback chub, and the bonytail chub. The razorback sucker, a candidate species, is also known to occur in the river within the WSA. These species are also presently protected by Utah State law. Six additional candidate species may also occur in or near the Westwater Canyon WSA. The are the ferruginous hawk, long-billed

curlew, southern spotted owl, western yellow billed cuckoo, Great Basin silverspot butterfly, and southwestern otter. If present, most of these species would be associated with riparian and wet meadow areas or cliff faces and deep canyons, except for the ferruginous hawk. The ferruginous hawk inhabits pinyon-juniper woodland areas where there are ecotones or edges that provide opportunities for nesting cover and hunting activities.

The Colorado River corridor (about 4,160 acres within the WSA, or 13 percent of the WSA) provides the most essential wildlife habitat within the WSA this section of river has been designated critical habitat for the four endangered or candidate fish species. Three enclosures are located in the WSA. One 20-acre exclosure, located near the WSA's western boundary, was installed to improve wildlife habitat by excluding cattle. The other two enclosures are less than 1 acre in size.

Forest Resources

No forest products are currently harvested in the WSA. The potential exists for Christmas trees, cedar posts, and firewood to be harvested. However, due to the remote location of the WSA, lack of access, and abundance of more favorable areas elsewhere, no harvest of forest products is anticipated from the WSA in the foreseeable future. Approximately 29,190 acres with scattered pinyon and juniper trees are located in the WSA.

Livestock and Wild Horses/Burros

The WSA contains portions of five grazing allotments (two cattle, two sheep, and one which has both sheep and cattle). With the exception of Horse Pasture of the Buckhorn AMP allotment, grazing was authorized in all allotments when FLPMA was passed. The three cattle allotments are under a management plan, and the WSA portion of these allotments is not grazed every year. Table 8 gives livestock grazing use data for the WSA.

Range projects of record within the WSA are three livestock reservoirs in the southwestern part of the WSA (Knowles Pasture of the Buckhorn allotment) and short-gap fences of undetermined location. There is vehicle use on 3 to 4 miles of ways for livestock management on the east side of the river. There is a 500-acre prescribed burn and seeding proposed within the WSA that would produce an additional 63 AUMs of forage.

Presently there is no agricultural activity within the WSA. There are some irrigated lands within 0.50 mile of the WSA at four locations: Picture Gallery Ranch, Wild Ass Ranch, Westwater Ranch, and Rose Ranch.

APHIS conducts predator control in BLM grazing allotments that comprise the WSA. A total of 23 coyotes were taken in the allotments in and surrounding the WSA during 1986-1987 period (USDA, APHIS 1988). Of the Coyotes, seven were taken from aircraft and 16 by cyanide guns (M-44s).

Table 8
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Agate	10,840	305	623	9	700 Sheep	12/17-05/20	1
Little Hole	13,325	7,853	990	123	956 Sheep	12/13-02/28	1
Buckhorn	69,042	9,280	7,950	152	725 Cattle 2,994 Sheep	10/01-05/31	1
Lost Canyon	32,481	13,112	2,791	161	438 Cattle	11/01-05/31	1
Fish Park	3,863	610	570	100	250 Cattle	10/01-11/15	1
Total	129,551	31,160	12,924	545			5

Source: BLM File Data.

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The WSA comprises between 3 and 59 percent of the area of any one allotment. It is not known what proportion of the predators were actually taken within the WSA. The combined, confirmed livestock losses for 1986-1987 in these allotments were five lambs and five sheep.

Wild horses or burros are not known to inhabit the WSA.

Visual Resources

The WSA is characterized by dramatic visual contrasts. Red sandstone cliffs, with ribbons of desert varnish, rise high above the lower canyon walls of black rock patterned with bands of white quartz and dark reddish granite. The Colorado River with its whitewater rapids has polished the sides of the inner canyon to a smooth gloss and carved out potholes and caverns.

Visual resources in the WSA were inventoried in 1976. Refer to Appendix 7 in Volume I for an explanation of BLM's VRM rating system. The areas (25,000 acres) that can be seen from within the Colorado River corridor and the major side drainages to the east were evaluated as having Class A Scenery in a foreground/middleground distance zone with high visual sensitivity, and were given VRM Class II status. A narrow strip along the southern boundary, encompassing about 1,000 acres, has been evaluated as Class B Scenery in a seldom seen distance zone, with low visual sensitivity, and was given VRM Class IV status. Approximately 5,120 acres (17 percent) along the northwest side of the WSA is in VRM Class III status. This area has Class C scenery, high visual sensitivity, and is in a foreground visual zone.

Cultural Resources

A complete inventory has not been made of the WSA, but four historic and nine prehistoric sites are known (USDI, BLM 1988). Historic sites are associated with early mining camps and an outlaw hideout; prehistoric sites include camps and rock art. None of the prehistoric sites within the WSA are on the National Register; however, some of the recorded sites may be eligible. The potential for discovery of additional sites is high. European influence in the region dates from the early 1800s.

Ranching spread to the WSA in the 1890s along the Grand River (now Colorado) and from the State of Colorado. The oldest known historic site is the Miner's Cabin (also called Malin Cabin), a dugout near the head of Westwater Canyon built about 1912. In the late 1920s a placer operation began about 0.25 mile downstream from Miner's Cabin; several dugout cabins and sheds still remain. In about 1913 two outlaws hid out in a cave on the east side of the river. One of the outlaws is buried just downstream from the cave.

Recreation

Although it is only 7 miles southeast of I-70, the WSA is difficult to reach. The nearest community, Cisco (population less than 50), is about 5 miles west of the WSA. The abandoned townsite of Westwater lies about 1 mile north of the WSA. The nearest towns of any size are Grand Junction, Colorado, which is about 25 miles to the east, and Moab, Utah, which is about 30 miles to the southwest. The portion of the WSA north of the Colorado River is accessed by dirt roads leading from I-70 through Westwater or Cisco. The portion of the WSA south of the river is accessed by an unimproved road leading west from Glade Park, Colorado. The Colorado River is accessed from the BLM ranger station near Westwater.

Westwater Canyon is popular for recreation. The primary attraction is the opportunity for whitewater river running and related camping and hiking. The whitewater is considered among the most challenging on the Colorado River. Rapids are rated as Class III to V on the International Scale of Whitewater Difficulty (Class VI is the most difficult rating given to rapids).

Inflatable rafts are the most commonly used craft, although kayaks are becoming more popular. Motors are sometimes used on flatwater.

A permit system was instituted by BLM in 1974 to monitor use by both commercial outfitters and private parties. An average of about 11,500 permits are issued annually. BLM maintains a river ranger station just north of the WSA. Maximum use currently allowed is 14,000 visitor days annually for the season from May through September. Use is near the carrying capacity based on studies of environmental, physical, and social constraints. It is generally in accord with the river management plan which specifies 14,000 visitor days as the upper limit of use allowed. Off-season private use could increase, but this is unlikely. The whitewater rafting experience in Westwater Canyon is well known; public awareness of this portion of the WSA is high.

Rangers also assign campsites; group number and type of camp are regulated. Ten designated campsites are within the WSA, but the number actually available depends on water level. At high water, only four are available. The campsites are not developed. Informal hiking trails are used around the camps. Side canyons to the Colorado River Canyon are hiked from the river. The many sheer cliffs limit potential hiking routes and increase hiking challenge.

The Colorado River channel within Westwater Canyon is well defined with little or no beach or riparian area. Side washes have cut precipitous channels to the river below. Numerous rock falls and steep sides of the inner canyon have created a series of 12 rapids separated by calmer water. The Colorado River in this area is narrow and deep, about 30 feet wide at the narrowest point and up to 60 feet deep at normal flows. It drops 151 feet through the canyon, an average of 11 feet per mile.

At the lower end of Westwater Canyon, the river emerges into a flat, wide bed bordered by sandstone cliffs. The water is quiet with sand bars and sand islands. The river is about 0.75 mile wide as it leaves the WSA.

Since 1975, the Colorado River within the Westwater Canyon WSA has been part of a study river as designated by an amendment (P.L. 93-621, 1975) to the Wild and Scenic Rivers Act (P.L. 90-452, 1968). The Act preserves "certain selected rivers" that "possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values . . . for the benefit and enjoyment of present and future generations." Two legislative bills, H.R. 3399 and S. 1719, have been introduced to designate Westwater Canyon as part of the National Wild and scenic River System.

Westwater Canyon was designated as a Special Recreation Management Area (SRMA) under previous MFPs covering the old planning units, and this designation has been carried forward under the Grand RMP. The WSA is entirely within the SRMA. BLM has an active management program for Westwater Canyon within the SRMA in the form of a river management plan.

No visitor use data has been compiled other than river use.

Some hunting for waterfowl and big game takes place within the WSA. Successful big game hunting depends on severity of winter weather. A difficult winter will push deer into the WSA from higher elevations to the southeast. No use statistics are available; however, hunter use is estimated at probably no more than 200 visitor days annually in the WSA. Some fishing, mostly for channel catfish, takes place in areas where the river bank is accessible, primarily along the western boundary and at Miner's Cabin. This use may account for up to 200 visitor days per year.

Vehicular use within the WSA probably accounts for about 60 visitor days per year. Some ORV use is made of areas along the northwest boundary and above Big Hole. There are 22.5 miles of ways in the WSA. An established ORV trail runs along the south rim of the river at the west end of the WSA; use appears to be associated with hunting. Short trails extend into the WSA from Picture Gallery Ranch, probably for ranching use. The remoteness of the WSA does not make it as attractive for recreational ORV use as other areas nearer to population centers.

Under the Grand RMP, three ORV designations have been recommended in accordance with 43 CFR 8560. Approximately 8,080 acres south of the Colorado River would be designated as closed to ORVs. This would affect use in the vicinity of Miner's Cabin. Approximately 5,510 acres would be designated as limited to existing roads and trails. This would affect a portion of the WSA north of the Colorado River, including two segments of the trail leading to Cottonwood Wash overlook, and a 1-mile-wide corridor along the Colorado River in the western portion of the WSA, including part of the trail above the southern river canyon rim and the short trail along the south bank of the river. The remainder of the WSA (about 17,570 acres) would be designated as open to ORV use.

Land Use Plans

There are no private lands, private subsurface rights, rights-of-way, or pending applications in the WSA. Two tracts of State lands (1,120 acres) within the WSA are currently undeveloped, but are leased for oil and gas, hydrocarbons, and grazing. There is no vehicular access to either State in-holding. The current policy of the State is to maximize economic returns from State lands and to reserve its position regarding exchange of in-held lands (see Chapter 1 in Volume I).

In 1986, the Utah State Legislature passed S.C.R. No.1 opposing any additional wilderness in Utah and

urging that State lands not be exchanged out of wilderness areas.

There have been legal questions in the past regarding State vs. Federal ownership of the Colorado River bed. The portion of the river through the WSA has not been adjudicated.

The Westwater Canyon WSA is managed by BLM under the Grand RMP (USDI, BLM, 1983a), which allows for multiple use with certain restrictions as discussed in the description of the No Action/No Wilderness Alternative. Wilderness is not addressed in the RMP. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

The Dolores Triangle portion of the WSA is covered by a habitat management plan. River management in Westwater Canyon is managed by a plan published in the Federal Register in 1976. The FWS administers a program for recovery of protected fish species in the Colorado River within the WSA and administers the Endangered Species Act (as amended) (Ninety-Third Congress of the U.S. 1973).

The Grand County Master Plan (U of U, BCD, 1979) does not specifically address the Westwater Canyon WSA; however, wilderness designation is not favored within the county. The plan generally would continue existing uses and maximize mineral development. The Grand County Commission has also endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is in north-central Grand County. The socioeconomic effects of wilderness designation or nondesignation would be spread among communities in Grand County and eastern Emery County, Utah, with some spillover into western Mesa County, Colorado.

Grand County can be characterized as rural and sparsely populated. From 1970 to 1980, the population of Grand County grew from 6,688 to 8,250, an overall increase of about 23 percent. Grand County contains less than 1 percent of the State population of about 1.5 million (Utah Office of Planning and Budget, 1984). Table 9 presents baseline and projected population data for Grand County. It is estimated that between 1980 and 1987, the population decreased to about 7,250. Population projections indicate that the number of people living in Grand County in the year 2010 will be about 8,700 for about a 5 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab and 32 percent lives in Spanish Valley, which is adjacent to and southeast of Moab (USDC, Bureau of the Census, 1981). The land in Grand County comprises about 4.5 percent of the State, or about 3,615 square miles.

Table 9
Baseline and Projected Population and Employment Growth
Grand and Emery Counties

	1980	1990	2000	2010
Grand County				
Population	8,250	7,000	7,000	8,700
Employment	3,702	2,900	3,100	3,900
Emery County				
Population	11,600	12,000	11,900	14,000
Employment	5,480	4,900	5,500	6,700

Source: Utah Office of Planning and Budget, 1987.

From 1970 to 1980 the population of Emery County grew from 5,140 to 11,600, an overall increase of about 126 percent. Most of the increase was related to construction of coal-fired power plants in the western portion of the county. It is estimated that between 1980 and 1987, population increased to about 11,800. Population projections for the county indicate that the number of people living in Emery County in the year 2010 will be approximately 14,000 for about a 21 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987). Most of the Emery County population is concentrated in a series of small communities in Castle Valley, which extends through the northwestern part of the county. There are two service centers in the northwestern part of Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316) (USDC, Bureau of the Census, 1981). The town of Green River is located in the eastern part of the county and had a 1980 population of 1,282. Green River is isolated from the western part of Emery County by the San Rafael Swell.

Mesa County had a 1981 population of 87,100. The Grand Valley area, which is in the midwestern part of Mesa County, contains 83 percent of the county's

population. Grand Junction (1980 population of 28,194) serves as a major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981).

The communities nearest to the WSA are Thompson (population 200), about 30 miles southwest, and Cisco (population 45), about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado, is about 40 miles east of the Harley Dome exit on I-70, and Green River and Moab, Utah, are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

- Employment

Table 9 shows the baseline and projected total employment for Grand County to the year 2010.

Emery and Grand Counties are part of the Southeast MCD. Table 10 shows the baseline (1980) and projected employment by source for MCD to the year 2010. In 1980 the leading employment sectors for the Southeast MCD were mining (28 percent), government (18 percent), trade (15 percent), and services (8 percent).

Table 10
Southeast Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,203	1,100	1,100	1,100
Mining	6,368	3,500	4,500	5,700
Construction	1,360	700	900	1,100
Manufacturing	551	600	700	800
Transportation, Utilities	1,563	1,800	2,000	2,200
Trade	3,289	3,600	4,000	4,800
Finance, Insurance, Real Estate	424	400	400	500
Services	2,067	3,200	4,000	5,300
Government	3,994	4,100	3,800	4,400
Nonfarm Proprietors	1,715	2,000	2,200	2,800
Totals	22,534	21,000	23,600	28,700

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Carbon, Emery, Grand, and San Juan Counties.

It is projected that by the year 2010, employment in the MCD will increase by 27 percent, services will increase to 18 percent, and trade to 17 percent of the total, while government will decline to 15 percent and mining to 20 percent of the total MCD employment. Agriculture currently represents about 5 percent of all employment and is projected to be about 4 percent in the year 2010 (Utah Office of Planning and Budget, 1984).

Green River (population 1,048) in Emery County on the Grand County line is basically a tourism and farming community because of its location at the crossroads of U.S. Highway 6 and I-70. The mining and government sectors are also major employers in the area.

In Colorado, Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the recent decrease in oil shale activities, the local economy still shows some signs of growth.

- Sales and Revenues

Economic-related activities in the WSA include livestock production, mining, and recreation. Table 11 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

Table 11
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Mining Claim Assessment	$1,500	None
Oil and Gas Leases	0	0
Livestock Grazing	$10,900	$840
Recreational Use	$1,500,000	$32,217
Total	$1,512,400	$33,057

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has 15 mining claims. Regulations require a $100 annual expenditure per claim for labor and improvements. No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Five livestock operators have a total grazing privilege of 545 AUMs within the WSA. If all this forage were utilized, it would account for $10,900 of livestock sales and $2,725 of ranchers' returns to labor and investment.

Current use of the Colorado River through Westwater Canyon is a significant source of income for several individual sectors, particularly river outfitters. There are nine local and 10 non-local commercial

operators that boat Westwater Canyon. River operators based in Moab, Green River, and Grand Junction offer commercial river trips, and private users buy supplies in these towns. Particularly for Moab and Green River, sales from tourism provide an export industry that has seen steady growth. River outfitters provide a fairly stable (although seasonal) source of local employment and income. Commercial boating use and other recreational use directly accounts for an estimated $1.5 million in local sales. Refer to Table 11. The 10 non-local outfitter operations contribute less to the local economy than do the nine local outfitters. Economic effects are concentrated in (1) certain communities such as Green River, which has a employment work force of 238; and (2) certain industrial sectors such as retail and service businesses. Therefore, expenditures related to boating use of the WSA are significant to a number of local businesses.

Land-based recreation use of the WSA is low.

The WSA generates revenues to the Federal Treasury from two sources: grazing fees and recreation use permits. Based on 545 AUMs of forage consumed by livestock in the WSA and a $1.54 per AUM grazing fee, the WSA annually accounts for $840 of grazing fee revenues to the Treasury. One-half of this is allocated back to the local BLM district for the construction of range improvement projects.

Commercial recreation permits generate about $15,395 in Federal revenues annually. Private recreation permits provide about an additional $16,822 in Federal Revenues annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Westwater Canyon WSA.

No Action/No Wilderness Alternative

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness with this alternative, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy. Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface disturbing activities (i.e., VRM Class II management on 25,040 acres, management under oil and gas leasing Category 4 [closed to leasing] on 751 acres and oil and gas leasing Category 3 [no surface occupancy] on 14,043 acres, ORV limitations on 13,590 acres, and withdrawal from mining claim location on 4,160 acres).

In the foreseeable future, disturbance of approximately 500 acres would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Most special features including, geologic features, endangered and sensitive species, historical and archaeological values, wild and scenic values of the Colorado River, and wildlife associated with wilderness, would not be significantly affected because the direct disturbance would involve only about 1.6 percent of the WSA and would generally not be located where the special features are located. In addition, appropriate measures would be taken to protect endangered and sensitive species prior to any surface-disturbing activity. About 50 acres of Class A scenery would be directly disturbed and reduced in quality. The proposed vegetation treatment may benefit wildlife special features associated with wilderness because of increased forage. Refer to the Wildlife and Vegetation Including Special Status Species sections for more information.

During the period of activity, the visual and audible disturbance from the vegetation treatment would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also on adjacent portions of the WSA. As much as 4 percent (1,246 acres) of the WSA could be so affected in the foreseeable future. The areas that would be affected do not have outstanding opportunities for solitude or primitive recreation.

Because future vehicular use would generally be limited by rugged terrain and management constraints to 22.5 miles of existing vehicular ways, no additional disturbance from ORV activity is anticipated in the future. The continued and increased use of existing ways would occasionally detract from opportunities for solitude and primitive recreation.

The increased visitor use that would occur over time would not be expected to significantly reduce the quality of wilderness values because the additional use would be largely primitive in nature, and river use would be controlled.

The degree to which disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness mangement and loss would occur as intrusions increase. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 500 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to about 1,246 acres of the WSA. Class A scenery would be reduced in quality on about 50 of the acres that would be disturbed and in surrounding areas.

• Impacts on Vegetation Including Special Status Species

The anticipated maximum disturbance of 500 acres would likely not significantly alter the WSA's vegetation. The 500-acre burning and seeding project would occur in the pinyon-juniper woodland and sagebrush vegetation types and would affect only 1.6 percent of the WSA. A grass-shrub vegetation type would dominate the disturbed areas. Over time, these areas would revert back to original vegetation types unless they were treated again. The riparian vegetation type would not be disturbed.

One endemic plant species is found within or near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas. If any special status species could be affected, BLM would consult with FWS as required (refer to Appendix 4 in Volume I). Because necessary measures would be taken to protect all special status species, the viability of populations of threatened, endangered, or other special status plant species would be preserved with the No Action/ No Wilderness Alternative.

Conclusion: Vegetation types would be altered on 6 percent (500 acres) of the WSA. Threatened, endangered, or other special status species would not be significantly affected.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Disturbance of an estimated 500 acres from the proposed burning and seeding project would disrupt wildlife on 1.6 percent of the WSA. Wildlife disturbance and habitat loss would be short term while work was ongoing. Over the long term, habitat for some species would be enhanced. The river corridor is temporarily withdrawn from mineral entry, eliminating 4,160 acres from any potential surface disturbance from mining. The 13 miles of river corridor are considered critical habitat for three endangered and one potentially threatened or endangered fish species and is important habitat for two endangered bird species. The corridor area would be protected unless the temporary segregation/with-drawal were lifted. Prior to surface disturbance activities, BLM would require site-specific clearances of potentially disturbed areas. If any threatened or endangered species are located in the area could be affected, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Because necessary measures would be taken to protect these animals species, the viability of populations of any endangered or other special status animal or fish species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Implementation of the 500-acre burning and seeding project would disturb 1.6 percent of the habitat in the WSA. Some wildlife species would benefit from additional forage and ecotones. Threatened, endangered, or other special status species would not be significantly affected. Ferruginous hawk habitat would be improved.

• Impacts on Livestock Management

Domestic livestock grazing levels and management practices would not be affected. The estimated 545 AUMs currently allocated in the WSA are controlled by five livestock permittees. Existing range facilities (three reservoirs and several short-gap fences) could be maintained by mechanical methods. Access to 3 to 4 miles of ways used to manage livestock in the WSA, would not be affected. A planned 500-acre burning and seeding project would be implemented to produce an additional 63 AUMs.

Conclusion: Livestock grazing levels and management practices would not be affected. Five-hundred acres would be burned and seeded to produce an additional 63 AUMs.

• Impacts on Recreation

About 17,570 acres would remain open for vehicular use in accordance with the RMP. ORV use would be limited to existing roads and trails on about 5,510

acres. About 8,080 acres would be closed to ORV use. The limited use and closed areas are adjacent to the Colorado River. Approximately 2 miles of vehicular way to Miner's Cabin would be closed. Vehicle use could continue on about 20.5 miles of existing ways.

Up to 500 acres could be disturbed by the burning and seeding project. The burning and seeding project would slightly reduce the quality of sightseeing and other primitive recreation opportunities.

River recreation visitor use would not exceed 14,000 visitor days. Although the wild and scenic values of the Colorado River would not receive additional protection, no loss of recreational opportunities is anticipated. Other types of recreation use (i.e., fishing, hunting, ORV use) would be expected to increase in relation to State population increases. Based on a review of several projections (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Jungst, 1978; Cordell and Hendee, 1982; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year to the year 2020. Based on this projection, annual land-based recreation in the WSA would increase from the current estimated 470 annual visitor days to be between 980 and 2,820 annual visitor days by the year 2020. Only 13 percent of the land-based recreation would involve ORV use.

Conclusion: Recreational use of the Colorado River would be controlled by BLM and would continue at about 14,000 visitor days per year. Annual land-based recreational use in the WSA would increase from the present 470 visitor days to be between 980 and 2,820 visitor days by the year 2020. About 13 percent of the land-based recreation use would involve vehicle access on about 20.5 miles of existing ways.

- Impacts on Local Economic Conditions

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. The probability of economic development of minerals within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials) and no development is projected.

There would be no livestock-related economic losses because the existing grazing use (545 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The 500-acre burning and seeding project that would produce 63 AUMs of new allocated forage could lead to $1,260 of livestock sales, including $315 of ranchers' returns to labor and investment.

As discussed in the Recreation section, water-based recreation use in Westwater Canyon would be controlled and would remain at about 14,000 visitor days per year. Personal income and sales related to river recreation would continue to average approximately $1,500,000 annually while providing about 110 seasonal jobs. Land-based recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 to 7 percent per year over the next 30 years. Because land-based recreational use in the area is estimated to increase to be between 980 2,820 visitor days per year at the end of 30 years, and because overall recreation-related local expenditures average $4.10 per visitor day, land-based recreation-related expenditures attributable to the WSA could contribute up to $11,562 annually to the local economy by the year 2020.

Federal and State revenues would not be reduced by this alternative. Commercial recreation river use would continue to provide $32,217 in Federal fees. There are 30,409 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to $60,818 in Federal lease fee revenues per year. Half of these monies would be allocated to the State, a portion of which could reach the local economy. These potential lease fees would probably not be sustained over the long term because the probability of oil and gas development in the WSA is very low due to unfavorable geologic conditions. Collection of livestock grazing fees ($840 per year) would continue. The additional 63 AUMs that would be produced by the burning and seeding project and allocated to livestock under this alternative would increase Federal revenues by $106 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

Conclusion: Present economic conditions would not be affected. Recreation-related sales including commercial river based recreation could contribute up to $1,511,562 annually to the local economy by the year 2020. The WSA could contribute up to $12,100 annually in local livestock sales and $932 in Federal grazing fees. Although unlikely, oil and gas leasing revenues could contribute up to $60,818 per year in

Federal and State revenues. Federal fees collected from private and commercial river use would continue to be about $32,217 annually.

All Wilderness Alternative (31,160 Acres)

- Impacts on Wilderness Values

Designation and management of all 31,160 acres as wilderness would preserve the wilderness values in the Westwater WSA. The potential for surface-disturbing activities would be eliminated through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I, which allows for only natural ecological change. Naturalness would be preserved on all 31,160 acres. Solitude would be preserved on approximately 20,600 acres that meet and 10,560 acres that do not meet the standards for outstanding opportunities. Primitive and unconfined recreation would be preserved on approximately 7,760 acres that meet and 23,400 acres that do not meet the standards for outstanding opportunities. Resources considered as special features in the WSA, including all Class A scenery, geologic features, endangered and sensitive species, wildlife associated with wilderness, historical and archaeological values, and the wild and scenic values of the Colorado River corridor, would also be preserved.

With this alternative, no loss of wilderness values would occur. Vehicular use of existing ways would cease with ORV closure, improving opportunities for solitude and primitive recreation. Increased visitor use that would occur with time would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would preserve the wilderness values in the WSA.

- Impacts on Vegetation Including Special Status Species

The 500-acre surface disturbance caused by the proposed prescribed burn and seeding would not occur with this alternative. No other surface disturbance activities are projected. The one sensitive plant species that may be located in the WSA would receive an additional level of protection with this alternative.

Conclusion: Vegetation types and special status species would be preserved with this alternative.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, wildlife would not benefit from 500 acres of proposed burning and seeding project because this project would be prohibited to protect wilderness values. No specific wildlife facilities or vegetation treatments have been proposed for this WSA. Approximately 4,160 acres along the river (13 miles in length) are considered critical or important habitat as discussed in the No Action/No Wilderness Alternative. Wilderness designation would ensure additional protection of this segment of river from disturbance that could affect threatened or endangered or special status animal species.

Conclusion: None of the wildlife habitat in the WSA would be disturbed. Wilderness designation would preclude the proposed burning and seeding project and the potential wildlife benefits from additional forage and ecotones would be foregone. Most wildlife species would benefit from provision of solitude and elimination of ORV use and surface-disturbance. Threatened, endangered and other special status species would be preserved.

- Impacts on Livestock Management

Present domestic livestock grazing would continue as authorized in the Grand RMP. The estimated 545 AUMs currently allocated in the WSA would remain available for livestock. Existing developments (three stock reservoirs and several short-gap fences) would be used and maintained in the same manner as the past, based on practical necessity and reasonableness. The 500-acre burning and seeding project that would result in an increase of 63 AUMs would not be allowed.

Three to four miles of ways are used by permittees for livestock management during the grazing season. Restrictions on vehicle use on these ways would be an inconvenience to the permittees who manage livestock in the WSA. An increase in costs and time to manage livestock inside the WSA would adversely affect the five permittees. Predator control affects the permittees in three of the five allotments. Approximately 70 percent of past predator control has been done with cyanide guns (M-44s), which are prohibited in wilderness areas. The prohibition of this control method may reduce the effectiveness of predator control in the three allotments and result in slight increases in loss of livestock and costs of management.

Conclusion: Restrictions on access and predator control would increase the time and costs required for livestock management in the WSA for five livestock permittees. An estimated additional 63 AUMs of forage production would be foregone.

- Impacts on Recreation

The quality of the primitive recreational experience in the WSA would be preserved.

River use in Westwater Canyon, which is managed according to the Westwater Canyon River Management Plan, would not be allowed to increase over carrying capacity levels, identified as about 14,000 visitor days annually. This includes both private and commercial use. Wild and scenic values of this portion of the Colorado River would receive additional protection.

As discussed for the No Action/No Wilderness Alternative, it is estimated that land-based recreational use of the WSA will increase by 2 to 7 percent per year over the next 30 years in relation to population increases and current trends of recreational use. At these rates, annual primitive land-based recreational use would increase from the present 410 annual visitor days to be between 855 and 2,260 annual visitor days by the year 2020. Management provided through a Wilderness Management Plan would control destructive increases in future recreation use, and the quality of the primitive recreation experience would not be negatively affected by increased use. The 60 visitor days of ORV play activity in the WSA that could occur without designation would be eliminated from the WSA. Hunting access would be more restrictive because the 22.5 miles of ways currently available for use would be closed. Because there are other suitable ORV play areas in the vicinity of the WSA and because the WSA is not a destination area for ORV play, ORV use would probably not experience an overall decline in the vicinity of the WSA.

Conclusion: River-based recreation on the Colorado River in the WSA would continue at about 14,000 visitor days per year because use is near maximum levels and would be controlled by BLM. The wild and scenic values of this portion of the Colorado River would receive additional protection. Land-based primitive recreation in the WSA is expected to increase to be between 855 and 2,260 annual visitor days by the year 2020. The present 60 visitor days of ORV use and the potential for increases in ORV use would be eliminated. ORV use would not decline on a regional basis.

- Impacts on Local Economic Conditions

Overall, there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 12), as well as loss of potential increases in sales and Federal revenues that could occur with the No Action/No Wilderness Alternative.

Because the potential for mineral development is low, it is estimated that potential mineral-related local sales and income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with $10,900 of livestock sales, including $2,725 of ranchers' return to labor and investment. About 63 AUMs of livestock forage would be foregone, along with $1,260 in annual livestock sales and $315 in ranchers' return to labor investment.

There would be a potential loss of $60,818 annually in Federal revenues from the 30,409 acres that could be leased without designation. However, it should be noted that the likelihood of oil and gas development in the WSA is very low and loss of lease fees would probably be less than the potential amount.

Local sales and employment from river-based recreation would continue at present levels because use of the river is controlled by the BLM and is near maximum carrying capacity. Primitive land-based recreation is expected to increase to be as much as 2,460 visitor days per year by the year 2020. Related local expenditures would average about $4.10 per visitor day for a total annual expenditure of up to about $10,086. Motorized recreational use of the WSA is estimated at 60 visitor days per year. Any decrease in local sales and Federal revenues from loss of motorized recreation would be small and insignificant to both the local economy and individual businesses.

If the proposed range improvements are not developed and used, an estimated $97 of annual Federal

grazing revenues from 63 increased AUMs would be foregone.

Recreation-related Federal revenues would not increase as commercial use of Westwater Canyon is regulated by a management plan and use is already near maximum levels allowed.

Conclusion: Present economic conditions would not be significantly affected. Recreation-related sales, including commercial river-based recreation, could contribute up to $1,510,086 annually to the local economy by the year 2020. The WSA would continue to contribute up to $10,900 annually in local livestock sales and $840 in Federal grazing fees. Potential for $1,260 in livestock sales and $315 in Federal grazing fees would be foregone. Although unlikely, potential annual Federal and State oil and gas leasing revenues of up to $60,818 per year could be foregone.

Partial Wilderness Alternative (Proposed Action) (26,000 Acres)

- Impacts on Wilderness Values

Wilderness designation of 26,000 acres would contribute to preservation of the area's wilderness values. Although disturbance would be the same as identified for the No Action/No wilderness Alternative, this Partial Wilderness Alternative would eliminate any potential for surface-disturbing activities that could impair wilderness values in the designated area, which is 83 percent of the WSA.

Wilderness values would be preserved in the designated area. Protection in this area would include management under VRM Class I (which generally allows for only natural ecological change), ORV closure including closure of 10 miles of ways, and closure to future mineral leasing and location. Naturalness and outstanding opportunities for solitude would be preserved on all 26,000 acres. Primitive recreation (including 7,760 acres that meet and 18,240 acres that do not meet the standards of outstanding), and special features including over 99 percent of the Class A scenery, all the geologic features, and the Colorado River corridor, would be preserved in the designated area. Endangered, threatened, and sensitive species and wildlife associated with wilderness would benefit from the solitude and from the elimination of the potential for surface disturbance and ORV use. Most historical and archaeological values would also receive additional protection.

In the foreseeable future, loss of naturalness and opportunities for solitude and primitive recreation due to surface disturbance from vegetation treatments would occur on 500-acres within the nondesignated portion. Special features would be largely preserved because disturbance would involve only 1.6 percent of the WSA and, except for 50 acres involving Class A scenery, development is not expected in areas where special features are located. In addition, appropriate measures would be taken to protect endangered and sensitive species prior to any surface-disturbing activity, and it can be assumed that no significant negative impact would occur to these species. Wildlife associated with wilderness would benefit from the additional forage. (Refer to the Wildlife and Vegetation Including Special Status Species analyses.)

Sights and sounds from burning and seeding would temporarily reduce opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas including up to 4 percent (1,246 acres) of the WSA. All of this type of impact would be in the nondesignated area and would be in areas not considered to have outstanding opportunities. Elimination of ORV use in the designated area would improve opportunities for solitude and primitive recreation although vehicular use of 12.5 miles of ways in the nondesignated area would continue to detract from these opportunities during the period of activity.

The degree to which disturbance would occur over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur as intrusions increase in the nondesignated area.

Conclusion: Wilderness values would be preserved in the designated area which is approximately 83 percent of the WSA. Naturalness and opportunities for solitude and primitive recreation would be directly lost on 500 acres of the WSA, and opportunities for solitude and primitive recreation would be indirectly and temporarily reduced on up to 1,246 acres of the WSA. Approximately 50 acres of Class A scenery would be directly disturbed. All of these impacts would be in the nondesignated area.

- Impacts on Vegetation Including Special Status Species

With this alternative impacts on vegetation in the designated portion would be similar to those described in the All Wilderness Alternative. No vegetation disturbance is anticipated. The proposed 500-acre

prescribed burn and seeding is located in the non-designated portion of the WSA and could occur with this alternative. Impacts on the non-designated area would be similar to those analyzed in the No Action/ No Wilderness Alternative.

Conclusion: Approximately 500-acres of prescribed burn and seeding would be allowed with this alternative. About 1.6 percent of the vegetation in the WSA would be altered. This would not significantly affect vegetation types or special status plant species.

- Impacts on Wildlife Habitat and Populations Including Special Status Species

With this alternative, impacts on wildlife would be similar to those described for the No Action/No Wilderness Alternative because the proposed 500-acre burning and seeding project could be allowed and would reduce livestock and wildlife competition and improve wildlife habitat over the long term. No surface disturbance from mineral exploration and development would occur in either the designated or nondesignated portions of the WSA. The critical endangered species habitat in the Colorado River would be maintained. overall wildlife would benefit from solitude and additional protection on 83 percent of the WSA.

Conclusion: Implementation of the 500-acre burning and seeding project would disturb 1.6 percent of the wildlife habitat in the WSA. Some wildlife species would benefit from additional forage and ecotones. Vegetation types and special status species would receive additional protection on 83 percent of the WSA.

- Impacts on Livestock Management

Livestock grazing levels would not be affected in either the designated or nondesignated areas. Of the estimated 545 AUMs in the WSA, 520 would continue to be used in the designated area and 25 would be used in the nondesignated area. Impacts on access for livestock management and predator control would be about the same as with the All Wilderness Alternative because access would be placed on methods of predator control on 83 percent of the WSA. An estimated 63 AUMs of additional forage could be produced because 500 acres would be burned and seeded in the nondesignated area.

Conclusion: Restrictions on access and predator control would increase the time and costs required for livestock management in the WSA for five livestock permittees. An estimated additional 63 AUMs of forage could be produced.

- Impacts on Recreation

River use (both commercial and noncommercial) would continue as described for the All Wilderness and No Action/No Wilderness Alternatives. Use would not exceed carrying capacity which is about 14,000 visitor days annually as directed by the river management plan. The river corridor would be within the designated area and would receive additional protection.

The entire 26,000 acres designated as wilderness would be closed to recreational ORV use. About 10 miles of trails and traveled ways would be closed as compared to 22.5 miles under the All Wilderness Alternative. Closure of 10 miles of ways could initially reduce vehicular use (currently 60 visitor days per year), in the WSA by approximately 50 percent. Regional ORV use would not be significantly affected. Overall, land-based recreational use in the WSA is projected to increase by between 2 and 7 percent per year. Therefore, annual land-based visitation would be expected to be between 917 and 2,640 visitor days per year by the year 2020.

Primitive recreation values within the designated portion would be protected as described under the All Wilderness Alternative.

Conclusion: River-based recreation use would remain constant. The wild and scenic values of the portion of the Colorado River that flows through the WSA would be in the designated area and would receive additional protection. Approximately 30 visitor days of present ORV use would be precluded initially. This would not significantly reduce ORV use on a regional basis. Overall, land-based recreation would increase to be between 917 and 2,640 visitor days per year by the year 2020.

- Impacts on Local Economic Conditions

Overall, there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local sales and Federal revenues currently provided by resource uses in the WSA (refer to Table 12) as well as loss of potential increases in

income and Federal revenues that could occur with the No Action/No Wilderness Alternative.

Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action/No Wilderness Alternative. Potential mineral-related local income would not be significantly reduced by wilderness designation because the potential for mineral development is low even is part of the area is not designated wilderness. However, any local sales and income related to assessment of future mining claims in the designated section of the WSA would be lost.

Livestock use and ranchers' income would continue as at present with $10,900 of livestock sales, including $2,725 of ranchers' return to labor and investment. Five hundred acres of burning and seeding have been proposed for the nondesignated portion of the WSA and would be allowed with this alternative, resulting in an increase of 63 AUMs and an additional $1,260 in annual local livestock sales and $315 in ranchers' returns to labor and investment.

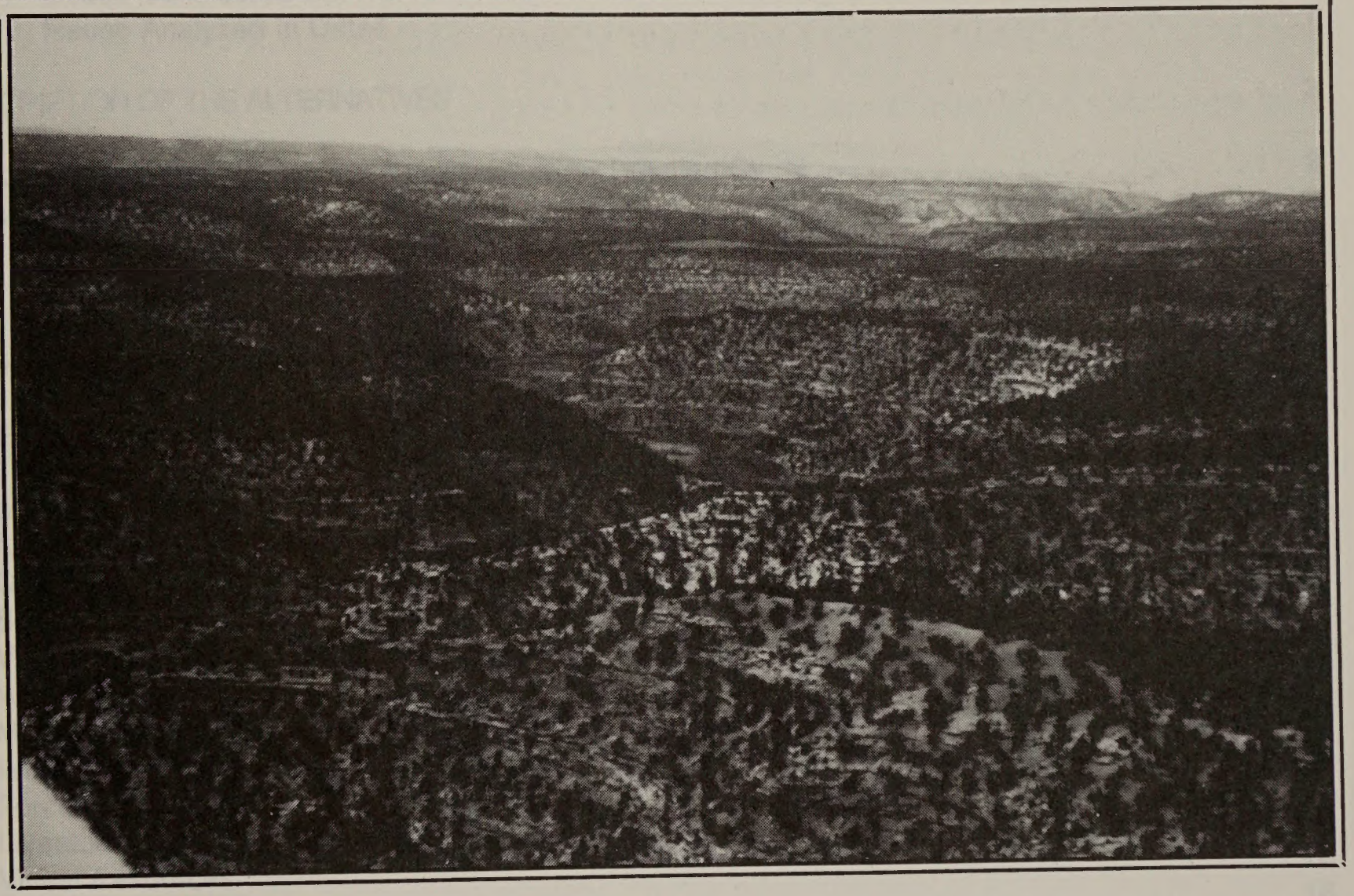
Local sales and employment from river-based recreation would continue at about present levels (currently about $1,500,00 in local sales annually), because use of the river is controlled by the BLM and is near carrying capacity. Land-based recreation is expected to increase to be as much as 2,640 visitor days per year by the year 2020. Related local expenditures would average about $4.10 per visitor day for an annual expenditure of about $10,824. Motorized recreational use of the WSA (currently 60 annual visitor days), would initially decrease by about 50 percent. Any decrease in local sales and Federal revenues from loss of motorized recreation would be small and insignificant to both the local economy and individual businesses.

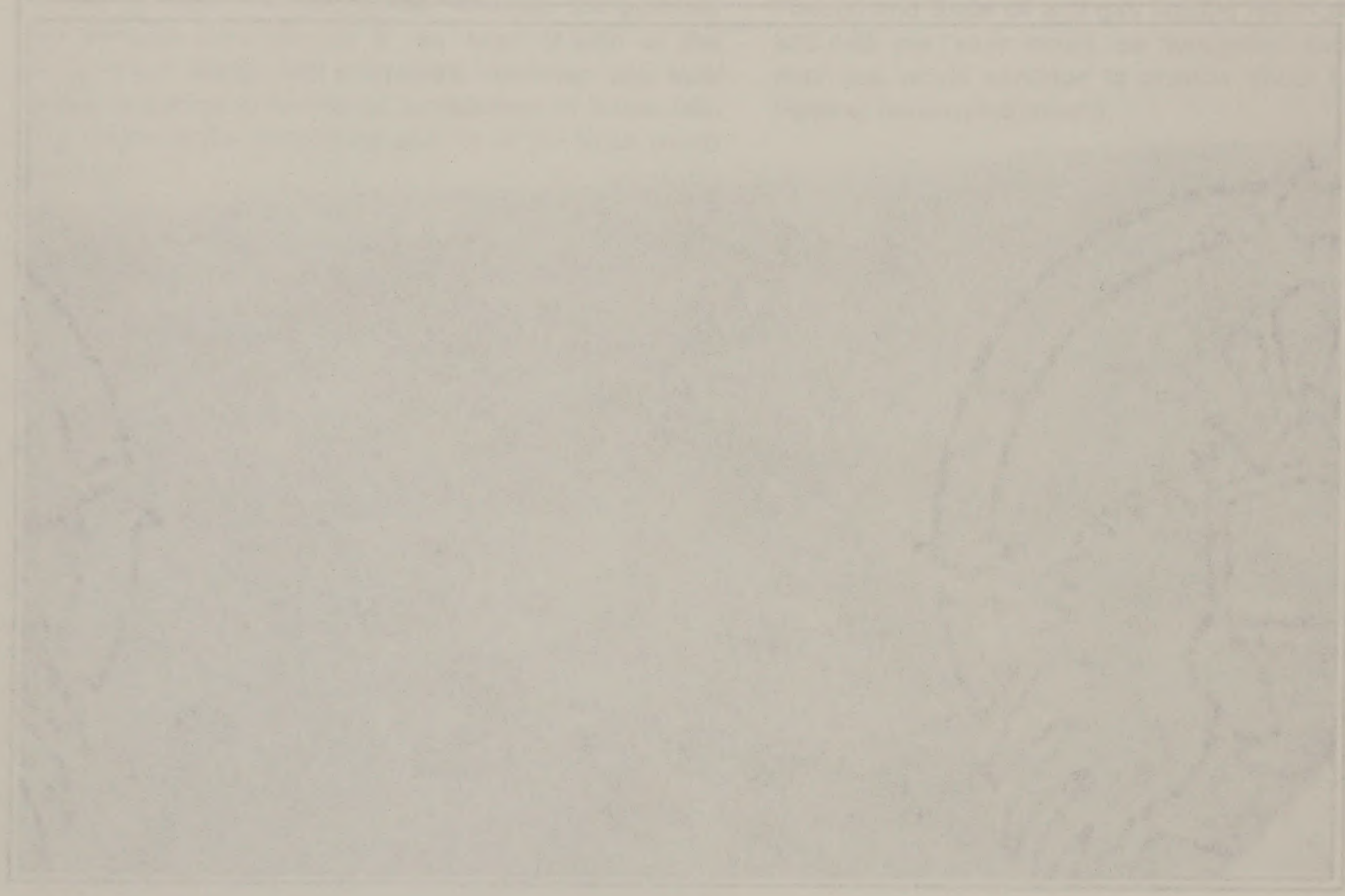
There would be a potential loss of $50,478 in annual Federal oil and gas lease fees from the 25,249 acres in the designated part that could be leased without designation. Approximately $10,320 of potential annual Federal oil and gas lease fees from the 5,160 acres not designated could be collected. The potential losses and receipts from lease fees is low because the probability of mineral development is low.

Recreation-related Federal revenues would remain essentially as at present (about $32,217 annually) because commercial water-based use of the canyon is regulated by a river management plan and use is near maximum levels.

Conclusion: Economic trends and conditions would not be significantly affected. Recreation related sales, including commercial river-based recreation, could contribute up to $1,510,824 annually to the local economy by the year 2020. The WSA could contribute up to $12,100 annually in local livestock sales and $932 in Federal and State oil and gas leasing revenues of up to $50,498 per year could be foregone. Recreational river use would continue to provide about $32,217 in Federal revenues annually.

Winter Ridge WSA





WINTER RIDGE WSA

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WINTER RIDGE WSA

(UT-080-730)

INTRODUCTION

General Description of the Area

The Winter Ridge WSA consists of 42,462 acres of public land in the Book Cliffs Mountains in southern Uintah County, Utah. The Winter Ridge WSA is about 60 miles due south from the community of Vernal, Utah. Major features include Winter Ridge and Main Canyon.

Elevations range between 5,700 and 7,600 feet. The climate of the region is semi-arid to arid. Because of the typically dry atmosphere, bright, sunny days and clear nights frequently occur. Temperatures range from 97 degrees Fahrenheit (F) in the summer to as low as -15 degrees F in December and January. Precipitation averages 12.5 inches.

There are four sections of State land (2,561.4 acres) within the WSA. There are no private or split-estate lands.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

The anticipated surface disturbance presented in the Draft EIS (6,132 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been revised to focus on activities projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance estimates from the 6,132 acres reported in the Draft EIS to 2,844 acres of surface disturbance for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration for this WSA in the Introduction to Volume VI (i.e., water rights and land use plans and policies) the issues of impacts on forest resources and wild horses were considered and eliminated from detailed study for the following reasons:

1. Forest Resources: There are potentially large volumes of firewood and fence posts in the WSA. However, there is generally limited access and demand for these products is low. Therefore, impacts on forest resources are not analyzed in detail for the Winter Ridge WSA.

2. Wild Horses: A herd of about five wild horses utilized portions of the Winter Ridge WSA. As per the decisions in the BLM Book Cliffs RMP (USDI, BLM, 1984e), this herd of horses will eventually be removed from the area. Therefore, impacts on wild horses are not addressed in the Final EIS.

3. Visual Resources: The WSA contains no areas of high visual sensitivity or high visual quality. Impacts on visual resources are described in the Wilderness Values section.

- Issues Analyzed in Detail

Over the short term, BLM projects 879 acres of surface disturbance related to oil and gas exploration and development, access to in-held State lands, and rangeland developments. This level of activity (disturbance of 2.1 percent of the WSA) would not significantly affect surface resources. However, there is the potential for development of a known tar sand resource in the long term which could result in disturbance of an additional 1,965 acres. Tar sand development would create extensive surface disturbance in the eastern portions of the WSA that would significantly affect most surface resources and values. Significant issues for the Winter Ridge WSA are:

1. Impacts on the wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

STATEWIDE
POCKET MAP
WSA
NO. 73
SEE VOL.I

2. Impacts on air quality.

3. Impacts on geology and topography.

4. Impacts on soils, including increased erosion rates and salinity production.

5. Impacts on vegetation, including special status species.

6. Impacts on water uses for the Green River drainage and on water quality, including salinity in the Colorado River system.

7. Impacts on mineral exploration and production, including oil and gas exploration and potential surface mining of tar sands.

8. Impacts on wildlife habitat and populations including special status species.

9. Impacts on livestock management, particularly vehicular access for management operations and construction of rangeland developments.

10. Impacts on cultural resources.

11. Impacts on recreational use of the WSA.

12. Impacts on local economic conditions.

Comments made during the public comment period for the Draft EIS were not voluminous.

Issues addressed in the public comments include:

1. The potential value of mineral resources in the WSA, particularly oil and gas.

2. Impacts on non-game wildlife.

3. Relatively low wilderness values and importance of land use conflicts.

4. Loss of critical habitat.

5. Alleged interim management violations.

See Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis and Volume VII-C, Section 73, for responses to specific comments about the Winter Ridge WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

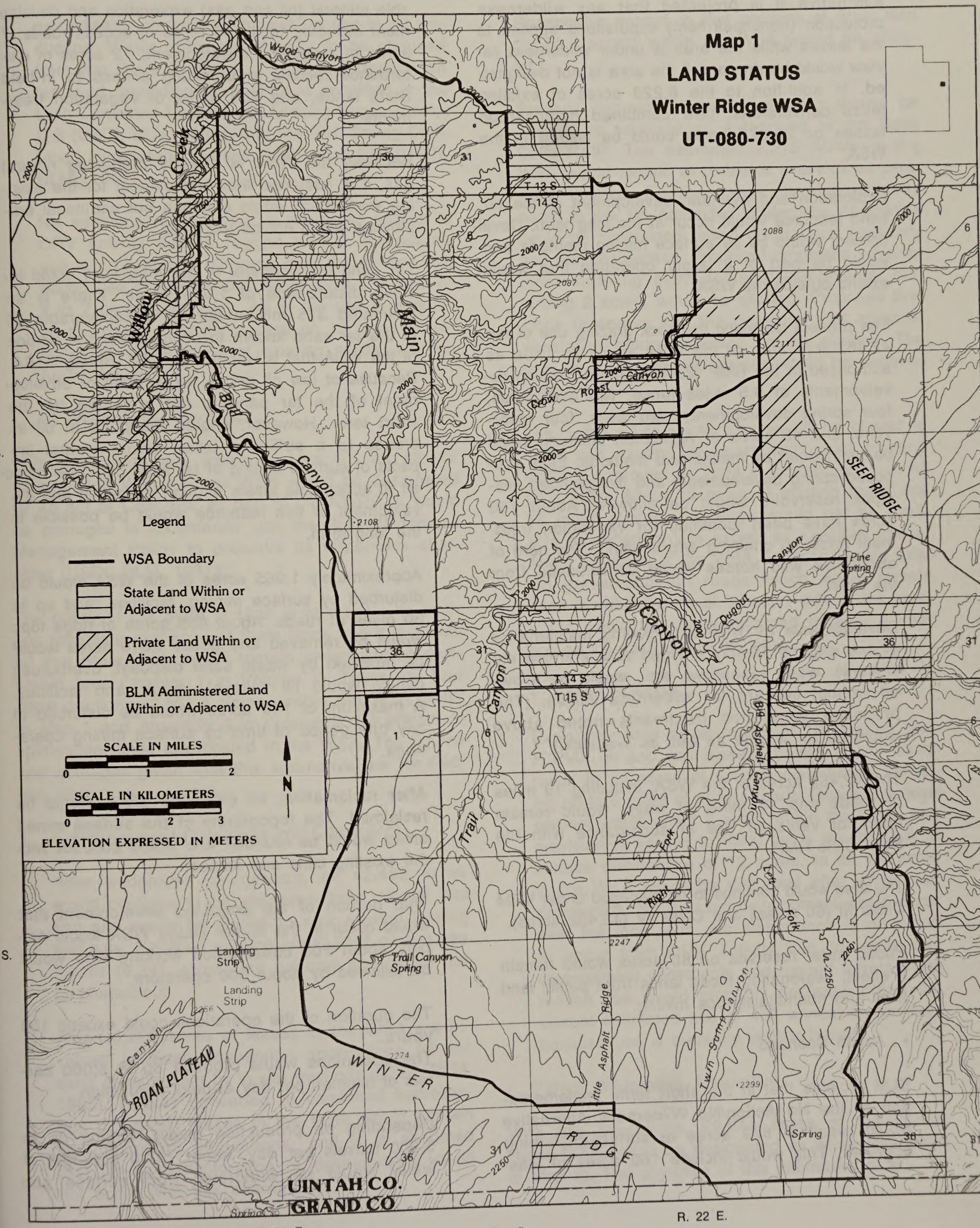
Three alternatives are analyzed for this WSA: (1) No Action/No Wilderness (Proposed Action); (2) All Wilderness (42,462 acres); and (3) Partial Wilderness (28,044 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

- No Action/No Wilderness Alternative (Proposed Action)

With this alternative, none of the 42,462-acre Winter Ridge WSA would be designated by Congress as part of the NWPS (refer to Map 1). Although BLM land use plans are regularly updated, it is assumed that the area would continue to be managed in accordance with the Book Cliffs RMP (USDI, BLM, 1984e). The four sections (2,561.4 acres) of State land within the WSA are ana-lyzed as remaining under State ownership.

- Management Conditions and Constraints

All 42,462 acres would remain closed to mining claim location due to the presence of an oil shale withdrawal which withdraws the area from location of minng claims. Development work, extraction, and patenting would not occur since no mining claims exist and the withdrawal would be continued. The WSA would be open to mineral leasing and mineral sale. Eighteen existing pre-FLPMA oil and gas leases (9,241 acres) and four post-FLPMA leases (1,525 acres) and new leases could be developed under leasing Category 1 (standard stipulations) on about 25,314 acres, Category 2 (standard and special stipulations) on about 17,068 acres, and Category 3 (no surface occupancy) on 80 acres. About 35,300 acres of the Winter Ridge WSA are part of the P.R. Spring STSA. Of this total, some 6,228 acres of existing oil and gas leases are involved in lease conversion applications for combined hydrocarbon (tar sand) development (USDI, BLM, 1985). With this


Map 1
LAND STATUS
Winter Ridge WSA
UT-080-730
Legend
WSA Boundary
State Land Within or Adjacent to WSA
Private Land Within or Adjacent to WSA
BLM Administered Land Within or Adjacent to WSA
SCALE IN MILES
0 1 2
SCALE IN KILOMETERS
0 1 2 3
N
ELEVATION EXPRESSED IN METERS
Wood Canyon
Willow Creek
Bull Canyon
Main Trail
Crow Roost Canyon
SEEP RIDGE
Pine Spring Canyon
Dugout Canyon
Big Asphalt Canyon
Trail Canyon
Trail Canyon Spring
Landing Strip
Landing Strip
V Canyon
ROAN PLATEAU
WINTER RIDGE
Little Asphalt Ridge
Left Fork
Right Fork
Iwun Sump Canyon
Spring
T 13 S
T 14 S
T 15 S
T. 14 S.
T. 15 S.
R. 21 E.
R. 22 E.
UINTAH CO.
GRAND CO

alternative it is projected that any wilderness protection (nonimpairment) stipulations applied to the leases while the area is under wilderness review would be dropped if the area is not designated. In addi-tion to the 6,228 acres of existing lease conversions, new combined hydrocarbon leases on 29,072 acres could be issued in the WSA.

Exploration and eventual development of the tar sand resource would occur in the long term. Development would be by surface mining methods and would be part of a larger operation that would extend outside the WSA.

The present domestic livestock grazing use of the 42,462-acre area of the WSA would continue as authorized in the RMP (2,215 AUMs). Existing developments of 9.5 miles fence, two exclosures, four spring developments, two wells, four reservoirs, and 45 acres of vegetation chaining could be maintained by mechanical methods. Eight proposed spring developments and five planned livestock reservoirs would be allowed. About 700 acres have been identified for vegetation treatment involving chaining and seeding. The herd of about five wild horses would be removed from the WSA.

Developments for wildlife (including maintenance of one existing 45-acre chained area and one exclosure), water resources, etc., would be allowed without concern for wilderness values. (The proposed vegetation treatments noted above would be for wildlife as well as livestock.)

The 42,462 acres of the WSA, including 19 miles of roads and 13 miles of ways, would remain open for vehicular use in accordance with the Book Cliffs RMP.

The area would continue to be managed under VRM Class III (60 acres) and Class IV (42,402 acres).

Public water reserves on 80 acres would remain if effect, segregating those lands from public land laws and nonmetalliferous mining.

- Action Scenario

BLM projects that in the short term, implementation of the No Action/No Wilderness Alternative would result in 879 acres of surface-disturbing activities. This would include 160 acres of leasable mineral (oil and gas) exploration and development including up to 40 miles of access roads; 7 acres of rangeland development, 12 acres of disturbance related to providing access to in-held State lands, and 700 acres of vegetation treatments.

Because the WSA is already producing natural gas, it is assumed that employment for the existing work force would continue but additional employees would not be required.

Tar sand development in the long term could involve disturbance of 1,965 acres. There is an estimated 375 million barrels of recoverable oil in the tar sand known to occur under the portion of the WSA that is within the P. R. Spring STSA. Because of low oil prices, exploration or development of the tar sand is not projected for the short term. However, should the price of oil increase to a sufficient level, environmental impacts of surface mining of tar sand could be reduced to acceptable levels through mitigation and development of this resource would be possible in the long term.

Approximately 1,965 acres of the WSA would be disturbed by surface mining, facilities, and up to 30 miles of roads. About 655 acres of ridge tops would be removed and about 1,310 acres would be modified by waste sand disposal, overburden (which would fill valleys), roads, and facilities. A maximum of 140 acres would be disturbed at any one period of time by surface mining operations.

After reclamation, all disturbed areas would be reclaimed. The topography of the surface mined areas would be rounded and would contrast with the existing cliffs and slopes.

That portion of the projected development that would occur in the Winter Ridge WSA would employ about 200 construction workers who would be followed by about 300 operators.

The duration of the operations could exceed 100 years.
The operations would produce up to 5,000 barrels of bitumen per day at peak production.

Depending on production levels ranging up to 5,000 barrels per day, about 7,000 acre-feet of water would be withdrawn from surface and

groundwater sources each year for use in oil production. Water rights would have to be obtained from the State Engineer. Further information on tar sand development in Utah is provided in the Utah Combined Hydrocarbon Leasing Regional Final EIS (USDI, BLM, 1984c) and the P.R. Spring Combined Hydrocarbon Lease Conversion EIS (USDI, BLM, 1985).

No additional disturbance is projected related to ORV activity due to rugged terrain. Recreation use is projected to increase over the current estimated use of 435 annual visitor days at a rate of 2 to 7 percent annually. All of the use is projected to involve vehicular access on 13 miles of existing ways, 19 miles of existing roads, and on future roads.

- All Wilderness Alternative

With this alternative (refer to Map 2), all 42,462 acres of the Winter Ridge WSA would be designated by an act of Congress as part of the NWPS. It would be managed in accordance with the BLM Wilderness Management Policy to preserve its wilderness character (USDI, BLM, 1981a).

The policy of the State of Utah is to reserve its position regarding exchange of State lands and it is assumed that State lands would remain under existing ownership (see Chapter 1 in Volume I). There are four State sections (2,561.4 acres) within the WSA (refer to Map 1 and Appendix 3 in Volume I). No private or split-estate lands are located in the WSA. The figures and acreages given with this alternative are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 42,462 acres would continue to be withdrawn from mineral location and would be closed to new mineral leasing and sale. Eighteen existing pre-FLPMA oil and gas leases (9,241 acres) are unitized and would not be phased out.

About 6,228 acres of leases in the WSA are involved in lease conversion applications for tar sand development by in-situ methods (USDI, BLM, 1985). Leases converted to combined hydrocarbon (tar sand) leases in the WSA would contain nonimpairment stipulations, and it is assumed that tar sand exploration or development would not occur with this alternative.

Reasonable access to four sections of State land (2,561.4 acres) within the WSA would be allowed.

Present domestic livestock grazing would be allowed to continue as authorized in the Book Cliffs RMP. The estimated 2,215 AUMs in the WSA would remain available to livestock as presently allotted. Existing range developments as noted in the No Action/No Wilderness Alternative could be maintained based on practical necessity and reasonableness. Proposed rangeland development involving eight spring developments, disturbing 2 acres, would be allowed. Proposed livestock reservoirs and the proposed 700 acres of vegetation treatment would not be allowed. The herd of about five wild horses would be removed from the WSA.

The entire 42,462-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560. About 19 miles of existing roads and 13 miles of vehicular ways would not be available for vehicular use except as indicated above. About 28 miles of the WSA boundary follow existing gravel and dirt roads which would remain open to vehicular travel. About 1 mile of the open roads would be cherry-stemmed through a section on the east side of the WSA.

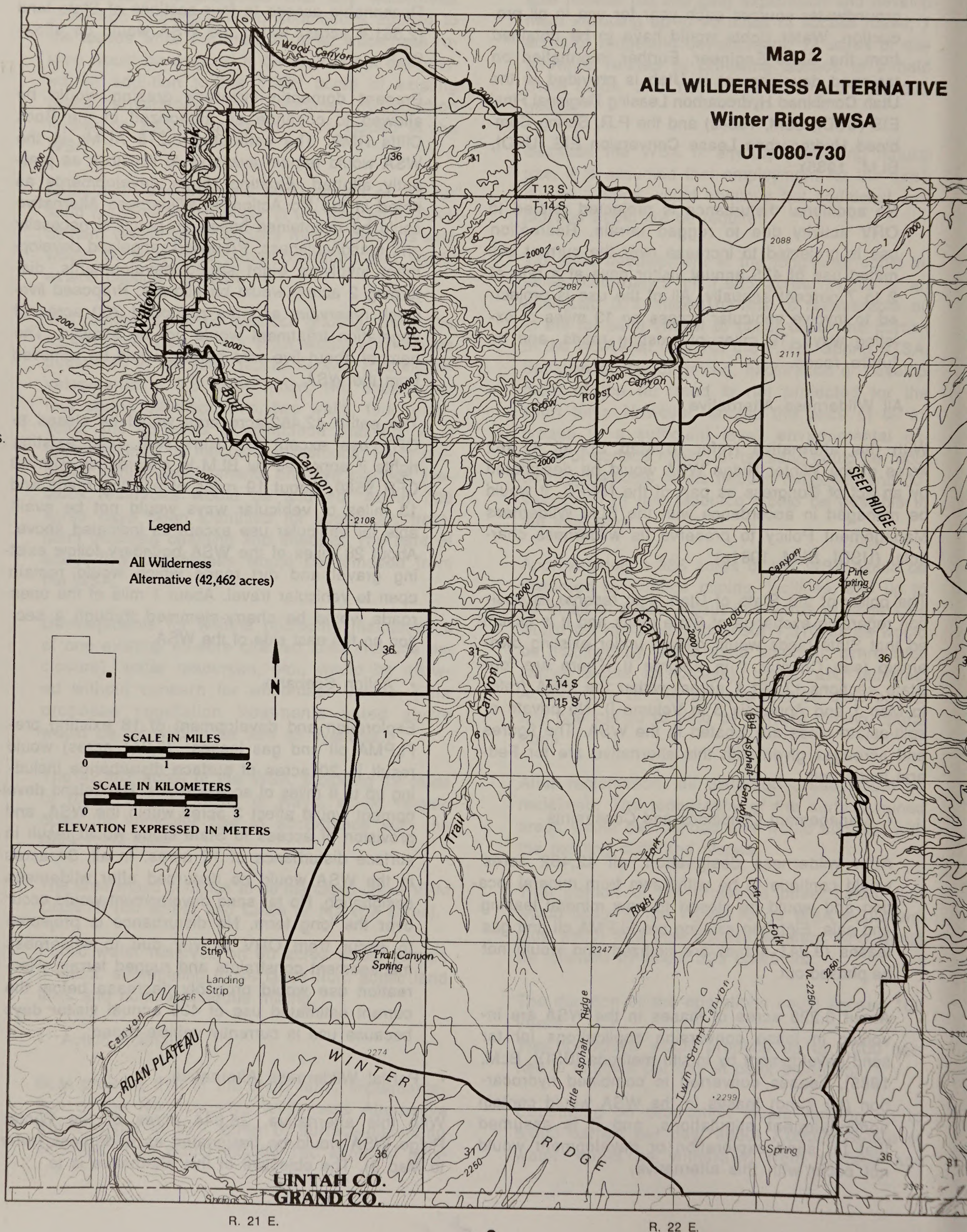
- Action Scenario

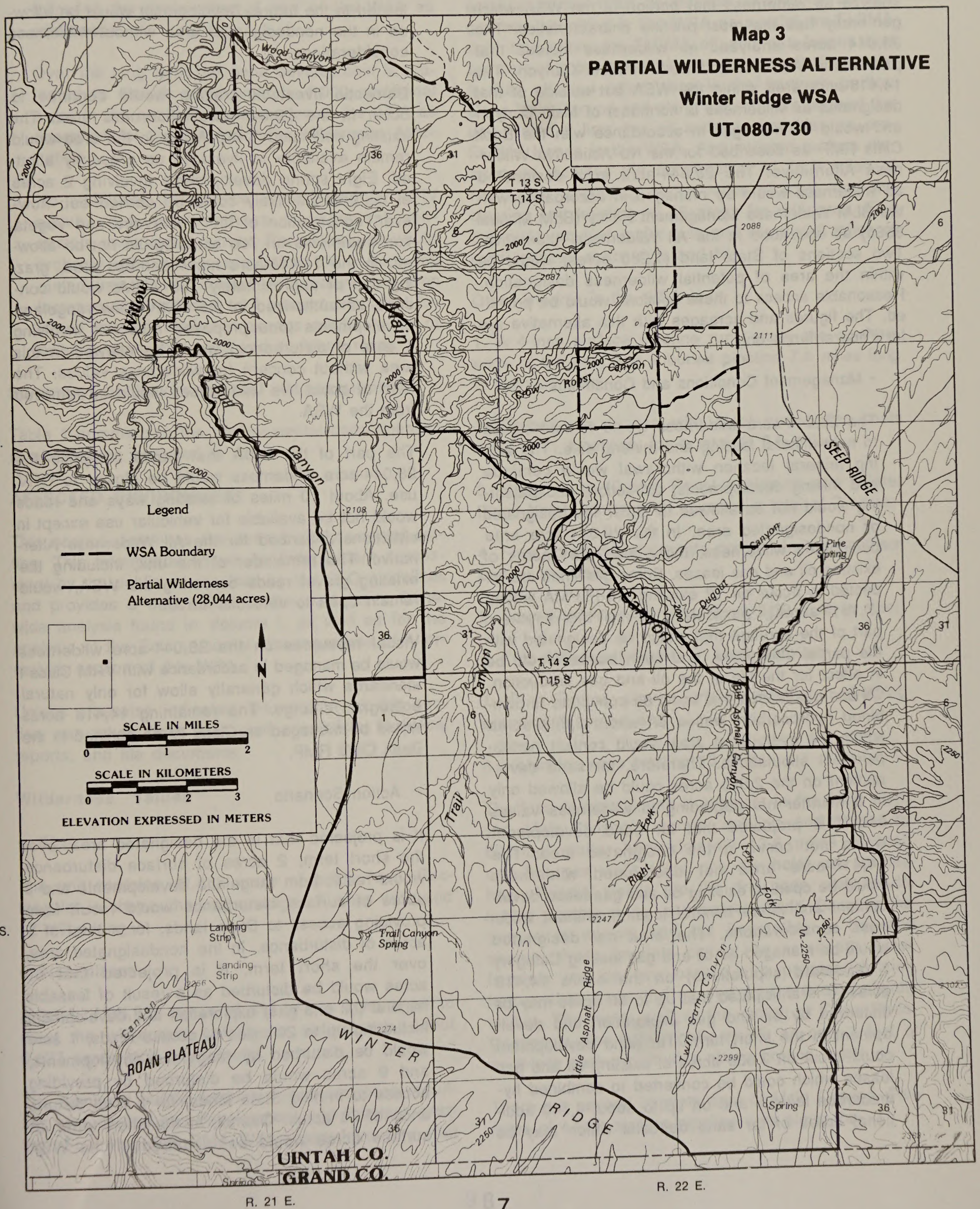
Exploration and development of 18 existing pre-FLPMA oil and gas leases (9,241 acres) would result in 20 acres of surface disturbance including up to 6 miles of access roads. Rangeland development would affect 2 acres within the WSA, and provision of access to State lands would result in surface disturbance of 12 acres. In all, 34 acres in the WSA would be disturbed after wilderness designation. No tar sand development would occur over the long term. No disturbance is projected to occur from ORV activity due to wilderness management constraints and rugged terrain. Recreation use would probably decrease below the current estimated use of 435 annual visitor days because use is currently vehicle-based.

- Partial Wilderness Alternative

With this alternative, 28,044 acres of the Winter Ridge WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to

WINTER RIDGE WSA




Map 3
PARTIAL WILDERNESS ALTERNATIVE
Winter Ridge WSA
UT-080-730
Legend
WSA Boundary
Partial Wilderness Alternative (28,044 acres)
N
SCALE IN MILES
0 1 2
SCALE IN KILOMETERS
0 1 2 3
ELEVATION EXPRESSED IN METERS
T. 14 S.
T. 15 S.
R. 21 E.
R. 22 E.
Wood Canyon
Willow Creek
Bull Canyon
Main
Crow Roost Canyon
SEEP RIDGE
Pine Spring Canyon
Dugout
Big Asphalt Canyon
Trail Canyon
Left Fork
Right Fork
Trail Canyon Spring
Landing Strip
Landing Strip
V Canyon
ROAN PLATEAU
WINTER RIDGE
Little Asphalt Ridge
Twin Sprng Canyon
Spring
UINTAH CO.
GRAND CO.
T 13 S
T 14 S
T 15 S
36
31
1
6
2000
2088
2087
2111
2108
2247
2250
2274
2299

analyze as wilderness that portion of the WSA which gen-erally has the most pristine characteristics. The 28,044 acres analyzed as wilderness include that part of the WSA located west of Main Canyon. The 14,418-acre area within the WSA but outside of that designated as wilderness is northeast of Main Canyon and would be managed in accordance with the Book Cliffs RMP as described for the No Action/No Wilderness Alternative. The 28,044-acre area designated as wilderness would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) as described in the All Wilderness Alternative. Two sections of State land (1,280 acres) would be within the area of potential wilderness designation. Reasonable access to these sections would be provided. The figures and acreages with this alternative are for Federal lands only.

• Management Conditions and Constraints

The 28,044-acre wilderness would remain closed to new mineral leasing and mineral sale. The existing mineral location withdrawal would continue and mining developments, extraction, and patenting would not be allowed in either the designated or nondesignated area. In the 28,044-acre area designated wilderness, there are 7,491 acres of existing oil and gas leases. Some gas finds are expected to occur on 12 existing pre-FLPMA leases (7,181 acres), particularly along the southern part of the acreage that would be designated with the partial alternative, and such leases would be in effect for the life of the oil and gas production. Oil and gas leases that could be converted to combined hydrocarbon leases on about 2,628 acres within the designated area would contain nonimpairment stipulations. Therefore, tar sand development on the 2,628 acres could be allowed only in a manner not degrading to wilderness values and it is projected that tar sand development would not occur in the designated area. The 14,418-acre area not designated wilderness would be open to existing oil and gas lease development and future mineral leasing, without wilderness considerations. The area not designated would be managed as oil and gas leasing Category 1 (standard stipulations) on the entire 14,418 acres. It is anticipated that up to 60 acres may be disturbed by oil and gas exploration and development in the short term. Tar sand development could occur on 3,600 acres of existing oil and gas leases which could be converted to combined hydrocarbon leases, and on up to about 4,740 additional acres of tar sand deposits which may be leased in the future. Development would be allowed in the nondesignated area without wilderness considerations.

Domestic livestock grazing would continue to occur in the 28,044-acre wilderness area. The existing estimated 1,460 AUMs in the area would remain available to livestock as presently allotted. Eight spring developments involving 2 acres of disturbance likely could be carried out; however, construction of four reservoirs and vegetation treatments on 700 acres would not be allowed. In the 14,418-acre nonwilderness area, grazing use of approximately 755 AUMs would continue as authorized in the RMP. New rangeland developments (one proposed reservoir involving 1 acre of disturbance) would be allowed in this area without concern for wilderness values. The herd of about five wild horses would be removed from the WSA.

The part of the WSA that would comprise the 28,044-acre wilderness would be closed to ORV use. About 10 miles of existing ways and roads would not be available for vehicular use except in situations described for the All Wilderness Alternative. The remainder of the unit, including the existing gravel roads bordering the WSA, would remain open to vehicular travel.

Visual resources on the 28,044-acre wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The remaining 14,418 acres would be managed as Class IV as outlined in the Book Cliffs RMP.

• Action Scenario

It is projected that in the designated area, over the short term, 2 acres of surface disturbance would result from rangeland developments and 3 acres of surface disturbance would result from providing access to State lands, for a total of 5 acres of disturbance. In the nondesignated area, over the short term, it is projected that 60 acres would be disturbed as a result of leasable mineral (oil and gas) exploration and development includ-ing up to 20 miles of access roads, 1 acre would be disturbed by rangeland developments, and 9 acres would be disturbed by providing access to in-held State lands, for a total disturbance of 70 acres. Overall, in the short term, 75 surface acres would be disturbed in the WSA

following the designation of part of the WSA as wilderness.

Over the long term, tar sand development is projected to disturb approximately 1,000 additional acres in the nondesignated portion of the WSA as described for the No Action/No Wilderness Alternative.

No additional disturbance is projected for ORV activity due to wilderness management constraints and rugged terrain. Recreation use would probably initially decrease below the current estimated use of 435 annual visitor days, but then increase at a rate of 2 to 7 percent annually. Use would involve vehicular access on 22 miles of existing ways and roads and on future roads.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as for the analysis of the Environmental Consequences of Alternatives section of this WSA.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The unit contains 42,462 acres of public land. Rectangular in shape, the unit averages 5 miles wide and 12 miles long.

- Naturalness

A total of 35,835 acres of the unit is considered to meet the wilderness criteria for naturalness. About 6,627 acres lack naturalness.

The dominant human imprints found are those resulting from oil and gas development and livestock grazing. Following the BLM Wilderness Inventory that established the WSA boundaries, drilling for oil and gas was permitted in the WSA as a valid pre-FLPMA right to explore pre-FLPMA oil and gas leases that are part of a producing oil and gas unit. Drilling activity has affected naturalness in the northern portion along Main Canyon and along the southern edge of the unit. Table 5 lists the oil and gas activities on pre-FLPMA leases in the WSA. Accumulated surface disturbance includes the construction of 16.9 miles of roads, the upgrading of 2.1 miles of road, and the clearing and leveling of 25 acres for drill pads. Five drill pads required major cuts and fills and 2 miles of road required major cuts and fills.

Other imprints in the WSA are:

1. A 4-inch surface pipeline runs along the northern edge of the unit, and a buried pipeline 7.6 miles long in Main Canyon;

2. Barbed-wire fences with steel and cedar posts exist in 11 locations, for a total of 9.5 miles;

3. Study plots (Crows Roost exclosure and Winter Ridge brush control plot) covering a total of 7 acres;

4. Four spring developments present in the southern part of the unit;

5. Four livestock reservoirs, each 0.50 acre in size;

6. Two drilled water wells in Main Canyon;

7. Pine Spring pinyon-juniper woodland chaining covering 45 acres; and

8. Vehicular ways totaling 13 miles.

The loss of naturalness is greatest in the Main Canyon. Main Canyon is narrow, twisting, and rimmed by 600-foot walls. Approximately 13.6 miles of road and five gas wells (plus one dry hole) are located here. Readily visible are the drill pads, well heads, buried pipeline route, and access roads. Because the canyon is narrow and the vegetation is low and sparse, these imprints cannot be screened. Other imprints include two barbed-wire pasture division fences that cross the canyon and are only slightly visible. The water well at the mouth of Crow Roost Canyon is also only slightly visible as only 1 foot of an 8-inch casing protrudes above ground level.

There are several imprints east of Main Canyon. Five miles of 4-inch surface pipeline runs along the

WINTER RIDGE WSA

Table 1
Summary of Environmental Consequences

Resources	Alternatives No Action/No Wilderness	All Wilderness (42,462 Acres)	Partial Wilderness (28,044 Acres) (Proposed Action)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the short term, naturalness and opportunities for solitude and primitive recreation would be directly lost on 879 acres and indirectly reduced in quality on up to about 10,600 acres. The disturbance would be due to oil and gas exploration and development, rangeland development, vegetation treatment, and providing access to State in-holdings. Vehicular use of existing and future ways and roads would detract from the quality of solitude and primitive recreation in the WSA. Long-term tar sand development would result in a direct loss of wilderness values on 1,965 acres of the WSA, and indirect reduction in the quality of wilderness values throughout the WSA. Wildlife associated with wilderness would be displaced.	Wilderness designation would protect the wilderness values of the WSA. In the short term, opportunities for solitude and primitive recreation would be directly lost on 34 acres of the WSA and indirectly reduced in quality on up toabou 1,300 acres due to valid existing rights. Special features would be preserved. The extent of loss that would occur over the long term would be much less with this alternative than with the No Action/No Wilderness Alternative because tar sand development would not occur and the area would be closed to ORV use.	Wilderness values would be protected in the designated area, which is approximately 66 percent of the WSA. In the short term, naturalness and opportunities for solitude and primitive recreation would be directly lost on 75 acres of the WSA and would be indirectly reduced in quality on up to 3,800 acres. The disturbance would be due to oil and gas exploration and development, rangeland development, vegetation treatment, and providing access to State in-holdings. Most of the impact would be in the nondesignated area. Vehicular use of existing ways and future roads in the nondesignated portion would detract from the quality of opportunities for solitude and primitive recreation. Long-term tar sand development in the nondesignated area would result in a direct loss of wilderness values on about 1,000 acres and an indirect reduction in the quality of the wilderness values throughout the WSA. This indirect impact would be to half the degree that would occur eith the No Action/No Wilderness Alternative. Wildlife would be displaced but impacts on wildlife would be less than with the No Action/No Wilderness Alternative because the best wildlife habitat would be in the designated area.
Impacts on Air Quality	Air quality would not be significantly reduced by activities in the WSA. In the long term, tar sand mining would result in temporary violations of PSD Class II TSP standards.	Air quality would not be affected by activities within the WSA because tar sand development would not occur.	Impacts would be about the same as with the No Action/No Wilderness Alternative because tar sand would be mined in the nondesignated area.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (42,462 Acres)	Partial Wilderness (28,044 Acres) (Proposed Action)
Impacts on Geology and Topography	In the long term, geologic and topographic features would be altered significantly on 1,965 acres as a result of tar sand mining.	Geologic and topographic features would not be significantly affected because the potential for surface mining would be eliminated.	In the long term, geologic and topographic features would be significantly altered on 2.4 percent (1,000 acres) of the WSA as a result of tar sand development in the nondesignated area.
Impacts on Soils	Overall, there would be a 6 percent increase in sediment yield from the WSA. This would be significant on a localized basis. Discharge of sediment and salts into the Green River drainage would not be significantly increased because mitigation would be required, there are no perennial streams in the WSA and the disturbance would mainly be on an upland plateau.	Impacts on soils and increased erosion would be insignificant because sediment yield from the WSA would increase by only 0.1 percent.	Overall there would be a 2 percent increase in sediment yield from the WSA. Impacts would be about the same as with the No Action/No Wilderness Alternative because tar sand would be mined in the nondesignated area.
Impacts on Vegetation	Over the long term, up to 6.7 percent (2,844 acres) of the vegetation types in the WSA would be altered or destroyed. Populations of special status species would be protected even though inadvertent loss of some individual plants would occur.	Vegetation types and special status species would be protected because potential disturbance would be reduced from 2,844 acres to 34 acres.	Over the long term, 2.5 percent (1,075 acres) of the vegetation types would be altered or destroyed. Populations of special status plant species would be protected even though individual plants may be inadvertently destroyed.
Impacts on Water Resources	In the short term, ground and surface water quality and quantity would not be affected. Over the long term, tar sand development would reduce quantities of groundwater by about 700 acre-feet per year. It would not significantly affect the Green and Colorado Rivers' salinity or water flows because precipitation is low, all drainages in the WSA are ephemeral and mitigation would be required.	Ground and surface water quality and quantity in the WSA would be protected.	Water quality, quantity, and uses would not be affected in the short term. Over the long term, tar sand development would reduce the quantity of groundwater in the nondesig-nated area by 700 acre-feet per year but for a shorter period of time than with the No Action/No Wilderness Alternative. Salinity or flows in the Green and Colorado Rivers would not be significantly affected.

WINTER RIDGE WSA

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (42,462 Acres)	Partial Wilderness (28,044 Acres) (Proposed Action)
Impacts on Mineral and Energy Exploration and Production	Implementation of this alternative would not significantly affect mineral exploration or production because mineral leasing, exploration, and development could occur without restrictions for protection of wilderness values.	Long-term potential for production of up to 375 million barrels of oil from tar sand and an unknown but locally significant amount of natural gas and oil would be foregone.	Recovery of up to 248 million barrels of oil from tar sand and an unknown portion of the oil and gas in the WSA would be foregone. However, in the nondesignated area up to 127 million barrels of oil from tar sand and a portion of the oil and gas could be recovered.
Impacts on Wildlife Habitat and Populations	In the short term, some wildlife species may be displaced or otherwise affected by oil and gas activities on 160 acres and continued use of vehicular or roads or ways big game would benefit from rangeland developments. Reductions in populations can be expected if long-term development of tar sand occurs on 1,965 acres (affecting up to 500 acres at any one time) due to large restructuring of habitat components. Some benefits would also result from increased forage resulting from reclamation.	Overall, wildlife species and their habitat would benefit from wilderness designation because it would prevent large scale development of tar sand. Eight proposed springs could be developed which would expand species diversity, distribution, and possible population levels. Opportunities for improving wildlife habitat by vegetation manipulation or construction of reservoirs would be foregone. Special status species would be protected.	Impacts on wildlife species and their habitat would be similar to those with the All Wilderness Alternative because the best wildlife habitat in the WSA would be in the designated area. Overall, wildlife species and their habitat would benefit from partial wilderness designation because the potential for surface disturbance and human intrusion would be reduced on 66 percent of the WSA. Eight proposed spring developments could be completed which would expand species diversity, distribution and possible population levels. Opportunities for improving wildlife habitat would be foregone because of prevention of reservoir construction and treatment of vegetation. Populations of special status species would be protected.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives: No Action/No Wilderness	All Wilderness (42,462 Acres)	Partial Wilderness (28,044 Acres) (Proposed Action)
Impacts on Livestock Management	In the short term, livestock management would not be adversely affected and would benefit from rangeland developments. In the long term, available forage would be reduced by about 18 AUMs for the duration of tar sand activities.	Restrictions on vehicle use on 13 miles of ways would be an inconvenience for six permittees. Livestock management techniques would be altered and operating costs could increase. Opportunities to improve livestock distribution and increase forage by 105 AUMs would be foregone because construction of proposed reservoirs and vegetation treatments would not be possible.	Restrictions on vehicle use on 10 of the 13 miles of ways would be an inconvenience for six permittees. Livestock management techniques would be altered and operating costs could increase. Opportunities to improve livestock distribution and increase forage by 105 AUMs would be foregone because construction of proposed reservoirs and vegetation treatments would not be possible.
Impacts on Cultural Resources	Inadvertent loss or damage to archaeological sites including 26 recorded sites, may occur due to surface developments and ORV use. Intentional vandalism and artifact collection may increase due to increased activity and accessibility. Cultural resource management would continue without regard to wilderness management considerations.	Cultural resources would receive additional protection from the effects of surface disturbance and vandalism because potential disturbance would be reduced from 2,844 acres to 34 acres and the area would be closed to ORV activity. Cultural resources could be inadvertently damaged by the 34 acres of projected surface disturbance but impacts would be minor because only 0.08 percent of the WSA would be disturbed. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.	Approximately 13 of the 26 recorded sites would receive protection as a result of wilderness designation. All sites in the nondesignated portion of the WSA would continue to be protected by existing laws. Inadvertent loss or damage to archaeological sites may occur due to 1,075 acres of surface disturbance in the WSA and/or continued use of vehicles in the nondesignated area. Cultural resource management may be limited in scope and execution on 66 percent of the WSA in order to protect other wilderness values.
Impacts on Recreation	This alternative would not significantly affect recreational use in the WSA. Motorized recreational use would increase over present levels by 2 to 7 percent per year for the foreseeable future. In the long term, levels of use would be reduced because of the intrusion of tar sand development.	Overall, recreational use of the area would initially decline following wilderness designation and would not reach the levels projected for the No Action/No Wilderness Alternative (up to 3,800 visitor days by the year 2020) because primitive recreation would probably not replace vehicle-based recreation in this area. Hunting would be the primary recreation use affected.	Overall, recreational use of the area would initially decline following wilderness designation and would not reach the levels projected for the No Action/No Wilderness Alternative (up to 3,800 visitor days by the year 2020) because primitive recrea-tion would probably not replace vehicle-based recreation in this area. Hunting would be the primary recreation use affected.

Table 1 (Continued)
Summary of Environmental Consequences

Resources	Alternatives		
	No Action/No Wilderness	All Wilderness (42,462 Acres)	Partial Wilderness (28,044 Acres) (Proposed Action)
Impacts on Economic Conditions	Present economic conditions would not be affected. Employment in oil and gas exploration and production in the WSA would continue. Employment of 300 people in production of oil from tar sand would represent about 2.1 percent of the projected Uintah County employment in the year 2010. There would be minor beneficial and adverse economic impacts. By the year 2020, the WSA would contribute up to $15,580 annually in local sales related to recreation. Considering proposed vegetation treatments and possible tar sand development, livestock sales and $3,545 in Federal grazing revenues each year. Tar sand royalties from the WSA would contribute about $1.8 million per year to the Federal treasury for about 100 years while gas royalties of $50,000 per year would ocntinue and could increase from $20,000 to as much as $100,000 per year per well depending on demand for natural gas.	Present economic conditions would not be affected. The potential for 300 jobs, 2.1 percent of the projected Uintah County employment in the year 2010, would be foregone. Annual local recreation-related sales would be less than with the No Action/No Wilderness Alternative (less than $15,580 by the year 2020) because primitive recreational use would probably not replace motorized use. Livestock grazing would continue to contribute $44,300 in local sales and $3,411 in Federal revenues annually but potential livestock-related sales and revenues would be reduced by $1,740 and $134 respectively as compared to the No Action/No Wilderness Alternative because potential vegetation treatments would not be allowed. Annual oil, gas, and tar sand leasing fees of up to $66,442 would be foregone as would tar sand royalty payments of about $1.8 million annually for about 100 years and oil and gas royalties of between $20,000 and $100,000 per well per year on future wells on 79 percent of the WSA.	Present economic conditions would not be affected. Employment for oil and gas explor-ation and production would continue but for a shorter period of time than with the No Action/No Wilderness Alternative. Oil production from tar sand in the nondesignated portion fo the WSA would employ abou 300 people (about 2.1 percent of the projected Uintah County employment in the year 2020), but the duration of mining, employment, and related beneficial and adverse economic impacts would be reduced because only 34 percent of the tar sand in the WSA could be mined. Annual local recreation-related sales would be less than with the No Action/No Wilderness Alternative (less than $15,580). Livestock grazing would continue to contribute $44,300 per year in local sales and $3,411 in Federal revenues annually but potential annual livestock related sales and revenues would be reduced by $1,740 and $134, respectively, as compared to the No Action/No Wilderness Alternative because proposed vegetation treatments would not be allowed. Annual Federal and State oil and gas and tar sand leasing fees of up to $41,726 would be foregone as would potential royalties on oil, gas, and tar sand production from 49 percent of the WSA.

northern edge of the unit. Because the trees were removed along a 20-foot right-of-way, the pipeline is a linear intrusion and is readily visible. However, from a distance or from an oblique angle, the pipeline is hardly evident. The Skyline No. 3 well, drilled in 1963, was restored to a natural condition in Crow Roost Canyon in 1987; the access road, constructed in the wash in the bottom of the canyon, has nearly eroded away. Four gas wells, one abandoned drill pad, and 1.5 miles of road have been located on pre-FLPMA leases in the portion of the WSA east of Main Canyon since 1981. Because major cuts and fills were required for three of the drill pads and for access roads to them, the drill pads and access roads are highly visible as viewed from adjacent ridges within 0.50 mile of the imprint. The Crows Roost exclosure, approximately 4 acres in size, is fenced with a cedar post and net wire fence. The study plot does not significantly affect naturalness. The Pine Springs chaining laps into the unit in two areas, both under 22 acres in size. Because of the irregular edge of the clearing and the small size of the two areas, naturalness is only somewhat affected. The division fence, a barbed-wire fence of steel and cedar posts, borders the northern edge of the Pine Spring chaining and protrudes into the unit for 0.70 miles. Because the fence right-of-way has been bladed, a visual scar will be evident for the next 20 to 30 years.

West of Main Canyon are several imprints. A 7.1 mile-long barbed-wire fence located along the west edge of the unit is not highly visible as vegetation was not removed along the right-of-way. Neither this nor another 1.10 miles of fence located along the southern boundary significantly affects naturalness as both are adjacent to the unit's boundary and built with a minimum of disturbance to soil and vegetation. A 3-acre vegetation study plot is located about 0.25 mile from the southern boundary. Because a 1-acre tract within a sagebrush park was converted to grass-land, a slight contrast in color is evident. Naturalness is only slightly affected as the 1-acre plot is enclosed by a barbed-wire range fence. The four stock reservoirs and four spring developments blend with the natural environment and do not significantly affect naturalness.

The biggest detraction from naturalness west of Main Canyon is the location of well No. 2-18-15-22, including a 2-mile access road in the southwest corner of the unit. This well penetrates an area that heretofore was pristine. Although this well cannot be seen from more than 0.50 mile away, it is located in an area that would be frequently traveled by wilderness visitors.

- Solitude

Solitude is influenced by the oil and gas activities within this unit. Traffic created by the drilling and maintenance crews does not give a visitor the feeling of being alone. The influence zone affected by sights and sounds of drilling, travel, and surface disturbance is about 0.50 mile. About 10,565 acres of the unit do not have outstanding solitude. In the remaining 31,897 acres of the unit, opportunities for solitude are considered outstanding.

The largest single area lacking outstanding solitude is Main Canyon. The canyon traverses diagonally through the center of the unit and is narrow with steep-sided walls. With the location of 12 miles of road and six gas wells within the canyon, a major portion of the area was judged as not offering outstanding solitude. In the southern portion of the WSA, where large sagebrush parks dominate some of the ridge tops, vegetation screening is poor, especially adjacent to the southern boundary road. No opportunities exist for vegetation or topographic screening.

- Primitive and Unconfined Recreation

Opportunities for primitive and unconfined recreation exist for day hiking, backpacking, horseback riding, and big game hunting. However, none of these activities can be considered outstanding. Day hiking and backpacking do not qualify as outstanding because the unit lacks a focal point of interest. No perennial streams, ponds, or lakes exist, and there are no prominent overlooks or high terrain which offer sweeping panoramic views. Along the rim of Main Canyon, a person has a limited view of small vertical rock cliffs, talus slopes, and a narrow canyon floor. The landscape, composed principally of shallow canyons and flat ridge tops, does not offer challenge or uniqueness. These factors, as well as repetitious vegetation patterns of solid stands of pinyon pine and juniper trees with interspersed sagebrush openings, make hiking and backpacking an ordinary experience.

The terrain is suitable for the use of horses but again, because of a lack of a focal point and diversity, this activity cannot be regarded as outstanding.

Big-game hunting for elk and deer is popular within the region. However, the quality of the wildlife habitat within this unit is lower than surrounding areas.

As a consequence, big game numbers, hunting quality, and big-game viewing are poorer within the unit than in nearby areas outside the WSA.

Other activities such as sightseeing for geologic features and nature study are not outstanding. The rock formations, erosional patterns, color contrast between the soil, rock and vegetation, and canyon characteristics are common within the physiographic region. No threatened, endangered, or other special status plants or animals have been found in the area to enhance nature study. However, three candidate plant species and five candidate wildlife species may occur within the WSA.

Lack of dependable snow depths in winter make cross-country skiing questionable. Opportunities for high-interest nature photography are poor.

No area was identified as having outstanding opportunity for primitive and unconfined recreation.

- Special Features

The wilderness inventory identified a herd of about five wild horses as a special feature in the WSA. The wild horses currently inhabit Little Asphalt Ridge, located in the south-central portion of the WSA. The remoteness of the area and the feed available in an old burn provide the needed year-round habitat for the horses. According to the BLM Book Cliffs RMP the horses will eventually be removed from the area (USDI, BLM, 1984c).

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are two animal species (peregrine falcon and bald eagle) listed as endangered that may occasionally pass through the WSA. There are six animal species and three plant species that are considered sensitive that may occur in the WSA. The WSA has year-round populations of cougar, elk, and black bear, which are wildlife species associated with wilderness. (Refer to the Vegetation and Wildlife Including Special Status Species sections for additional information.)

- Diversity

This WSA is in the Rocky Mountain Forest Province Ecoregion and has the PNV type of juniper-pinyon woodland. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour driving time of two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is located in a PSD Class II area under the provisions of the Clean Air Act as amended. This classification permits moderate air quality deterioration. The nearest Class I area is Arches National Park about 55 miles to the south. The Colorado portion of Dinosaur National Monument, 50 miles to the northeast, is classed as Colorado Category 1 which is about the equivalent of Federal PSD Class I.

Current air quality of the region is typical of a largely undeveloped region in the western United States. Measured long-term average concentrations of pollutants are well within current National Ambient Air Quality standards except for total suspended particulates. The probable cause of this exceedence is windblown dust from unpaved roads. Normal visual range in the vicinity varies from about 110 to 120 miles during the summer (USDI, BLM, 1984e).

Geology and Topography

The Winter Ridge WSA is located along the southern edge of the Uinta Basin, in that region between the Rocky Mountains of Colorado and the Wasatch Range of central Utah. It is in the Colorado Plateau Physiographic Province. The basin is bounded on the north by the Uinta Mountains and on the south by the Roan Cliffs and the Book Cliffs escarpment. Surface exposures in the area consist of the Wasatch Formation, which is exposed in Main Canyon, and the overlying Green River Formation, which is exposed throughout 90 percent of the tract (parts of the Wasatch and Green River Formations are interfingered). Numerous, but gentle, northwest-trending folds and small faults are found in this area (Cashion, 1973). The WSA consists of relatively flat and gently sloping bench areas dissected by shallow canyons. Elevations within the WSA vary from 5,700 feet in Main Canyon near the northwest corner to 7,600 feet along Pretty Valley Ridge near the southeast corner. The predominant topographic feature is Main Canyon, which diagonally bisects nearly the entire area from northwest to southeast.

WINTER RIDGE WSA

Despite the relatively simple geology visible at the surface of the WSA, the subsurface geology in this area is complex. It straddles what geologists refer to as the Uncompaghre Uplift, a northwest-trending mountain range that existed in this area in late Paleozoic time (Stone, 1977). This uplift coincided in trend and position with the present-day Uncompaghre Plateau, but it extended farther north as a distinct topographic feature. The Uncompaghre Uplift probably stood several thousand feet above sea level, and enormous volumes of rock were shed into nearby marine basins during late Paleozoic and early Mesozoic time.

The area encompassing the WSA can be subdivided into two somewhat distinct late Paleozoic settings. The southern part of the WSA overlies the Uncompaghre Uplift, and Paleozoic and Mesozoic rocks are not preserved. The northern part of the WSA overlies a faulted segment of the Upcompaghre Uplift, in which a few thousand feet of Paleozoic rock are preserved. The subsurface fault separating these two areas is referred to as the Garmesa fault zone (Stone, 1977).

Soils

Soils in the WSA vary greatly. Those on the flatter benches and gentle slopes south of Main Canyon are very deep and well-drained loams. The canyon sides are shallow, well-drained gravelly loams and those in the northern part of the unit near Seep Ridge are very shallow to shallow and well-drained. Approximately 5 percent of the WSA consists of rock outcrop. The soils are classified as nonsaline, with an annual salt yield of about 18 lb per acre.

Seeding potential in more than 30 percent of the WSA is fair to good, where soils are moderately deep to deep gravelly loam, slopes are 10 percent or less, and rock outcrops are isolated. Table 2 displays current erosion condition.

Table 2
Erosion Condition

Classification	Annual Soil Loss (cubic yards/acre)	Acres	Percent of WSA	Total Annual Soil Loss (cubic yards)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	6,497	15	12,344
Slight	0.6	35,965	85	32,369
Stable	0.3	0	0	0
Total		42,462	100	44,713

Sources: USDI, BOR, 1975.

Vegetation Including Special Status Species

Two major vegetation types, pinyon-juniper woodland and sagebrush-grassland, are located in the WSA. Ridgetop vegetation (refer to Table 3) in the Winter Ridge WSA is composed of broad sagebrush-grass parks and islands of pinyon-juniper woodland in the Winter Ridge WSA with small sagebrush parks scattered among broad belts of pinyon-juniper woodland on Seep Ridge. The canyons in the WSA are predominantly pinyon-juniper woodland with Douglas fir intermingled in minor amounts on the north-facing canyon sides. Ponderosa pine is found occasionally near the heads of these canyons. The canyon bottoms are mostly sagebrush and grass with some very minor amounts of riparian vegetation occurring in Main Canyon.

Table 3
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	33,739	79
Sagebrush-grassland	8,723	21
Total	42,462	100

Source: USDI, BLM, 1983a

No threatened or endangered plant species have been found in the WSA. Three Category 1 candidate species, Cryptantha barnebyi, Penstemon grahamii, and Penstemon albifluvis, and one sensitive species, Aquilegia barnebyi, may occur in the WSA (see Appendix 4 in Volume I).

The Winter Ridge WSA is in the Rocky Mountain Forest Province as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV type in the WSA is juniper-pinyon woodland.

Water Resources

The Winter Ridge WSA is located in the Willow Creek subbasin of the Green River drainage in the Upper Colorado River hydrologic subbasin. Main Canyon is the major basin of the WSA and it drains into Willow Creek. All drainages within the WSA are intermittent of ephemeral. There are no perennial streams. No riparian zones or wetlands are found within the WSA.

There are two wells, four reservoirs, and 12 springs on which BLM has water rights for livestock and wildlife. Four of the springs have been developed, and one of those is in need of maintenance. The reservoirs

need maintenance to improve their water-holding capacity. One well has not been pumped. There are no perennial streams.

Water quality of springs and reservoirs within the WSA is adequate for all existing benefiting uses.

Groundwater is found in shallow, perched aquifers and deep artesian aquifers from 2,000 to 7,000 feet below the surface under the WSA. The springs mentioned above are supported by the shallow, perched aquifers.

No floodplains or wetlands are found within the WSA.

The WSA is within Water Right Adjudication Area 49. The waters in this area are not fully appropriated. This area is closed to surface waters, except for isolated springs. Groundwater and isolated springs will be considered for 0.015 cfs only, together with uses limited to domestic purposes for one family, 0.25 acre of irrigation and reasonable stockwatering. Fixed time (normally approved for 5 years) and temporary applications may be approved in excess of the 0.015 cfs limit (UDNRE, DWR, 1988).

The water quality standards for Willow Creek and tributaries from confluence with Green River to headwaters have been set as follows: Class 3C (protected for nongame fish and other aquatic life), and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering). Water quality of springs and reservoirs within the WSA is adequate for all existing benefiting uses.

Mineral and Energy Resources

The energy and mineral resource rating summary is given in Table 4. Refer to Appendix 5 in Volume I for a description of the mineral and energy rating system.

The Winter Ridge WSA is in an area well known for hydrocarbon potential (oil and gas, tar sand, and oil shale). The Book Cliffs to the south of the WSA are known to contain coal. Occurrence of other minerals is speculative.

Although highly speculative, vanadium might be found in the WSA. Vanadium is currently listed as a strategic and critical material (USDoD, 1988).

Table 4
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability[a]	Certainty[b]	
Oil and Gas	f 2	c4	Less than60 billion cubic feet of gas
Tar Sand	f 4	c4	More than 500 million barrels
Oil Shale	f 2	c4	48 million barrels

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

- Leasable Minerals
  - Oil and Gas

Oil and gas production from the present-day Uncompaghre Plateau comes almost exclusively from small-to moderate-size, shallow fields producing from the Entrada Sandstone and Morrison Formation of Jurassic age, as well as the Cedar Mountain and Dakota Formations of Cretaceous age. Many oil and gas wells have been drilled within and near the WSA, and drilling activity remains high in nearby surrounding areas. The chief targets are those units already productive in the area; namely, the Entrada Sandstone, the Morrison Formation, the Cedar Mountain Formation, and the Dakota Sandstone. There are no known large structures within the area, and it seems reasonable to assume that the largest structural features in this general area have already been drilled. Future discoveries will be largely in stratigraphic traps, particularly in lenticular sandstone bodies and small structural traps (Cashion, 1973). The Winter Ridge WSA is considered favorable (f2) for a shallow gas field with ultimate recoverable reserves of less than 60 billion cubic feet. The certainty (c4) that oil and gas resources exist in the WSA is high (SAI, 1982). Currently, 10,766 acres, representing 25 percent of the WSA are under oil and gas lease.

Table 5 lists recent activity on pre-FLPMA leases in the Winter Ridge WSA. Associated pipelines also exist in the WSA. Production of gas from within the WSA amounts up to about 7.5 million cubic feet per day from 10 producing

Table 5
Recent Oil and Gas Activity on Pre-FLPMA Leases

Well Number	Company	Date Drilled	Construction Actions: Miles of Road Const.	Miles of Road Upgrade	Major Cuts/Fills Required: Roads	Drill Pad	Remarks
In Main Canyon							
9-12-14-21	Coseka	1982	12		yes	no	producing
6-7-14-22	Coseka	1982	-		no	no	producing
12-18-14-22	Coseka	1983	-		no	no	producing
16-19-14-22	Coseka	1983	-		no	no	producing
8-20-14-22	Coseka	1983	-		no	no	producing
13-1-14-21	Coseka	1984	1.6		yes	no	dry hole - plugged
West of Main Canyon							
5-13-15-21	Coseka	1981	0.3	1.1	yes	yes	producing
2-18-15-22	Coseka	1981	2.1		no	yes	producing
1-28	Chorney	1972		0.4	no	no	producible
East of Main Canyon							
1-10-14-22	Coseka	1983	0.1		no	no	producing
7-21-14-22	Coseka	1981	0.2	0.6	yes	yes	producing
Number 1	Exxon	1981			yes	yes	producing
Number 2	Exxon	1981	0.6		yes	yes	Road and pad constructed but approval lapsed without drilling
Number 3	Skyline	1963	-	-	-	-	Producible
		Total	16.9	2.1			

Source: BLM File Data.

wells on pre-FLPMA leases. The amount varies depending on seasonal market conditions.

Leases that are producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Table 6 lists the leasing status for the Winter Ridge WSA. The 9,241 acres of pre-FLPMA leases are part of a producing gas unit.

Table 6
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Pre-FLPMA leases	9,241	22
2. Post-FLPMA leases	1,525	4
3. Unleased-Open to future	31,696	74
Total	42,462	100

Source: USDI, BLM, 1983a and 1984e.

The entire WSA is covered by BLM's oil and gas category system. Category 1 contains 25,314 acres; Category 2 contains 17,068 acres; and Category 3 contains 80 acres (USDI, BLM, 1984e).

- Oil Shale and Tar Sand

Oil shale is related to the sediments (comprising the Green River Formation) which were deposited in ancient Lake Uinta, a body of water that covered about 20,000 square miles in the present-day area of the Uinta and Piceance Creek basins. In the Piceance Creek Basin in Colorado, where the thickest and richest oil shales occur, the Green River Formation is subdivided generally into four members.

The Parachute Creek Member, particularly the upper part containing the Mahogany Zone, contains the richest oil shale deposits in the region, ranging in potential yield from 3 to 60 gallons of oil per ton (Van West, 1972). The Mahogany Zone of the Parachute Creek Member extends into the northern and southern parts of the Winter Ridge WSA. The oil shales in this area are relatively thin and low grade compared with the oil shales deposited along the axis of the Uinta Basin farther

north; however, there is an estimated 48 million barrels of shale oil in-place within the WSA (Cashion, 1981). The unit has a favorability of f2 with a high certainty of c4 for occurrence of oil shale (SAI, 1982).

Of the 50 plus tar sand deposits identified throughout the State, more than 96 percent of the oil is contained in six deposits, one of which is the P.R. Spring STSA, which lies partly within the Winter Ridge WSA. About 35,300 acres of the STSA are within the WSA. (About 7,162 acres of the WSA at the lower end of Main Canyon are not in the STSA.) The oil in-place is found primarily in the sandstones and siltstones of the Green River Formation of Tertiary age (particularly in the Douglas Creek and Parachute Creek members). Nearly all of the eastern two-thirds of the WSA is underlain by a 10- to 15-foot continuous tar sand sequence yielding 1,000 barrels per acre-foot or about 15,000 barrels per acre. Most of the remaining one-third of the tract also contains tar sand but at somewhat lower quality. It is estimated that the entire WSA contains more than 500 million barrels of oil in-place from tar sand. The WSA contains portions of four lease conversion applications. These are Beartooth B (598 acres), Enercor (4,206 acres), Enserch (1,020 acres), and Mobil (404 acres), for a total of 6,228 acres in the WSA. The impacts of developing these lease conversions were analyzed in the P.R. Spring Combined Hydrocarbon Lease Conversion EIS (USDI, BLM, 1985). The WSA has a favorability of f4 with a high certainty of c4 for occurrence of tar sand (SAI, 1982).

- Coal

Coal-bearing rocks of Cretaceous age almost certainly exist at great depth beneath the WSA. The coal is thin, and its quality is apparently poor. It is projected that the coal resource will not be mined in the foreseeable future. The WSA has a favorability of f1 with a high certainty that a minable coal resource does not exist (SAI, 1982).

- Locatable Minerals

Locatable mineral activity is governed by the Mining Law of 1872. Under this law, the mining claimant has the right to locate, develop, and produce mineral resources on open public land. The entire WSA falls within an oil shale withdrawal which segregates the public lands from mineral entry and appropriation under the Mining Law of 1872. Only those claims which predate the 1930 withdrawal are considered to have grandfathered rights. The Winter Ridge WSA has no pre-withdrawal claims and has no demonstrated value for locatable minerals. The Winter Ridge WSA has no history of economic production of locatable minerals and is not considered potentially valuable for development. The existing geologic environment may contain uranium/vanadium or copper deposits at considerable depth, but this is highly speculative. No mining claims exist nor can any mining claims be located in the WSA as a result of the withdrawal.

- Salable Minerals

No salable minerals of note are located in the WSA.

Wildlife Including Special Status Species

Virtually the entire Winter Ridge WSA is recognized as important wildlife habitat. Approximately 70 species of mammals, 174 species of birds, seven reptile species and two amphibians inhabit the general area. As would be expected, some are common yearlong residents, while others are found only during a particular season.

Deer and elk are probably the most notable wildlife found in the area. However, sage grouse, blue grouse, mourning doves, and chukar partridge are also found. Black bear and cougars are there in significant numbers. This is particularly true for bear.

No threatened or endangered species are year-round residents of the WSA.

Occasionally, peregrine falcon and bald eagle (both endangered species) pass through the area during spring and fall migration. A variety of other raptors use the area, including the golden eagle, and BLM sensitive species. It is reported as a widespread nester in northeastern Utah (Behle, 1975). Nesting probably occurs along the Main Canyon drainage. Other special status species that could occur in the WSA are five Category 2 candidate species. These are the long-billed curlew, southern spotted owl, western yellow-billed cuckoo, ferruginous hawk, and Great Basin Silverspot butterfly. Refer to Appendix 4 in Volume I for details.

Other important raptors using the area include the red-tailed hawk, Cooper's hawk, and the American kestrel. Other avian inhabitants include the goshawk,

great horned owl, and a wide variety of small birds (Behle, 1975).

Deer and elk populations are increasing over the entire north Book Cliffs (Karpowitz, 1982). Increased fawn production is also noted. Table 7 provides habitat information as it relates to the Winter Ridge WSA.

Table 7
Crucial Wildlife Habitat

Species	Habitat Designation	Season of Use	Acreage	Percent of Herd Unit Total
Deer	Crucial	Winter	7,400	4.0
	Crucial	Summer	14,400	7.0
Elk	Crucial	Winter	6,700	6.4
	Crucial	Summer	14,400	7.0
Sage grouse	Crucial (nesting)	Spring	800	- -

Source: USDI, BLM, 1984e.

Wildlife management facilities in the Winter Ridge WSA consist of the Crows Roost Study Exclosure and the 45-acre Pine Springs Chaining.

Forest Resources

There are approximately 11,900 potentially accessible acres with pinyon pine and juniper trees. The WSA is capable of producing fenceposts and firewood. Currently, about 10 percent of this area is accessible for harvest. There is some Ponderosa pine and Douglas fir in the WSA. The Douglas fir is located on steep north-facing slopes and the Ponderosa pine is near the heads of the canyons. These two species are in limited quantity and have no commercial value.

There are approximately 12 cords of green firewood per acre in the WSA with a total estimated volume of 142,800 cords. There is an average of four posts per acre for a total of 45,000 fenceposts. There are more fenceposts per acre in this area than any other portion of the southern Uinta Basin.

Because of limited access and availability of forest products elsewhere in the vicinity of the WSA, demand for these products is low, with the unauthorized harvest of 15 to 20 Christmas trees and a few cords of wood in the WSA each year.

Livestock and Wild Horses/Burros

The Winter Ridge WSA includes portions of four livestock grazing allotments operated by a total of six livestock permittees. There are approximately 2,215 AUMs of forage produced annually within the WSA. Table 8 lists livestock grazing use data for the WSA.

In the WSA, there are 700 acres of rangeland that could feasibly be treated by various methods to increase total forage production. Through these different vegetation treatments, a total of 105 AUMs of additional forage could be produced.

Present livestock management facilities include 9.5 miles of fence, two exclosures, four spring developments, two wells, four ponds, and about 45 acres that have been chained.

Table 8
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Winter Ridge	33,997	29,990	1,974	1,536	240 Cattle	yearlong	2
Horse Point	33,453	880	2,385	138	426 Cattle	11/16-04/30	1
Sweetwater	95,498	2,312	7,328	51	728 Cattle	03/01-10/31	1
Sunday School	40,414	9,280	3,671	490	745 Cattle	11/01-04/30	2
Total	203,342	42,462	15,538	2,215			6

Source: BLM File Data.

WINTER RIDGE WSA

A herd of about five wild horses currently inhabit the Winter Ridge area of the WSA yearlong. They are concentrated in the Little Asphalt Ridge area. The Book Cliffs RMP (USDI, BLM, 1984e) indicates that the long-range plan is to remove all feral horses from this area.

Predator control was not conducted during the 1986 to 1987 period in the grazing allotments that comprise the Winter Ridge WSA (USDA, APHIS, 1988).

Visual Resources

With the exception of Main Canyon and some of the other drainages, the topography is rolling to hilly with ridges running primarily northeast-southwest. Main Canyon exhibits narrow, layered vertical rock formations with predominate tan, cream, and to a lesser extent, red-brown coloration. Texture in this canyon is composed of rough sidewalls with fairly smooth drainage bottoms. Irregular wildfire areas have exposed tan, rocky soil.

The southwest part of the area is flat to gently rolling and lacks dramatic topographic relief. Except in the drainages, soil is not highly visible to the casual observer. On closer observation, tan, cream, and brown soils are visible.

Vegetation in most of the side drainages is varied, including tree, shrub, and ground cover species. For most of the area, pinyon pine and juniper dominate, with some Douglas fir on northern slopes. Coloration is light green, dark green, and grey-green. Most vegetation is pyramidal to ovate in silhouette.

Man-made disturbances visible outside the WSA include silver-colored cylindrical storage tanks, surface pipelines, rectangular drill pads, and roads. Internal disturbances include rectangular drill pads denuded of vegetation with stockpiles of soil; red, silver, and black gas regulators; roads; and wildfire scars with irregular perimeters that are generally devoid of vegetation.

Visual evidences of vehicle travel generally are most numerous in Main Canyon and the area northeast of Main Canyon.

BLM visual resource evaluations assessed scenery as Class C on 37,012 acres (Environmental Associates, 1979). This included all areas except 5,450 acres in Main Canyon and the northwest corner of the unit within view of Willow Creek which were assessed as Class B scenery. Public concern for scenic quality preservation (expressed as sensitivity) is medium for the Main Canyon drainage and Willow Creek and low for the major portion of the unit.

Most of the area is seldom seen with exception of the southeast (vicinity of Main Canyon) and northwest corners near Willow Creek, considered as foreground and middle ground from travel corridors of Seep Ridge and Willow Creek roads.

The resulting VRM class for the majority of the area (42,402 acres) is Class IV. A tract of land (60 acres) in the northwest corner of the unit in the vicinity of Willow Creek is Class III.

Cultural Resources

A total of 26 archaeological sites have been recorded in the WSA (USDI, BLM, 1988b). The majority of these are prehistoric surface lithic scatters located in pinyon-juniper woodlands on ridge tops. Most are small in size, but some cover as much as 5 acres and contain buried fire hearths. Only one recorded site yielded a temporally diagnostic artifact, a projectile point of Archaic age. The temporal and cultural affiliations of the remaining lithic scatters are unknown. Four sites in the WSA contain petroglyphs and pictographs: one of Fremont style figures, one of historic or protohistoric Ute origin, and two of unknown age or cultural affiliation. Two historic sites, a sheepherder camp and a set of corrals and associated refuse, have been recorded in the unit. Four of the lithic scatter sites are considered to be eligible for nomination to the National Register of Historic Places because of the presence of buried deposits. The Fremont style petroglyphs are also considered to be eligible for the Register. Several rockshelters sites have been identified in the unit, but have not yet been recorded. Some of these sites have already been heavily vandalized.

European influence in the region dates from Mexican traders and French fur trappers in the earlier 1800s. The signature of Louis Robidoux in the WSA represents an important historical resource because the early trapper's signature is found in few other places.

Several Class III inventories have been conducted in the WSA to provide archaeological clearance for oil and gas exploration. All of these inventories are linear, thus, site densities cannot be computed for the unit on the basis of these data. According to District

archaeologists, site densities are generally moderate on the pinyon-juniper ridge tops and are mostly small lithic scatters. However, rockshelters and rock art sites are likely to be found in the canyon bottoms and sides. Very few buried sites were encountered during the monitoring of ground disturbance operations following archaeological clearance.

Recreation

Recreational activities are principally centered around the fall season and are comprised of the hunting of elk, deer, bear, lion, coyotes, and rabbits. Approximately 385 visitor days of use annually are related to hunting on lands within the WSA.

No Christmas tree permits are issued for the WSA. However, some unauthorized Christmas tree cutting occurs in the northern end of the unit, perhaps 15 to 20 trees per year. About 50 visitor days of recreational use are estimated for Christmas tree activities.

Opportunity exists for hiking, horseback riding, and sightseeing. In winter, the area lacks sufficient snow to be desirable for cross-country skiing. There is little demand for these activities, particularly since the same opportunities are available nearer population centers.

Total recreation use for the WSA is estimated to be about 435 visitor days per year, all of which is related to vehicle access on the 19 miles of roads and 13 miles of ways in the WSA, and on the 28 miles of road bordering the WSA. The entire WSA is open to ORV use.

Land Use Plans

The WSA is BLM-administered public land except for four State sections (2,561.4 acres). The current policy of the State of Utah is to maximize economic returns from State lands and to reserve its position regarding the exchange of in-held lands (see Chapter 1 in Volume I). In 1986, the Utah State Legislature passed S.C.R. No. 1 opposing any additional wilderness designation in Utah and urging that State lands not be exchanged out of wilderness areas. All 2.561.4 acres of State land in the WSA are leased for livestock grazing, oil, gas, and hydrocarbons.

The WSA is managed in accordance with the BLM Book Cliffs RMP (USDI, BLM, 1984c). Wilderness is not addressed in the RMP. However, wilderness is part of the BLM multiple-use concept and the BLM land use plan is linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/No Wilderness Alternative.

The Winter Ridge WSA in in Uintah County. The Uintah County Master Plan does not specifically address the Winter Ridge WSA. However, the county planning staff stated that designation of Winter Ridge as wilderness would conflict with present land use, which encourages development of the oil and gas reserves (Nicholson, 1982). County planning concerns also focus on the possible economic impacts of wilderness on continued energy development.

There are no private surface of subsurface mineral rights within the unit. There are no existing rights-of-way across the unit other than for a 4-inch pipeline on the northern edge (3.5 miles in the WSA) and the 4 1/2-inch pipeline in the Main Canyon area (1.25 miles in the WSA).

Socioeconomics

- Demographics

Winter Ridge WSA is located in southern Uintah County, Utah. It is approximately equal distance (60 miles) from Vernal in northern Uintah County and Grand Junction in western Mesa County, Colorado.

From 1970 to 1980, the population of Uintah County grew from 12,684 to 20,700, an overall increase of about 63 percent. Table 9 presents baseline and projected population data for Uintah County. It is estimated that between 1980 and 1987, the population increased to about 22,800. Population projections indicate that the number of people living in Uintah County in the year 2010 will be about 32,900 for about a 59 percent increase over 1980 levels (Utah Office of Planning and Budget, 1987).

Table 9
Baseline and Projected Population and Employment Growth
Uintah County

	1980	1990	2000	2010
Population	20,700	23,700	25,500	32,900
Employment	8,211	9,400	11,200	14,400

Source: Utah Office of Planning and Budget, 1987.

• Employment

Table 9 shows the baseline and projected total employment for Uintah County to the year 2010.

Uintah County is in the Uintah Basin MCD. Table 10 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980 the leading employment sectors for the Uintah Basin MCD were mining (19 percent), government (11 percent), and trade (16 percent). Services provided approximately 12 percent of the direct employment in the MCD.

Table 10
Uintah Basin Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,427	1,300	1,300	1,300
Mining	2,741	1,700	2,000	2,700
Construction	573	600	900	1,300
Manufacturing	357	400	500	600
Transportation, Utilities	865	1,000	1,300	1,800
Trade	2,340	2,900	3,500	4,600
Finance, Insurance, Real Estate	237	300	300	400
Services	1,771	2,300	3,000	3,900
Government	2,426	3,100	3,100	4,000
Nonfarm Proprietors	1,662	1,800	2,300	3,000
Totals	14,399	15,400	18,200	23,600

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Daggett, Duchesne, and Uintah Counties.

It is projected that by the year 2010, employment in the MCD will increase by up to 64 percent and that services will increase to 16 percent and trade to 19 percent of the total, while mining will decline to 11 percent. Government employment will remain at the same percentage.

• Sales and Revenues

Economic-related activities in the WSA include oil and gas exploration and production, livestock production, and recreation. Table 11 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate income and revenues.

The WSA has no mining claims. Annual maintenance of the 10 existing gas wells that need relatively little service, is estimated to be about $3,000 per well, contributing a total of $30,000 per year to the local economy. The value of the gas produced from existing wells is estimated to be about $350,000 per year. However, the production company is not locally owned and the gas sales cannot be considered as local sales.

Table 11
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	$30,000	$21,532 lease fees $50,000 royalities
Mineral Production	0	0
Livestock Grazing	$44,300	$3,411
Recreational Use	$1,785	0
Total	$76,085	$74,943

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Six livestock operators have a total grazing privilege of 2,215 AUMs within the WSA. If all this forage were utilized, it would account for $44,300 of livestock sales and $11,000 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures are insignificant to the local economy. The WSA's motorized recreational use and related local expenditures are low. They are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that the Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for Winter Ridge WSA is estimated as about 435 visitor days per year.

The WSA generates revenues to the Federal Treasury from three sources: oil and gas lease fees (rentals) royalty payments, and livestock grazing fees. Within the WSA, about 10,766 acres are leased for oil and gas. At $2 per acre, leasing generates $21,532 in lease fees each year. In addition, royalty payments of about $50,000 per year are generated by gas production from the 10 existing wells. Gas production is regulated according to demand, and royalty payments could increase or decrease substantially depending on demand. Half of the rentals and royalty payments could increase or decrease substantially depending on demand. Half of the rentals and royalty payments are allocated to the State of Utah, which then reallocates these revenues to various funds, the majority of

which are related to local energy development. Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown. However, the permittees in the WSA can use up to 2,215 AUMs per year. Based on $1.54 per AUM grazing fee, the WSA can potentially generate $3,411 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM District for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives for the Winter Ridge WSA.

It is projected that in the short term, about 2 percent (879 acres) of the WSA would be disturbed. In the long term, about 1,965 acres would be disturbed by surface mining for tar sand. The effect of tar sand development in the P.R. Spring STSA would be extensive and cannot be analyzed fully in this document. For more information on the impacts of tar sand development in the Winter Ridge WSA, the reader is referred to the P.R. Spring Combined Hydrocarbon Lease Conversion EIS (USDI, BLM, 1985) and the Utah Combined Hydrocarbon Leasing Regional Final EIS (USDI, BLM, 1984c). Surface mining operations in the WSA would likely be only a part of a much larger min-ing operation that would extend well beyond the WSA boundaries.

No Action/No Wilderness Alternative (Proposed Action)

- Impacts on Wilderness Values

Because the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy (BLM Manual 8560). Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., management under oil and gas leasing Category 3 [no surface occupancy] on 80 acres) and withdrawal of the entire WSA from location of mining claims.

In the short term, disturbance of approximately 879 acres from oil and gas exploration and development, vegetation treatments, rangeland projects, and from providing access to State in-holdings would result in a direct loss of naturalness and opportunities for solitude and primitive, unconfined recreation in the disturbed areas. Special features, including wildlife associated with wilderness, and endangered and sensitive species, would not be significantly affected by short-term development because the direct disturbance would involve only about 2 percent of the WSA. Proposed water developments and vegetation treatments would benefit wildlife and wild horse special features because of increased water and forage. In addition, appropriate measures would be taken to protect endangered and other special status species prior to any surface-disturbing activity. Refer to the Wildlife Including Special Status Species section for more information.

During the period of short-term development, the visual and audible disturbance from oil and gas exploration and development, vegetation treatments, rangeland developments, and from providing access to State in-holdings, would reduce the quality of opportunities for solitude and primitive recreation not only on directly disturbed areas but also indirectly on adjacent portions of the WSA. Up to about 25 percent (10,600 acres) of the WSA could be so affected in the foreseeable future.

Because future vehicular use would generally be limited by terrain to existing vehicular travel routes, no additional disturbance from ORV activity is anticipated in the future. Vehicular use of existing and future ways, oil and gas exploration roads, and roads to State in-holdings would detract from opportunities for solitude and primitive recreation.

The increased visitor use that would occur over time would not be expected to significantly reduce the quality of wilderness values except temporarily because, although the additional use would be largely vehicular in nature, it would generally be during hunting season and the WSA is large enough to incorporate the additional use adequately.

The extent that disturbance would occur on Federal lands and State in-holdings over the long term and, therefore, the long-term loss of wilderness values that would occur is not accurately known. If tar sand development occurs, wilderness values of naturalness and opportunities for solitude and primitive recreation would be lost on the 1,965 acres that would be directly disturbed in the northern half of the WSA. About 4.6 percent of the WSA would be directly

disturbed. Indirect effects of tar sand development including sights, sounds, and dust emissions would significantly reduce the quality of wilderness values throughout the WSA. Wildlife associated with wilderness and wild horses would be displaced and populations would be reduced. Refer to the Wildlife Including Special Status Species section.

Conclusion: Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the short term, naturalness and opportunities for solitude and primitive recreation would be directly lost on 879 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to about 10,600 acres. Long-term tar sand development would result in a direct loss of wilderness values on 1,965 acres of the WSA, and an indirect reduction in the quality of wilderness values throughout the WSA. Wildlife associated with wilderness would be displaced.

- Impacts on Air Quality

In the short term, disturbance of 879 acres from exploration, access road construction, and improvement of rangeland developments would not be a major source of emission and, therefore, would have little effect on the air quality of the area. However, if tar sand development were to occur in the P. R. Springs STSA in the long term under current technology, projects would likely include extraction strip mining and solvent assisted hot water extraction. Emissions would consist of total suspended particulates, sulfur dioxide, carbon monoxide, and nitrogen oxides. The rsults of air quality monitoring for a 5,000 BPD commercial operation in the Winter Ridge area indicates that only total suspended particulates (TSP) levels would violate the NAAQS and PSD Class II increments in the WSA. Sulfur dioxide and nitrogen oxide emmissions would be within standards. PSD Class I areas would not be affected. Disturbance of 1,965 acres would result in increases in fugitive dust emissions with additional potential for loss in visual range in the Uintah Basin. Because disturbance would proceed over long periods of time, reclamation would be ongoing and would reduce impacts from fugitive dust.

Conclusion: Air quality would not be significantly reduced by activities in the WSA.

- Impacts on Geology and Topography

In the short term, projected oil and gas exploration and possible development, road construction, and rangeland development would occur on up to 879 acres and would not affect the area's geology. Drilling, road construction, or rangeland improvements would not alter the overall land form but would create localized changes on topographic features. In the long term, surface mining would remove about 655 acres of ridge tops and 1,310 acres would be affected by waste sand disposal and filling some valleys. Topographic features could be blended but not restored.

Conclusion: Over the long term, geologic and topographic features of the WSA would be significantly altered on nearly 4.6 percent (1,965 acres) of the WSA as a result of surface mining tar sand deposits.

- Impacts on Soils

It is estimated that, in the short term, 879 acres of soil would be disturbed by oil and gas exploration, roads, and rangeland development. This is 2 percent of the WSA. In the long term, tar sand development would disturb 1,965 acres (4.6 percent) of the WSA. Assuming that all disturbance would occur in critical slight class areas and that erosion condition would increase one class, the soil loss on 879 acres would increase from the current 791 cubic yards per year to 1,670 cubic yards per year. Actual soil loss would be considerably less; however, because 700 acres are proposed for rangeland treatment, which would stabilize the soil. Soil loss from oil and gas activities would decrease as reclamation occurred. The time required for complete reclamation cannot be determined but would probably be about 5 years. With this alternative, tar sand development on 1,965 acres and 879 acres of other developments would increase maximum annual soil loss in the WSA from an estimated 44,713 cubic yards per year to 47,547 cubic yards per year, or an annual increase of up to 2,844 cubic yards (6 percent annually). Because of the requirement for holding ponds, normally enforced on public lands, and the small amount of water flow in the drainages of the area, increased sediment yield to the Green River drainage outside the WSA would be small.

Conclusion: Increases in soil erosion would be significant (6 percent increase) on a localized basis in the long term. Discharge of sediment and salts into the Green River drainage would not be significantly increased.

• Impacts on Vegetation Including Special Status Species

Approximately 21 percent (8,723 acres) of the WSA consists of sagebrush-grassland. The remaining 79 percent (33,739 acres) of the WSA is vegetated with pinyon pine and juniper trees. Over the short term, 879 acres of disturbance would affect about 2.1 percent of the vegetation in the WSA. Over the long term, an additional 1,965 acres of disturbance could alter the composition of up to 4.6 percent of the WSA's vegetation. If this development occurred, rehabilitation of the affected area to its former condition might be difficult, possibly causing portions of existing and PNV types to be permanently modified through scarring of the landscape. Because the two vegetation types are common throughout the WSA and the State, this impact would not be significant on a regional level.

Three Category 1 candidate plant species and one sensitive species may occur within or near the WSA. All of these species have a wide-spread distribution in the pinyon-juniper woodland, sagebrush and desert shrub communities, and shale outcrops of the Green River Formation. The habitat of all of these species extends beyond the boundaries of the WSA. Before authorizing surface-disturbing activities (2,844 acres potential), BLM would require site-specific clearances of the potentially disturbed areas. If any threatened or endangered species are located, BLM would initiate consultation with the FWS as required by the Endangered Species Act (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Therefore, while surface-disturbing activities could result in the inadvertent loss of some individual plants of these species, threats to the continued existence of any of the species would not occur. Because necessary measures would be taken to protect these species, the viability of populations of special status species would be preserved with the No Action/No Wilderness Alternative.

Conclusion: Over the long term, up to 6.7 percent (2,844 acres) of the vegetation in the WSA would be altered or destroyed. Populations of special status species would be protected even though inadvertent loss of some individual plants would occur.

• Impacts on Water Resources

Over the short term, mineral exploration and other anticipated activities would affect 2.1 percent of the WSA and would be confined near the surface. This would not alter ground or surface waterflows, quality, or uses.

In the long term, as the surface mine is opened, some shallow groundwater may be interrupted, thereby affecting some springs and seeps. However, groundwater, water aquifers, and springs and seeps in strata below the tar sand would not be affected. The major groundwater zones in this area are below the tar sand strata.

Sedimentation in drainages would not significantly affect surface water quality because precipitation is low, all streams are ephemeral, and mitigtion would be required.

Acquisition of up to 700 acre-feet of water per year from ephemeral surface waters and aquifers would reduce or eliminate the average annual flow of the Main Canyon-Willow Creek drainage. Additional water might have to be obtained from Willow Creek or the White River, subject to State water permits. Use of groundwater would significantly affect spring flows. Water use would not significantly affect discharge in the Green River (less than 0.1 percent) and salt content in the Upper Colorado River subbasin.

Conclusion: In the short term, ground and surface water quality and quantity would not be significantly affected. Over the long term, tar sand development would reduce the quantity of groundwater. It would not significantly affect the Green and Colorado Rivers' salinity or waterflows.

• Impacts on Mineral and Energy Exploration and Production

The WSA would remain open to exploration and development of mineral and energy resources without consideration of wilderness values. Therefore, mineral and energy resources would not be affected by the No Action/No Wilderness Alternative.

Conclusion: Implementation of the No Action/No Wilderness Alternative would not adversely affect mineral exploration or production.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

The WSA provides habitat for numerous species, including deer, elk, black bear, grouse, and partridge. These species would be adversely impacted in the

short term by up to 160 acres of surface disturbance from leasable mineral exploration and production. Oil and gas leasing categories would provide special stipulations to protect certain wildlife species.

Although not specifically designed for wildlife, the proposed 700 acres of vegetation treatment in the WSA would benefit wildlife by reducing forage competition with livestock and providing additional ecotones.

If tar sand resources are developed over the long term, the cover of pinyon pine and juniper trees would be lost and changes in topography would be expected on about 1,965 acres within the WSA. This would change some of the crucial habitat identified in Table 7 from good quality to poor quality. There would also be a short-term loss (3 to 5 years) of habitat on as much as 140 acres at any one time at varying locations as actual mining and rehabilitation are carried out. Species sensitive to disturbance would be displaced if important habitat is disturbed and might or might not return after activities cease. On a local basis, populations may decrease, but overall, populations would not be significantly affected.

Prior to any surface-disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas. If any threatened or endangered species possibly located in the area could be affected, BLM would initiate consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4 in Volume I). Appropriate mitigation measures, such as avoidance of sensitive areas, would be implemented. Therefore, while surface-disturbing activities could result in the inadvertent loss of some individual animals, the viability of populations of any special status species would be preserved with the No Action/No Wilderness Alternative.

Eight springs and five reservoirs (all livestock proposals) are proposed to be constructed within the WSA. These water developments would benefit wildlife through species diversity and distribution and possible increases in population levels. Approximately 7 acres are anticipated to be disturbed by these projects.

Conclusion: Some wildlife species may be displaced by surface disturbances caused by oil and gas exploration or development on 160 acres. Wildlife species would benefit from the completion of eight springs and five reservoirs and from additional forage and ecotones provided by 700 acres of vegetation treatments. Populations of threatened, endangered, or other special status species would not be dignificantly affected. Impacts can be expected if long-term development of tar sands is accomplished. Where as benefits from increased forage due to reclamation can be anticipated, adverse impacts would occur through the large scale restructuring of habitat components and increased human activity in the area.

- Impacts on Livestock Management and Wild Horses

Domestic livestock grazing would continue as authorized in the Book Cliffs RMP. The 2,215 AUMs currently allocated within four allotments are utilized by six livestock permittees. The potential exists for 1,965 acres to be disturbed by mineral exploration and development. In the short term, this could reduce the number of AUMs available. Because reclamation would be ongoing only a portion of the 1,965 acres would be affected at one time. Assuming about 140 acres of disturbance at one time, the reduction of AUMs would amount to approximately 18 per year. On the other hand, the opportunity to increase forage by 105 AUMs could be realized by the planned 700-acre vegetation treatment that would be allowed under this alternative.

If tar sand and oil shale resources are developed, standard rehabilitation practices would be expected in the long term to reestablish sufficient forage to maintain existing livestock numbers. Depending on rehabilitation success, available forage could increase over existing conditions after 3 to 5 years on up to 500 acres at varying locations as actual mining and rehabilitation were carried out. This could eventually result in an increase in permitted animals. The exact amount of this long-term increase, if any, is unknown.

Other new livestock facilities, such as the proposed five new reservoirs, would be allowed without concern for wilderness values, and these would aid in livestock distribution and management.

The wild horse herd would not have the protection provided by wilderness designation. Development of tar sand could adversely affect the horses, resulting in reduction or loss of the herd. This would not be significant because BLM plans to remove all feral horses from the area.

Conclusion: In the short term, the No Action/No Wilderness Alternative would not adversely affect

livestock management. Some increases in forage and improved livestock distribution would result from rangeland developments. In the long term, available livestock forage would be reduced by about 18 AUMs for the duration of tar sand activities.

- Impacts on Cultural Resources

In the short term, approximately 160 acres of disturbance is expected due to oil and gas development. The entire WSA would remain open to mineral location and leasing. Oil and gas-related development would continue unchanged. Archaeological inventory and mitigation would precede any ground-disturbing activities. Potential for tar sand development is high and some mining is likely to occur in the future within the WSA. Impact to cultural resources in the WSA under this alternative may be extensive; however, any development would be preceded by inventory and appropriate mitigation. All sites in the unit would continue to receive protection under existing Federal and State antiquities laws. Any surface disturbance would be preceded by standard inventory and mitigation procedures; however, some sites, especially those that cannot be identified by surface inspection, may be inadvertently damaged or lost. In addition, increased activity in developed areas may provide opportunities for illegal artifact collection.

The WSA would remain open to ORV use and vehicular access with this alternative. ORV activity currently constitutes a major recreational use of the unit and may increase in the future. Some archaeological sites may receive unintentional damage as a result of ORV activity. Sites located in sandy deposits or on thin soils overlying bedrock or lag gravels are vulnerable to any type of surface vehicular traffic. Artifacts may be broken or shallowly buried deposits may be disturbed and exposed to erosional processes. This would probably not be a major impact because ORVs are generally used on existing ways and trails in the WSA. Vehicular access to the unit would increase artifact collection and vandalization opportunities (Nickens, et al., 1981).

With this alternative, archaeological sites would be subject to standard cultural resource management procedures (Neumann and Reinburg, 1988). Stabilization, interpretation, and excavation could proceed without the restrictions or wilderness values maintenance.

Conclusion: Inadvertent loss or damage to archaeological sitesincluding 26 recorded sites, may occur due to surface development and/or continued ORV use. Intentional vandalism and artifact collection may increase due to increased activity and accessibility. Cultural resource management would continue without regard to wilderness management considerations.

- Impacts on Recreation

All of the estimated 435 annual visitor days are vehicle related. With this alternative, the WSA would remain open for ORV use. New access roads would probably be built to accommodate mineral exploration or development. Most of the recreation use is hunting (currently 385 hunter days per year) which is dependent on availability of big game, but recreation use may increase with population increase. Based on a review of several projections, it is estimated that outdoor recreation in Utah will increase at about 2 to 7 percent per year (UDNRE, ORA, 1980; UDNRE, DPR, 1985; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981). At this rate, overall recreation use on the WSA is projected to be as much as 3,800 visitor days by the year 2020. Most of this would be based on the use of motorized vehicles.

In the long term, recreational use might not reach the projected level because of the major intrusion of tar sand development.

Conclusion: Motorized recreation would initially increase over present levels. However, in the long term possible levels of use would be reduced because of the intrusion of tar sand development.

- Impacts on Local Economic Conditions

In the short term, there would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. Ongoing oil and gas development would sustain present levels of employment in gas production from the WSA.

In the long term, tar sand development would lead to an increase in population, employment, and income for Uintah County. Employment of up to 297 persons would be an 2.1 percent increase in the projected Uintah County total employment in 2010. It would represent only 1.3 percent of the projected Uintah Basin Multi-County District employment in the same year. These increases would create relatively minor changes in socioeconomic conditions. For information on the nature of socioeconomic impacts of tar sand

development in the general vicinity of the WSA the reader is referred to the Utah Combined Hydrocarbon Leasing Regional Final EIS (USDI, BLM, 1984c) and the P.R. Spring Combined Hydrocarbon Lease Conversion Draft and Final EIS (USDI, BLM, 1985). Beneficial impacts would include increased employment, income, and tax base. Adverse effects include the need for additional infrastructure such as water and sewage treatment, law enforcement, housing, and schools.

Recreational use and, therefore, recreation-related local expenditures could increase at a rate of 2 to 7 percent per year over the foreseeable future. Because by the year 2020, recreational use in the area could increase to be 400 to 3,400 visitor days per year and because recreation-related local expenditures average only $4.10 per visitor day, recreation-related expenditures attributable to the WSA would likely not be significant to the local economy. By the year 2020, recreation-related local expenditures could increase to be as much as $15,580 per year. In the long term, tar sand development could reduce recreational use and related local income.

Federal and State revenues would not be reduced by this alternative. In addition to the 10,766 acres presently leased for oil and gas ($21,532 in lease fees), there are 31,696 acres in the WSA open to oil and gas leases that are currently not leased. If leased, they would bring up to $63,392 additional Federal lease fee revenues per year. Existing new royalties from lease production of about $50,000 per year would continue and could increase from $20,000 to as much as $100,000 per well per year depending on the demand for oil and gas. Tar sand production would bring a royalty of 12.5 percent for products removed from the lease area. Assuming a 5,000-BPD operation, royalties would be significant in the range of about $1.8 million per year for 100 years. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (up to $3,411 per year) would continue unless tar sand development disturbed sufficient acreage to require reductions in livestock forage use. Forage reductions would be about 18 AUMs and annual fees would be reduced by about $28.The proposed 700-acre vegetation treatment could provide 105 AUMs, providing about $162 additional livestock grazing fees.

Livestock use and ranchers' incomes would continue as at present with up to $44,300 of livestock sales including $11,075 of ranchers' return to labor and investment. Increase in forage available for AUMs as a result of land treatment would provide an additional $2,100 in sales. In the long term, tar sand development would reduce available livestock forage by about 18 AUMs. This would reduce annual local livestock sales by about $360 and would reduce ranchers' returns to labor and investment by about $90.

Conclusion: Present economic conditions would not be affected. Employment in oil and gas exploration and production in the WSA would continue. Employment of 300 people in production of oil from tar sand would represent about 2.1 percent of the projected Uintah County employment in the year 2010. There would be minor beneficial and adverse economic impacts. By the year 2020, the WSA would contribute up to $15,580 annually in local sales related to recreation. Consid-ering proposed vegetation treatments and possible tar sand development, livestock grazing in the WSA would contribute $4,640 in livestock sales and $3,545 in Federal grazing revenues each year. Tar sand royalties from the WSA would contribute about $1.8 million per year to the Federal Treasury for about 100 years while gas royalties of $50,000 per year would continue and could increase to be as much as $20,000 to $100,000 per year per well depending on demand for natural gas.

All Wilderness Alternative (42,462 Acres)

- Impacts on Wilderness Values

Designation and management of all 42,462 acres as wilderness would contribute to the preservation of the wilderness values in the Winter Ridge WSA. The potential for surface-disturbing activities would be reduced through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I which allows for only natural ecological change. Naturalness would be protected on approximately 35,835 acres that meet and 6,627 acres that do not meet the standards for naturalness. Solitude would be protected on approximately 31,897 acres that meet and 10,565 acres that do not meet the standards for outstanding opportunities. Primitive and unconfined recreation would be protected on 42,462 acres that do not meet the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including wildlife associated with wilderness, endangered and sensitive species, and wild horses, would also be protected.

Although protected, complete preservation of wilderness values would not be assured because of the

existence of valid existing rights. In the short term, direct disturbance of up to 34 acres is anticipated from exploration and development of pre-FLPMA oil and gas leases, rangeland projects, and providing access to State in-holdings. Wilderness values of naturalness and opportunities for solitude and primitive recreation would be directly lost on the disturbed areas. During the period of activity, the quality of opportunities for solitude and primitive recreation would also be reduced on adjacent portions of the WSA. Up to about 3 percent (1,300 acres) of the WSA could be so affected. Special features would not be significantly affected because the direct disturbance would be minor, involving only 0.08 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species prior to any surface-disturbing activity (refer to the Wildlife Including Special Status Species section for more information.) Mitigation to protect wilderness values would be applied, but loss of wilderness values would occur if development involving valid existing rights could not be otherwise achieved. Rangeland projects, on the other hand, would be designed to meet wilderness management criteria and upon completion would not be substantially noticeable in the area as a whole. Spring developments would benefit wildlife special features associated with wilderness because of increased water sources. All in all, the disturbance would probably not be substantially noticeable in the area as a whole.

Vehicular use of existing ways and roads would generally cease with ORV closure, improving the quality of opportunities for solitude and primitive recreation and naturalness.

Over the long term, there would be no potential for loss of wilderness values due to development of new leases and mining claims. The potential for long-term development of pre-FLPMA leases and State in-holdings is not accurately known, but would be less with this alternative than with the No Action/No Wilderness Alternative due to application of mitigation that would protect wilderness values subject to valid existing rights. Tar sand development would not occur, and it can be assumed that all in all, wilderness values would be preserved over the long term.

Visitor use that would occur would be primitive in nature and would be managed so as to not result in loss of wilderness values.

Conclusion: Wilderness designation would protect the wilderness values in the WSA. In the short term, naturalness and opportunities for solitude and primitive recreation would be directly lost on 34 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to 1,300 acres. Special features would be preserved because disturbance would be reduced as compared to the No Action/No Wilderness Alternative and mitigation would be required. Loss of wilderness values over the long term, would be minimal because tar sand development would not be allowed.

- Impacts on Air Quality

In the long term, air quality would benefit from the reduction of possible disturbance from up to 2,844 acres to only 34 acres projected for the short term. If tar sand development occurred in the portion of the P. R. Springs STSA outside the WSA, however, reduction in visibility in the WSA and adjacent areas could still occur, although this impact would be less than what would occur if developments in the WSA with the No Action/No Wilderness Alternative were to occur.

Conclusion: Air quality would not be affected by activities within the WSA.

- Impacts on Geology and Topography

No effect on the geologic structure or topographic features of the WSA would result from 34 acres of surface disturbance in the short term.

Conclusion: Geologic and topographic features would not be affected.

- Impacts on Soils

The soil resource would benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities. It is estimated that up to 34 acres would be disturbed in the short term. Assuming that all disturbance would occur in areas with a slight erosion class and that erosion condition would increase one class, soil loss on the 34 acres would increase from an estimated 31 cubic yards per year to 65 cubic yards per year. However, soil loss would decrease as reclamation occurred. The time required for complete reclamation cannot be determined but would probably be at least 5 years after disturbance. Therefore, under this alternative, maximum annual soil loss from surface disturbance in the WSA would increase an estimated 34 cubic yards per year (less than 0.1 percent increase over present

soil loss), to approximately 44,747 cubic yards per year.

Conclusion: Impacts on soils and increased erosion would be insignificant.

• Impacts on Vegetation Including Special Status Species

A projected 34 acres would be disturbed in the short term. This would not significantly alter the composition of vegetation types in the WSA. Mitigation would be applied to protect the three Category 2 candidate and one sensitive plant species that may occur in the WSA. Some individual plants could be inadvertently lost, but the extent of possible impact would not be significant because less than 1 percent of the WSA would be disturbed and the area would be closed to ORV use.

Conclusion: Vegetation types and populations of special status plant species would be protected.

• Impacts on Water Resources

Oil and gas exploration in the WSA would generally be confined to widely spaced drilling and would not significantly affect the quantity or quality of groundwater in the WSA.

Surface water in the WSA (springs, seeps, and intermittent streams) could be expected to benefit from this alternative because of the reduced likelihood of disturbance of aquifers in the tar sand strata.

Because precipitation is low, no significant sedimentation or change in TDS is expected to occur because of an estimated annual increase in soil loss of 34 cubic yards from surface disturbance of 34 acres.

Conclusion: Ground and surface water quality and quantity would not be affected. The potential for disrupting shallow and perched aquifers in the tar sand strata would be eliminated.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

  Designation of the WSA would affect the exploration and production of oil and gas. Post-FLPMA leases (currently covering 1,525 acres of the WSA) would be subject to wilderness stipulations. There are approximately 9,241 acres in 18 pre-FLPMA oil and gas leases with prior and existing rights which would allow for continued exploration and development without wilderness restrictions. Gas discovery has occurred on some of these leases and on leases adjacent to the WSA. Undiscovered gas resources could not be explored or produced on the 31,696 acres not leased. Therefore, recovery of an unknown but locally significant portion of the oil and gas in the WSA would be foregone.

  Approximately 35,300 acres of the WSA are part of the P. R. Springs STSA. About 6,228 acres of existing oil and gas leases are under application for conversion to combined hydrocarbon leases. If converted, the combined hydrocarbon leases would be post-FLPMA and subject to wilderness protection stipulations. Because stipulations would be restrictive, no development is anticipated following wilderness designation. Combined hydrocarbon leases within the WSA would comprise about 28 percent of the total of the STSA.

  Therefore, it is concluded that, due to wilderness protection requirements and closure to future leasing, tar sand development within the WSA would not occur. The potential for recovery of an estimated 375 million barrels of oil would be foregone.

  • Locatable Minerals

  As the area is already withdrawn from mining claim location, no loss of locatable minerals would be foregone as a result of wilderness designation.

Conclusion: Long-term potential for production of 375 million barrels of oil from tar sand and an unknown but locally significant amount of natural gas and oil would be foregone.

• Impacts on Wildlife and Habitat Populations Including Special Status Species

With this alternative, 34 acres of surface-disturbing impacts would occur due to oil and gas exploration and development. Most impacts, if occurring, would be short term while exploration and production activities were ongoing. Species sensitive to disturbance could move out of the area and might not return after activities have ceased; however, this is unlikely due to the small acreage impacted. Overall, crucial wildlife habitats would be preserved.

No separate wildlife management facilities have been proposed for the WSA. However, the eight springs proposed for livestock improvement would also benefit wildlife. The five proposed reservoirs and 700 acres of vegetation treatments would not be allowed.

This alternative would generally be favorable for wildlife because it would provide a more pristine and solitary environment important to many species by reducing the number of access roads, fences, and other forms of man-made intrusions as well as the level of human activity in the area.

This designation, however, would preclude vegetation treatment, which would benefit wildlife.

Prior to any surface-disturbing activities, BLM would conduct site-specific clearances for any threatened or endangered species as discussed in the No Action/ No Wilderness Alternative.

Conclusion: Overall, wildlife species and their habitat would benefit from wilderness designation because it would prevent large scale tar sands development from occurring. Eight proposed spring developments could be completed which would expand species diversity, distribution, and possible population levels. Opportunities for improving wildlife habitat would be foregone because of prevention of construction of reservoirs and treatments of vegetation. Populations of special status species would be protected.

- Impacts on Livestock Management and Wild Horses

Present levels of domestic livestock grazing would continue as authorized. The estimated 2,215 AUMs currently allocated in the WSA would remain available for livestock. However, restrictions would be placed on the use of 13 miles of ways for livestock management. This would cause inconvenience for six livestock permittees and could lead to increased costs of livestock management. These ways are used for access to the existing livestock range improvements for maintenance purposes. Some of these ways are also used for access to key areas for vegetation trend and utilization data gathering.

Within the wilderness area, existing range improvements would be maintained as in the past, based on practical necessity and reasonableness. The potential vegetation treatment project with 105 additional AUMs of forage production and five proposed livestock reservoirs would not be allowed. This would limit the expansion and distribution of livestock use in the area.

The existing wild horse herd would not be affected would be removed as per the Book Cliffs RMP (USDI, BLM, 1984e)..

Conclusion: Restrictions on vehicle use on the 13 miles of ways would be an inconvenience for six permittees. Livestock management techniques would be altered and operating costs could increase. Opportunities to improve livestock distribution and increase forage by 105 AUMs would be foregone.

- Impacts on Cultural Resources

In the short term, an estimated 34 acres of disturbance would occur due to oil and gas exploration and development, rangeland improvements, and provision of access to State land. Inventory and mitigation procedures would precede any ground-disturbing activities, but would be subject to the restrictions of wilderness management. Tar sand development would be foregone and the area would be closed to ORV use. Cultural resources would be protected from the impacts of these impacts. In addition, the complete elimination of vehicular access to the WSA would indirectly help protect archaeological sites from intentional vandalism and artifact collection (Nickens, et. al., 1981).

As recreational use of the unit increases in the future, site vandalism and collection of small transportable objects may increase. Due to the lack of vehicular access, collection of large artifact and illegal excavation of sites may decrease. If sites containing valuable artifacts or specific features are present in the WSA, the increased inaccessibility of wilderness designation may encourage large scale commercial looting. The rockshelters and rock art sites in the WSA may meet these requirements (Wylie, 1988). The benefits of protection of cultural resources from ORV activity, vehicular access, and surface development would, however, probably outweigh any negative effects from increases in vandalism due to increased recreational use.

All cultural resource management procedures would be subject to the restrictions of wilderness management (Neumann and Reinburg, 1988). Access to sites for stabilization, interpretation, or excavation may be limited or denied.

Conclusion: Cultural resources would receive additional protection from the effects of surface disturbance

and vandalism. Approximately 34 acres of surface disturbance would cocur and cultural resources would be subject to inadvertent damage. Impacts would be minor because only 0.08 percent of the WSA would be disturbed. Cultural resource management may be limited in scope and execution in order to protect other wilderness values.

- Impacts on Recreation

The entire 42,462 acres (including about 30.8 miles of roads and ways) would be closed to ORV recreational use. This would not be a significant loss of ORV opportunity because this activity is presently very low within the WSA and is primarily related to hunting access. Hunting would be the primary recreation use affected, and numerous other areas are available that have hunting opportunity similar or better than this area.

Primitive recreation values would be enhanced through designation. By increasing public awareness of the area, designation would result in increased primitive recreation use of the WSA. However, judging from the site characteristics of the Winter Ridge WSA, population distribution about the site, and availability of similar sites, it is possible that primitive recreation use may not increase appreciably; therefore, it may not offset the loss of up to 3,800 annual visitor days of vehicular-related use projected to occur by the year 2020 without designation.

Conclusion: Overall recreational use of the area would initially decline following wilderness designation and would probably not reach the levels projected for the No Action/No Wilderness Alternative because primitive recreation would probably not replace vehicle-based recreation in this area. Hunting would be the primary recreation use affected.

- Impacts on Local Economic Conditions

Overall there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 10), as well as loss of potential increases in population, income, and Federal revenues that could occur with the No Action/No Wilderness Alternative as a result of tar sand development in the WSA.

The major economic benefits and drawbacks of employment of 300 persons in tar sand production from the WSA (i.e., increased personal income and demands placed on community infrastructure) would not occur. Tar sand production from the P. R. Springs STSA outside the WSA could occur and could result in socioeconomic impacts in Uintah County and the Uintah and Ouray Indian Reservation. Although a small portion of the STSA is in Grand County, the north crest of the Book Cliffs and access from Grand County is by unpaved road and impacts on Grand County would not be significant.

Potential for natural gas recovery and related economic benefits would be reduced. Because of existing valid rights, oil and gas production and employment would continue on pre-FLPMA leases, but the length of production would be less than with the No Action/ No Wilderness Alternative.

Livestock use and ranchers' income would continue as at present with up to $44,300 of livestock sales including $11,075 of ranchers' return to labor and investment. The potential for vegetation treatments and production of 105 AUMs with related sales and revenues would be foregone.

Recreation-related expenditures would be less than with the No Action/No Wilderness Alternative because primitive recreation would probably not replace motorized use in the area. Recreation-related local expenditures are small (average of $4.10 per visitor day Statewide) and the change in use would not be significant to either the local economy or individual businesses.

The loss of 1,525 acres of post-FLPMA leases would cause an eventual loss of up to $3,050 per year of lease fees to the Federal Treasury. There would also be a potential loss of $63,392 annually in Federal revenues from the 31,696 acres that could be leased without designation. In addition to these rental fees, any potential royalties from expansion of the oil and gas field into areas not presently under pre-FLPMA lease and tar sand production would also be foregone.

This could be a significant loss of revenues because a 5,000-BPD tar sand operation would produce about $108 million per year in Federal Royalties and depending on demand, oil and gas wells could produce from $20,000 to $100,000 per year in royalties because half of the royalties would normally go to the State of Utah, the State revenue would also be foregone.

Federal grazing fees would continue as at present with a possible collection of $3,411 per year.

Conclusion: Present economic conditions would not be affected. The potential for 300 jobs, 2.1 percent of the projected Uintah County employment in the year 2010 would be foregone. Annual local recreation-related sales would be less than with the No Action/ No Wilderness Alternative (less than $15,580 by the year 2020). Livestock grazing would continue to contribute $44,300 in local sales and $3,411 in Federal revenues annually but potential livestock-related sales and revenues would be reduced by $1,740 and $134 respectively, as compared to the No Action/No Wilderness Alternative. Annual oil, gas, and tar sand leasing fees of up to $66,442 would be foregone as would tar sand royalty payments of about $1.8 million annually for about 100 years and oil and gas royalties of between $20,000 and $100,000 per well per year on future wells on 79 percent of the WSA.

Partial Wilderness Alternative (28,044 Acres)

- Impacts on Wilderness Values

Wilderness designation of 28,044 acres would contribute to preservation of the area's wilderness values by reducing the potential for surface-disturbing activities that could impair wilderness values over both the short and long terms in the designated area. Protection in the designated area, which would be 66 percent of the WSA, would include management under VRM Class I which generally allows for only natural ecological change, ORV closure (including closure of 10 miles of ways and roads), and closure to future mineral leasing and location. Naturalness (including 26,418 acres that meet and 1,626 acres that do not meet the standards for naturalness), opportunities for solitude (including 22,624 acres that meet and 5,420 acres that do not meet the standards for outstanding), primitive recreation (including no acres that meet the standards of outstanding) and special features (including endangered and sensitive species and wildlife associated with wilderness) would be protected in the designated area.

In the short term, loss of naturalness and opportunities for solitude and primitive recreation due to surface disturbance from oil and gas exploration and development, from rangeland projects, and from providing access to State in-holdings, would occur on up to 5 acres within the designated portion and on up to 70 acres within the nondesignated portion. Special features would not be significantly affected because total direct disturbance would involve only 0.18 percent of the WSA. In addition, appropriate measures would be taken to protect endangered and sensitive species prior to any surface-disturbing activity (refer to the Wildlife Including Special Status Species section).

Sights and sounds from short-term development would indirectly reduce the quality of opportunities for solitude and primitive recreation on areas adjacent to the disturbed areas including up to 9 percent (3,800 acres) of the WSA. Most of this type of impact would be in the nondesignated area.

Elimination of ORV use in the designated area would improve the quality of opportunities for solitude and primitive recreation and naturalness in that portion of the WSA, although vehicular use of 3 miles of ways and existing and future roads in the nondesignated area would detract from these opportunities during the period of activity.

The extent that disturbance would occur over the long term and; therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would be less than with the No Action/No Wilderness Alternative due to application of mitigation in the designated area that would limit development subject to valid existing rights. If tar sands development occurs, wilderness values of solitude, primitive recreation, and naturalness would be directly lost on the 1,000 acres where direct disturbance would occur in the nondesignated area. Indirect affects including sights, sounds, and emissions would reduce the quality of wilderness values throughout the WSA, but to about half the degree of the impact that would occur with the No Action/No Wilderness Alternative. Wildlife associated with wilderness would be displaced.

Conclusion: Wilderness values would be protected in the designated area which is approximately 66 percent of the WSA. In the foreseeable future, naturalness and opportunities for solitude and primitive recreation would be directly lost on 75 acres and opportunities for solitude and primitive recreation would be indirectly reduced in quality on up to about 3,800 acres of the WSA. Long-term tar sand development in the nondes-ignated area would result in a direct loss of wilder-ness values on 1,000 acres of the WSA and an indi-rect reduction in the quality of wilderness values throughout the WSA. Wildlife associated with wilderness would be displaced.

• Impacts on Air Quality

Disturbance of up to 1,075 acres within the WSA, as well as disturbance for tar sand development outside the WSA, would affect air quality as described for the No Action/No Wilderness Alternative, but for a slightly shorter period of time.

Conclusion: Air quality would not be significantly reduced by activities in the WSA.

• Impacts on Geology and Topography

Impacts on geology and topography would be of the same nature as described for the No Action/No Wilderness Alternative but would occur on a smaller portion of the WSA. In the long term, tar sand development on 1,000 acres of the P. R. Springs STSA in the nondesignated portion of the WSA.

Conclusion: Over the long term, geologic and topographic features would be significantly altered on 2.4 percent (1,000 acres) of the WSA as a result of tar sand development in the nondesignated area.

• Impacts on Soils

In the short term, surface disturbance and related impacts on soils would be the same as described for the No Action/No Wilderness Alternative. In the long term, tar sand development would disturb up to 1,000 acres of the WSA. Short term disturbance would affect less than 0.01 percent of the WSA and would not affect soils significantly. Assuming that long-term disturbance would occur in areas with slight erosion condition and that erosion condition would increase one class, soil loss on the 1,000 total acres disturbed would increase from 9,000 cubic-yards per year to 1,900 cubic-yards per year. Soil loss would decrease as reclamation occurred. The time required for complete reclamation cannot be determined but would be at least 5 years. Therefore, with this alternative, maximum annual soil loss in the WSA would increase an estimated 1,000 cubic yards per year. This would be an increase of 2 percent above the total annual soil loss from the WSA. Because of requirements for holding ponds usually enforced on public lands, and the small amount of water flow in the drainages, increased sediment yield to the Green River drainage outside the WSA would be small.

Conclusion: Increases in soil loss would be significant (2 percent increase) on a localized basis. Discharge of sediment and salts into the Green River drainage would not be significantly increased.

• Impacts on Vegetation Including Special Status Species

With this alternative, vegetation would be protected on the 28,044 acres that would be designated wilderness as discussed for the All Wilderness Alternative. There would be minor loss of vegetation on 5 acres disturbed by providing access to enclosed State lands and rangeland developments. In the nondesignated area, leasable mineral exploration and development activities would occur as described for the No Action/No Wilderness Alternative. Approximately 70 acres would mainly be disturbed in the short term and 1,000 acres in the long term. Short-term disturbance would be small (about 0.02 percent of the WSA) and would not significantly alter vegetation types or special status plant species. In the long term, about 2 percent of the WSA's vegetation (all in the nondesignated area) would be disturbed or denuded. Portions of the existing vegetation and PNV types could be permanently modified through scarring of the landscape. Because the two vegetation types are common in the WSA and the State, this impact would not be significant on a regional basis. Impacts on three candidate species and one sensitive species would be as described for the No Action/No Wilderness Alternative. However, the potential for inadvertent disturbance of these species would be somewhat less for the Partial Wilderness Alternative than for the No Action/No Wilderness Alternative because the potential for surface disturbance is less.

Conclusion: Over the long term, about 2.5 percent of the vegetation in the WSA would be altered or destroyed. Populations of special status plant species would be protected even though inadvertent loss of some individual plants would occur.

• Impacts on Water Resources

Impacts on water quality, including salinity in the Green and Colorado River drainages, would be essentially the same as described for the No Action/No Wilderness Alternative because oil and gas exploration and tar sand development would take place in the nondesignated area. However, the groundwater in many operations would be required for less time.

Conclusion: Water quality, quantity, and uses would not be significantly affected in the short term. Over the long term, tar sand development would reduce the

quantity of groundwater in the nondesignated portion. It would not significantly increase the salinity or reduce the flows in the Green and Colorado Rivers.

• Impacts on Mineral and Energy Exploration and Production

  • Leasable Minerals

  The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 7,181 acres of pre-FLPMA oil and gas leases and 310 acres of post-FLPMA leases in the area that would be designated wilderness. Oil and gas exploration activities on pre-FLPMA leases could occur subject to the stipulations issued at the time of leasing. Post-FLPMA leases could be developed subject to restriction for the protection of wilderness values.

  Future leasing would not be allowed in the designated area. As a consequence, potential production of an unknown portion of the oil and gas in the WSA would be foregone. In the nondesignated area, the potential for loss of recoverable oil and gas would be less than with the All Wilderness Alternative because only 66 percent of the WSA would be designated.

  Approximately 25,060 acres (9 percent) of the P. R. Springs STSA are within the portion of the WSA that would be designated. If converted to combined hydrocarbon leases, they would be post-FLPMA and subject to wilderness protection stipulations. Because these stipulations are restrictive, no development within the designated portion is anticipated.

  The present leasing Category 1 would not change in the area that would not be designated wilderness. There are approximately 1,965 acres of tar sand presently under lease conversion application in this area. Future leasing could occur in this area. With this alternative, it is estimated that 127 million barrels of recoverable oil would have potential for exploration and recovery in the area that would not be designated.

Conclusion: Long-term potential for production of up to 248 million barrels of oil from tar sand and an unknown portion of the oil and gas in the WSA would be foregone.

• Impacts on Wildlife Habitat and Populations Including Special Status Species

Impacts with this alternative would be very similar to those described for the All Wilderness Alternative. Approximately 5 acres of surface disturbance could occur (2 from spring developments and 3 from access to State lands). Crucial habitat and areas with the best potential for habitat improvement would be within the area designated as wilderness.

If tar sand resources are developed on the 14,418 acres not designated as wilderness, the types of impacts that would occur would be similar to those discussed for the No Action/No Wilderness Alternative.

With this alternative, eight springs located within the designated portion of the WSA could be constructed. However, four reservoirs and 700 acres of proposed vegetation treatment would not be allowed. In the nondesignated area, one reservoir could be constructed. Excluding tar sand development, approximately 70 acres of surface-disturbing activities could impact wildlife species (69 from oil and gas activities and 1 from the reservoir construction).

Conclusion: Overall, wildlife species and their habitat would benefit from designation of 66 percent of the WSA as wilderness. Eight proposed spring developments could be completed which would expand species diversity, distribution and possible population levels. Opportunities for improving wildlife habit would be foregone. Populations of special status species would be protected.

• Impacts on Livestock Management and Wild Horses

The effect of designation of 28,044 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the estimated 2,215 AUMs allocated, 1,460 AUMs would be within the designated portion of the WSA and 755 AUMs within the nondesignated portion. Development of future roads, reservoirs, or other livestock management facilities for use with 1,460 AUMs in the designated portion could be restricted to preserve wilderness values. Effects on the management of livestock grazing is expected, due primarily to constraints that would prevent vegetation treatment and the projected 105 AUMs increase in forage production. In addition livestock distribution would not be improved.

With tar sand resources developed on the 14,418-acre area not designated as wilderness, vegetation would be removed. Standard rehabilitation practices would be expected to reestablish sufficient forage to maintain existing livestock numbers. There would be a short-term loss of forage on up to 140 acres for 3 to 5 years at varying locations as actual mining and rehabilitation are carried out. About 18 AUMs of forage could be lost at one time.

Conclusion: Restrictions on vehicle use on 10 miles of ways in the designated area would be an inconvenience to six permittees. The potential increase of 105 AUMs from rangeland developments would not occur. In the nondesignated area, with 755 AUMs, tar sand development on up to 140 acres at a time at varying locations would cause short-term loss of about 18 AUMs of forage.

- Impacts on Cultural Resources

Approximately one-half of the recorded sites would receive the protection of wilderness designation with this alternative. All of the recorded petroglyph sites and three of the sites considered to be eligible for nomination to the National Register of Historic Places are located in the designated portion. These sites and all other unrecorded sites in the designated portion would be managed as described under the All Wilderness Alternative.

The remaining recorded sites and all unrecorded sites in the undesignated portion would continue to be protected by existing Federal and State antiquities laws. All of these sites would be managed as described under the No Action/No Wilderness Alternative.

Conclusion: Approximately 13 of the 26 recorded sites would receive protection as a result of wilderness designation. All sites in the nondesignated portion of the WSA would continue to be protected by existing laws. Inadvertent loss or damage to archaeological sites may occur due to 1.075 acres of surface disturbance in the WSA and or continued use of vehicles in the nondesingated area. Cultural resource management may be limited in scope and execution on 66 percent of the WSA in order to protect other wilderness values.

- Impacts on Recreation

Impacts on recreation would be about the same as with the All Wilderness Alternative because approximately 66 percent of the WSA including 10 miles of the 32 miles of ways and roads would be closed to ORV use. Because current recreation use is vehicle-based, use would initially decrease below the current estimated use level of 435 annual visitor days and would not reach the levels projected for the No Action/No Wilderness Alternative.

Conclusion: Overall recreational use of the area would initially decline following wilderness designation and would not reach the levels projected for the No Action/No Wilderness Alternative because primitive recreation would probably not replace vehicle-based recreation in this area. Hunting would be the primary recreation use affected.

- Impacts on Local Economic Conditions

Overall, with partial designation there would not be significant changes in current trends of population, employment, and local income distribution in the short term.

Because of restrictions placed on the use of resources under partial wilderness designation there, could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11), as well as loss of potential increases in population, income, and Federal revenues that could occur with the No Action/No Wilderness Alternative.

The socioeconomic benefits and drawbacks of tar sand production from the approximately 25,060 acres of P. R. Springs STSA within the designated portion of the WSA that could occur under the No Action/No Wilderness Alternative would not occur under partial designation. However, tar sand production from the 14,418 acres of the P. R. Springs STSA in the nondesignated portion as well as the remainder of the P. R. Springs STSA outside the WSA could occur and could result in socioeconomic impacts in Uintah County. The employment and magnitude of economic impacts would be the same as with the No Action/No Wilderness Alternative but the duration of tar sand projects in the region would be shortened.

Over the short time, livestock use and ranchers' income would continue as at present with a potential of up to 2,215 AUMs of use, $44,300 of livestock sales, including $11,075 of ranchers' return to labor and investment. In the long term, tar sand development in the nondesignated portion of the WSA could reduce livestock forage by about 18 AUMs. Related local sales of about $360 per year would be foregone.

In addition, 700 acres of vegetation treatment that could produce 105 AUMs and $2,100 per year in local sales would also be foregone.

Future recreation-related local expenditures would be less than for the No Action/No Wilderness Alternative (less than $15,580 annually by the year 2020) and would be insignificant to both the local economy and individual businesses.

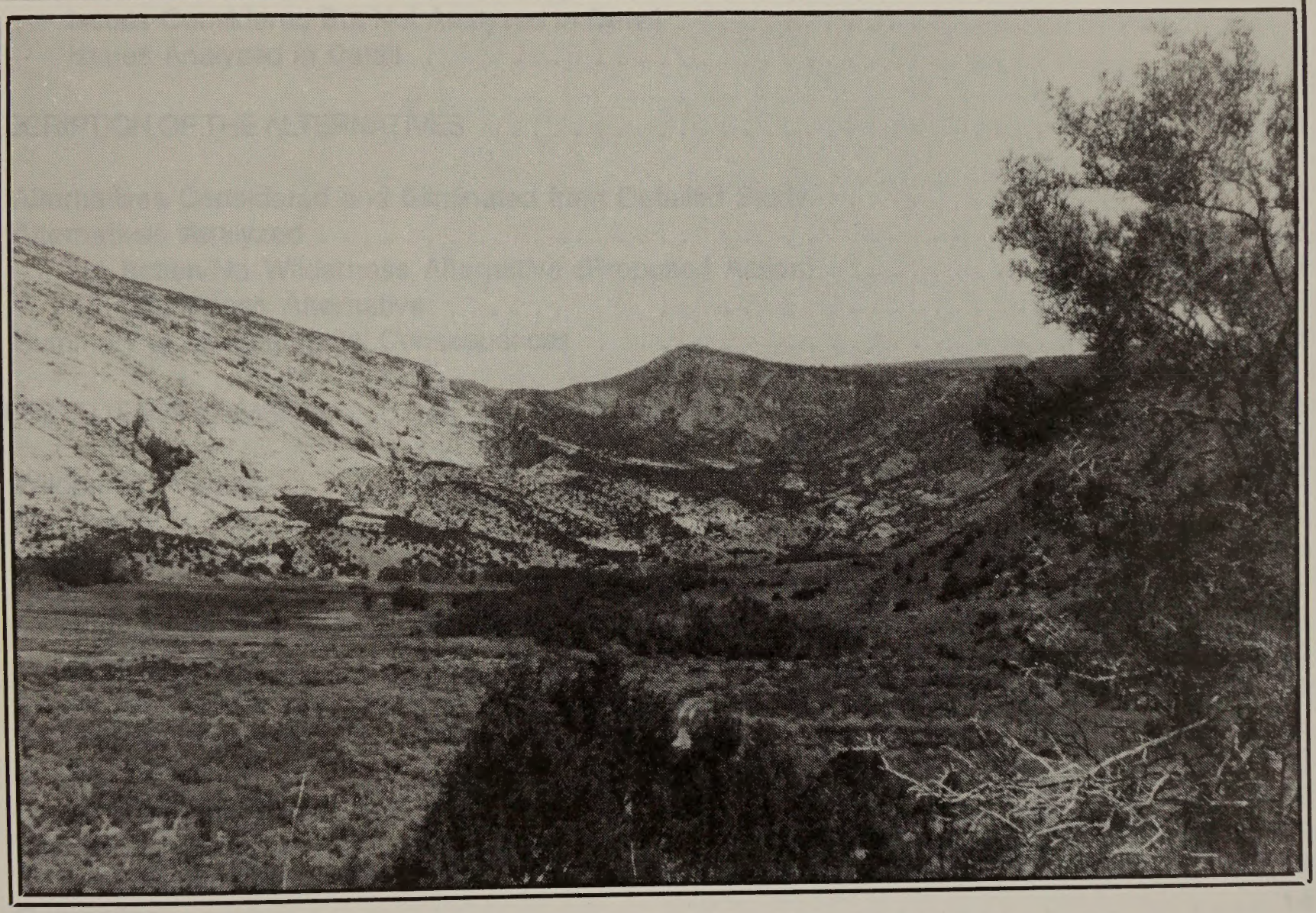
The loss of 310 acres of post-FLPMA leases in the designated portion of the WSA would cause an eventual loss of up to $620 per year of lease fees to the Federal Treasury. There would also be a potential loss of $41,106 annually in Federal revenues from 20,553 acres that could be leased without partial wilderness designation. Potential oil and gas royalties would also be foregone on 49 percent of the WSA. The 7,181 acres of pre-FLPMA leases in the designated area would continue to provide $14,362 annually in rental fees and royalties from $20,000 up to $100,000 per year per well depending on demand for natural gas.

Oil would be produced from tar sand in the nondesignated portion of the WSA. Based on a 5,000-BPD operation, Federal royalties of about $1.8 million per year would be possible. However, the duration of production would be less than with the No Action/No Wilderness Alternative because only 34 percent of the tar sand resource could be mined. Because half of the Federal rental and royalty payments normally go to the State of Utah, State revenues would also be foregone.

In the short term, Federal grazing fees of $3,411 per year would continue. In the long term, tar sand development in the nondesignated portion could reduce livestock forage use by 18 AUMs and annual Federal grazing fees by $28.

Conclusion: Present economic conditions would not be affected. Employment for oil and gas exploration and production would continue but for a shorter period of time than with the No Action/No Wilderness Alternative. Oil production from tar sand in the nondesignated portion of the WSA would employ about 300 people (about 2.1 percent of the projected Uintah County employment in the year 2020), but the duration of mining, employment, and related beneficial and adverse economic impacts would be reduced. Annual local recreation-related sales by the year 2020 would be less than $15,580. Livestock grazing would continue to contribute $44,300 per year in local sales and $3,411 in Federal revenues annually but potential annual livestock related sales and revenues would be reduced by $1,740 and $134 respectively as compared to the No Action/No Wilderness Alternative. Annual Federal and State oil and gas and tar sand leasing fees of up to $41,726 would be foregone as would potential royalties on oil, gas, and tar sand production from 49 percent of the WSA.

Daniels Canyon WSA



DANIELS CANYON

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(UT-080-414)

INTRODUCTION

General Description of the Area

The Daniels Canyon WSA consists of 2,496 acres of public land contiguous to the Dinosaur National Monument in eastern Uintah County, Utah. The Daniels Canyon WSA is about 22 miles due east of Vernal, Utah.

Major features include a portion of Daniels Canyon and Cub Creek. The WSA is on the south edge of the Yampa Plateau, near the Utah-Colorado border. It is in the northeastern part of the Uintah Basin. The Uintah Basin is known for energy development including oil and gas production, potential oil shale and tar sand projects, and a coal-fired powerplant.

Elevations in the WSA range between 5,600 and 7,720 feet. The climate of the region is semiarid to arid. Because of the typically dry atmosphere, bright, sunny days and clear nights frequently occur. Temperatures range from about 90 degrees Fahrenheit (F) in the summer to as low as -36 degrees F in January. Precipitation averages 10 inches or more.

The WSA was dropped from wilderness study status by the Secretary of the Interior on December 30, 1982, due to its small size. As a result of the WSA's potential wilderness value, it is included in the EIS for analysis. This is in accordance with general land use planning provisions of Section 202 of the FLPMA and BLM guidance that allows for wilderness consideration of areas of less than 5,000 acres if they are adjacent to land with wilderness potential administered by other Federal agencies.

There are no private, State, or split-estate lands within the WSA.

Changes for the Final EIS

In addition to the changes noted in the Introduction to Volume VI, the following changes specific to the WSA have been made since publication of the Draft EIS.

The anticipated surface disturbance due to mineral exploration and development presented in the Draft EIS (186 acres) was based on the assumption that all mineral and other resources potentially within the WSA would be developed sometime in the future without consideration of technical or economic feasibility. In response to public comments relative to the feasibility of developments, the disturbance estimates have been projected to be feasible within the foreseeable future (see Appendix 6 in Volume I). This resulted in a reduction of surface disturbance from 186 acres reported in the Draft EIS to no surface disturbance in the foreseeable future for the Final EIS.

Specific Issues Identified Through Scoping and Public Comment

- Issues Considered But Not Analyzed in Detail

In addition to the issues discussed and eliminated from further consideration in the Introduction to Volume VI (i.e., impacts on air quality, geology and topography, water rights, and land use plans and policies), the following issues or impacts specific to the Daniels Canyon WSA were considered but are not analyzed in detail in the Final EIS for the reasons described below:

1. Soils, Vegetation, Wildlife, and Forest Resources: Estimates of surface disturbance without wilderness designation have been revised downward from the 186 acres reported in the Draft EIS to none. Given this new scenario, impacts on soils, vegetation, wildlife, and forest resources would not occur in the time period analyzed in the Final EIS. Conversely, there are no proposals for improvements, harvests, or other uses which would be precluded for these resource values by wilderness designation. Therefore, impacts on soils, vegetation, wildlife, and forest resources are not issues in this Final EIS.

2. Water Resources: There are no proposed water developments in the Daniels Canyon WSA. Wilderness designation would not affect flows in the Cub Creek drainage and would not influence use of the water downstream of the WSA. Existing water developments (two reservoirs) could be maintained as in the past and would not be affected. There is little or no potential for surface disturbance or other activities

STATEWIDE POCKET MAP
WSA
SEE VOL.I

that would alter water quality in the WSA. Therefore, the impacts of wilderness designation on water rights and uses and quality are not discussed in detail.

3. Mineral Resources: There are oil and gas leases (2,176 acres) within the WSA. Potential for oil and gas deposits would be small with a low certainty that they exist. There are no mining claims inside the WSA. Projected uranium and other locatable mineral deposits are thought to be small with a low certainty of occurrence. For these reasons, it is projected that mineral exploration or development would not occur in the foreseeable future with or without wilderness designation. See Appendix 6 in Volume I for a discussion of mineral energy exploration or development projections. Therefore, impacts on mineral and energy exploration and production are not analyzed in detail in the Final EIS.

4. Livestock: The public is concerned that wilderness designation would interfere with livestock management by restricting access for maintenance of existing range improvements and moving of livestock, preventing future range improvements, and restricting predator control. However, under the Wilderness Management Policy (BLM Manual 8560) there shall be no curtailments in grazing simply because an area is wilderness. Access could be restricted, but there are only 2 miles of way in the WSA and these are only occasionally used for livestock management. The existing rangeland developments could be maintained as in the past and additonal developments are not planned.

Predator control has recently been conducted in the allotments that comprise the WSA. Wilderness designation would prevent the use of poison baits and cyanide guns (M-44s) but several methods of control would still be allowed in designated wilderness. Therefore, impacts on livestock grazing are not significant issues for the Daniels Canyon WSA.

5. Visual Resources: As discussed above, no surface disturbance is projected for the WSA in the Final EIS. Therefore, visual resources would not be significantly affected. Visual resources are not addressed in the Final EIS as a separate topic, but are addressed in relation to naturalness and special features in the Wilderness Values sections.

6. Cultural Resources: Cultural resources could be destroyed by surface-disturbing projects, use of vehicles, or vandalism. However, no mineral-related surface disturbance is projected. Recreation use is mainly primitive. Terrain and surface features limit vehicle use inside the WSA to jeep trails. Additionally, inventories for the purpose of site recordation and mitigation of impacts would take place prior to any surface disturbance in the future. Given these conditions, impacts on cultural resources are not significant issues for analysis in the Daniels Canyon WSA.

7. Recreation: The public has expressed concern that without wilderness designation use of vehicles would detract from opportunities for primitive recreation and conversely that with wilderness designation motorized recreational activities would be prevented. Overall recreational use in the Daniels Canyon WSA is low, no more than 150 visitor days per year, and is mainly primitive type recreation. Only an estimated 15 visitor days of use involve vehicular access. Because use is low and would remain primitive with any of the alternatives, impacts on recreation use are not significant for the Daniels Canyon WSA. Impacts on the quality of opportunities for primitive and unconfined recreation are addressed as part of the analysis of imapcts on wilderness values.

8. Economic Conditions: There are no existing or anticipated mineral developments or proposals for lands or realty activities which would be impaired with or without wilderness designation. Because no economic developments are expected, and because recreational use would remain primitive, impacts on economic conditions for the Daniels Canyon WSA are not significant issues for the Final EIS.

- Issues Analyzed in Detail

The significant issues for the Daniels Canyon WSA are impacts on wilderness values of naturalness, opportunities for solitude and primitive recreation, and special features.

Comments made during the public comment period for the Draft EIS centered mainly on the inventory phase of the wilderness review, BLM's assessment of the value of wilderness vs. other resource values, and the relationship to Dinosaur National Monument. See Volume VII-C, Section I, for responses to specific comments about the Daniels Canyon WSA and Volume VII-B for responses to general comments applicable to all WSAs and/or the Statewide analysis.

DANIELS CANYON WSA

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Transfer of several WSAs, including the Daniels Canyon WSA, to NPS administration in adjacent NPS units has been proposed (Ninety Eighth Congress of the U.S., 1983). Such a transfer could occur in the future regardless of wilderness status.

Transfer of jurisdiction is considered by BLM to be a separate matter that would be evaluated on its own merits and could be implemented with or without wilderness designation.

In cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the BLM Wilderness Study Policy requires BLM to determine whether: (1) the WSA would be a viable independent candidate for designation as wilderness if Congress does not designate the contiguous land; and (2) if the WSA were designated as wilderness, whether the BLM portion could be more effectively managed by the agency which administers the contiguous wilderness area (USDI, BLM, 1982a).

BLM has determined that the Daniels Canyon WSA would not be a viable independent wilderness if adjacent NPS land is not also designated as wilderness. The question of which agency should manage the WSA to achieve overall management effectiveness will be addressed in the Wilderness Study Report. This decision will be based primarily on factors affecting both BLM and NPS jurisdictions; such as, relative amounts of the total wilderness area administered by each agency, principal public ingress and exit points, agency staffing and workload in the region, and similar nonenvironmental items. Environmental differences, if any, would be due to variations in BLM and NPS mandates and policy (e.g., national parks are closed to hunting while public lands are not) rather than from wilderness designation. These differences would exist with or without wilderness designation and; therefore, are not relevant to the analyses of impacts from wilderness designation.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action/No Wilderness (Proposed Action); and (2) All Wilderness (2,496 acres). A description of BLM's management practices for each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

- No Action/No Wilderness Alternative (Proposed Action)

With this alternative, none of the 2,496-acre Daniels Canyon WSA would be designated by Congress as part of the NWPS. The area would be managed in accordance with the Book Cliffs RMP (USDI, BLM, 1984e). No State, private, or split-estate lands are within the boundary of the WSA (refer to Map 1).

- Management Conditions and Constraints

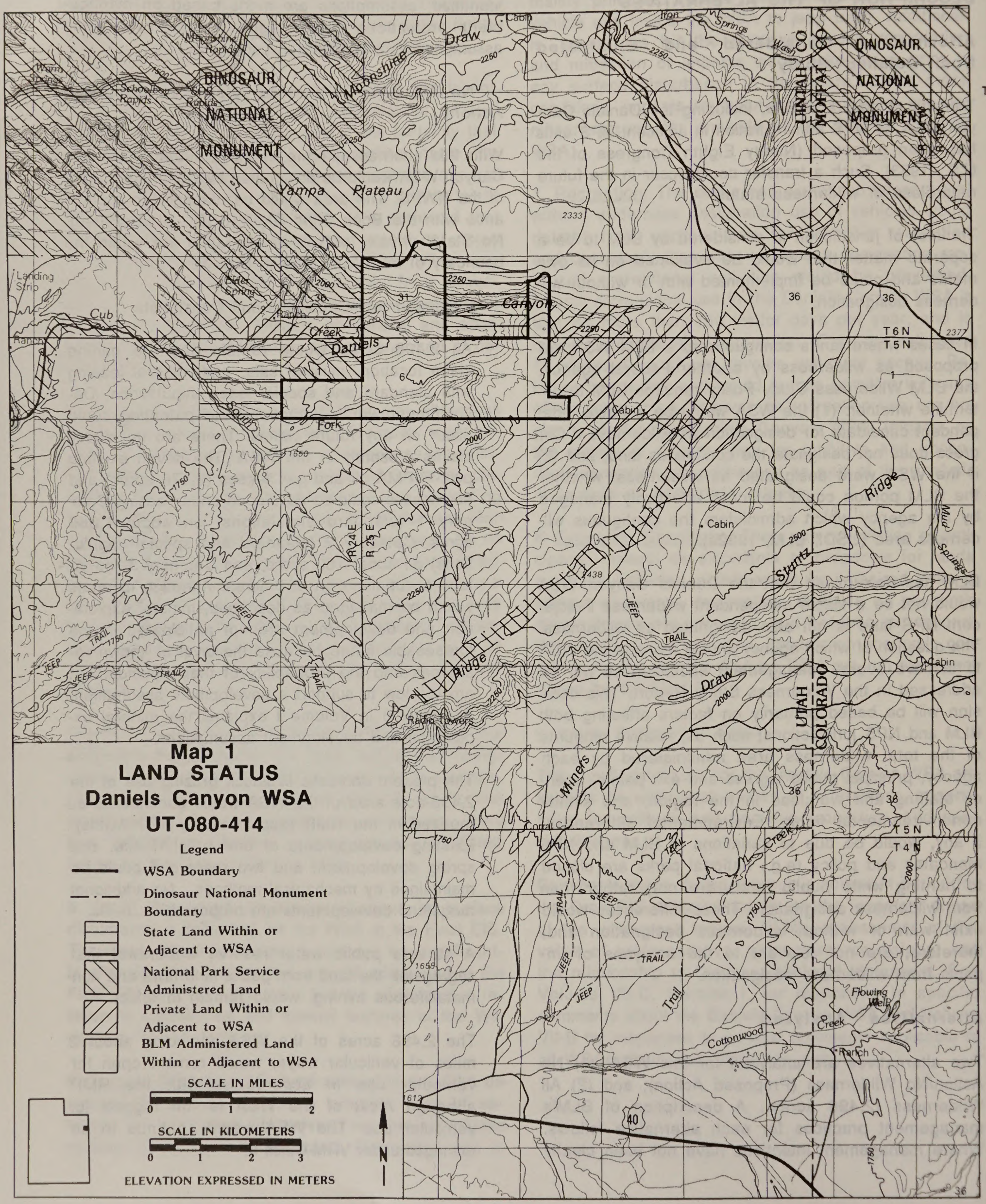
All 2,496 acres would remain open to mining claim location, mineral sale, and mineral leasing with standard and special lease stipulations. Development work, extraction, and patenting could occur on any future claims. There are no mining claims presently in the WSA. The seven existing post-FLPMA oil and gas leases (2,176 acres) and new leases could be developed under leasing Category 1 (standard stipulations) on about 1,869 acres, Category 2 (standard and special stipulations) on about 160 acres, and Category 3 (no surface occupancy) on 467 acres. Although minerals would be managed as described, mineral exploration and development are not anticipated in the foreseeable future because the level of known resources and the probability of their development are too low to support a development assumption. Appendix 6 in Volume I explains the mineral exploration and development assumptions.

The present domestic livestock grazing use of the 2,496-acre area of the WSA would continue as authorized in the RMP (approximately 179 AUMs). Existing developments of one brush fence, one spring development, and two reservoirs could be maintained by mechanical methods. No additional rangeland developments are proposed.

A 40-acre public water reserve withdrawal that segregates the land from public land laws and nonmetalliferous mining, would remain in effect.

The 2,496 acres of the WSA, including about 2 miles of vehicular ways, would remain open for vehicular use in accordance with the RMP although most of the WSA is too rugged for vehicular use. The WSA would continue to be managed under VRM Class II.

DANIELS CANYON WSA



Map 1
LAND STATUS
Daniels Canyon WSA
UT-080-414

Legend

- WSA Boundary
- Dinosaur National Monument Boundary
- State Land Within or Adjacent to WSA
- National Park Service Administered Land
- Private Land Within or Adjacent to WSA
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

- Action Scenario

It is projected that implementation of the No Action/No Wilderness Alternative would not result in any surface-disturbing activities in the foreseeable future. No mineral exploration or development is anticipated. No rangeland, wildlife habitat, watershed projects, or other developments are planned.

No disturbance is projected from ORV activity due to rugged terrain.

Recreation use is projected to increase over the current estimated 150 annual visitor days at a rate of 2 to 7 percent per year. Only 10 percent of the use would involve vehicular access on 2 miles of ways.

- All Wilderness Alternative

With this alternative, all 2,496 acres of the Daniels Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM Wilderness Management Policy (BLM Manual 8560) to preserve its wilderness character. This WSA is adjacent to Dinosaur National Monument and is contiguous with a 186,114-acre NPS-proposed wilderness. There are no State, Private, or split-estate lands in the WSA. The figures and acreages given are for Federal lands only.

- Management Conditions and Constraints

After wilderness designation, all 2,496 acres would be closed to new mineral leasing and mineral sale. Mining development, extraction, and patenting would be prohibited. Seven existing oil and gas leases involving 2,176 acres would be phased out upon expiration.

The approximately 179 AUMs in the WSA would remain available to livestock as presently allotted. Existing range developments as noted in the No Action/No Wilderness Alternative would be maintained based on practical necessity and reasonableness. No additional rangeland developments are expected following wilderness designation.
The entire 2,496-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR 8560 provisions. About 2 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 1 mile of the WSA boundary follows an existing dirt road that would remain open to vehicular travel.

Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.

- Action Scenario

No surface disturbance is projected following wilderness designation. Primitive-type recreation use is projected to increase over the current estimated 150 annual visitor use days at a rate of 2 to 7 percent per year.

Summary of Environmental Consequences

Table 1 summarizes the environmental consequences of the alternatives analyzed in detail.

AFFECTED ENVIRONMENT

This section describes the overall environmental setting. This information allows for independent assessment by the public as required by the CEQ guidelines and provides a data base for the cumulative Statewide analysis found in Volume I, as well as for the Environmental Consequences of Alternatives of this WSA analysis.

Unless otherwise indicated, information for this section was taken from BLM staff specialists, technical reports, and file documents.

Wilderness Values

- Size

The WSA contains 2,496 acres of public land, and is about 3 miles wide (east to west) and 2 miles long (north to south).

Because of the small size of this WSA (less than 5,000 acres), it does not qualify for wilderness status. However, the area qualifies for wilderness consideration under Section 202 of FLPMA because it is contiguous with a 186,114-acre proposed wilderness area within Dinosaur National Monument. Of the 2 miles of common boundary, 0.50 mile is contiguous to an area that has been formally recommended as wilderness. The initial NPS wilderness recommendation was submitted to Congress in August 1974. The

DANIELS CANYON WSA

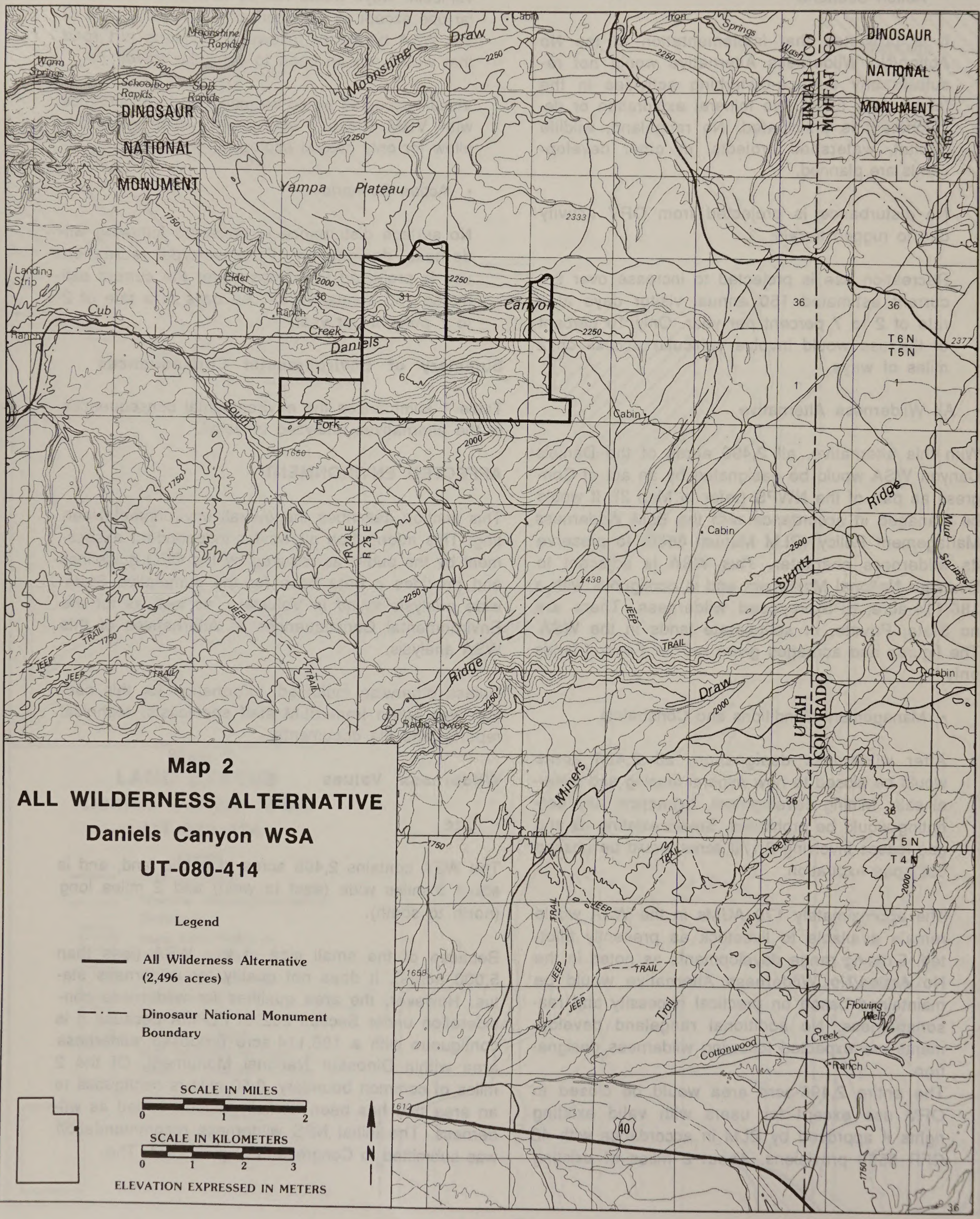
R. 24 E.

R. 25 E.

T. 6 N.

T. 5 N.

T. 4 N.



Map 2
ALL WILDERNESS ALTERNATIVE
Daniels Canyon WSA
UT-080-414

Legend

All Wilderness Alternative (2,496 acres)

Dinosaur National Monument Boundary

SCALE IN MILES
0 1 2

SCALE IN KILOMETERS
0 1 2 3

ELEVATION EXPRESSED IN METERS

N

DANIELS CANYON WSA

Table 1
Summary of Environmental Consequences

Resource	Alternatives	
	No Action/No Wilderness (Proposed Action)	All Wilderness (2,946 Acres)
Impacts on Wilderness Values	Wilderness values would not be protected by wilderness designation and loss would occur as intrusions increase. In the foreseeable future, no surface disturbing projects or other activities that would reduce the quality of wilderness values in the WSA are expected. This alternative would not enhance or complement wilderness values and management of the contiguous portion of Dinosaur National Monument, which is proposed by the NPS for wilderness designation.	Wilderness values would be preserved throughout the WSA. Designation would enhance and complement wilderness values and management of the contiguous portion of Dinosaur National Monument, which is proposed by the NPS for wilderness designation.

recommendation for the unit was revised and resubmitted in February 1978. To date, no Congressional action has been taken on the NPS recommendations.

- Naturalness

The WSA has only a few human imprints and none of these, when considered individually or collectively, greatly affect naturalness. There is an actively used stock drive trail along the side of Daniels Canyon. This trail resembles a hiking trail and does not affect outstanding naturalness. In Daniels Canyon, there is no imprint of man's work and it has retained its primeval character. Near the top of Blue Mountain, a 0.25-mile brush fence exists. Because it is made of local materials and well screened, it is not considered intrusive.

The biggest imprint on the surface is a small maze of jeep trails, about 2 miles, that wind along the top of a ridge near the southwest boundary. These trails are screened by the topography and juniper vegetation so that they are not noticeable from other portions of the unit. These were built for uranium exploration in the 1950s, receive little use now, and have eroded to four-wheel drive ways.

There are two livestock reservoirs in the WSA. They are small and unobtrusive. A spring developed many years ago located near the east boundary of the unit provides water to livestock. A trail leads to the spring. Development consists of a single trough that is secluded by vegetation. A short gap-fence, approximately 200 yards long, was built by NPS to mark the boundary of the monument along the west edge of the unit.

Overall, the imprint of man's work is substantially unnoticeable and the WSA meets the criteria for naturalness.

- Solitude

The Daniels Canyon WSA provides opportunities for solitude because of the topography and vegetation screening, especially in the northern half.

The terrain to the south is broken by a canyon and by a razor-backed ridge. Pinyon-juniper stands provide screening on the sloping terrain. The bottom of Daniels Canyon is rugged with screening provided by large boulders, tangled box elder branches, ledges, and water chutes.

From the upper elevations, there are panoramic views of Jensen and Vernal. However, because of the distance, no individual feature such as roads or prominent buildings are visible during the day. At night, only the lights of these towns and the airport beacon are visible. U.S. Highway 40, east of Jensen, is not visible nor are the highway noises audible under ordinary conditions.

The Blue Mountain road to the south of the WSA is an off-site distraction. The road is unpaved, frequently traveled during the summer (especially during the grouse and deer hunting season), and visible from locations within the unit.

Solitude is judged to meet the criteria for outstanding opportunities on all 2,496 acres.

- Primitive and Unconfined Recreation

Opportunities for hiking and horseback riding are present. Hiking or riding the livestock trail through the WSA can be done in 1 day. Panoramic views, photographic opportunities, and the chance to view wildlife or wildflowers in bloom add to the experience.

The common boundary with NPS lands is along a precipitous sanstone cliff which constitutes a natural barrier between the two units. Crossing from one unit to the other is nearly physically impossible for foot travelers.

Because of insufficient size, and lack of diversity in scenic attractions to enhance recreational opportunities, the primitive and unconfined recreational experience is not considered outstanding in the WSA.

- Special Features

Special features identified during the wilderness inventory include outstanding views of the surrounding countryside from within the WSA. Also, a number of archaeological sites exist, and there are opportunities for interpretation of the sites.

The WSA has resource values that, although not identified as such during the wilderness inventory, could be considered special features. There are three animal species (black-footed ferret, bald eagle, and peregrine falcon) listed as endangered that may occur in the WSA. There are eight animal and three plant species that are considered sensitive that may occur in the WSA. Cougar, which is a wildlife species associated with wilderness, is found in the WSA. Refer to

the Vegetation and Wildlife Including Special Status Species sections for additional information. The entire WSA is rated Class A for scenic quality. It has a perennial stream and springs.

- Diversity

This WSA is in the Rocky Mountain Forest Province Ecoregion and has the PNV type of sagebrush steppe. Refer to the Vegetation Including Special Status Species section for more discussion on ecoregions and PNV types. The ecoregion and PNV types represented by this WSA are compared with existing and other potential National Wilderness Preservation units in the Wilderness Values section of Volume I.

This WSA is within a 5-hour driving time from two standard metropolitan statistical areas. These are Salt Lake City-Ogden, Utah, and Provo-Orem, Utah.

Air Quality

The WSA is located in a PSD Class II area under the provisions of the Clean Air Act as amended. This classification permits moderate air quality deterioration. The nearest Class I area in Utah is Arches National Park about 108 miles to the south. The Colorado portion of Dinosaur National Monument, 4 miles to the northeast, is classed as Colorado Category I which is about the equivalent of Federal PSD Class I.

Geology and Topography

The Daniels Canyon WSA is on the northeastern edge of the Uintah Basin, in that region between the Rocky Mountains of Colorado and the Wasatch Range of central Utah. It is in the Colorado Plateau Physiographic Province. The basin is bounded on the north by the Uintah Mountains and on the south by the Roan Cliffs and the Book Cliffs escarpment. Elevation ranges from 5,600 feet along Cub Creek to 7,720 feet on the eastern boundary of the area. The area is characterized along the northern part of the unit by outcrops of Weber Sandstone and Park City Formations, with a small area of Brown's Park Formation on the east boundary. The nearly white Weber Sandstone, which forms the near vertical canyon walls along Daniels Canyon, slick rock ledges, and erosional sink holes, contrasts with the red rock exposures of the Moenkopi, making the area one of high visual contrast. The most spectacular landform is Daniels Canyon. It is a narrow cut through cream-colored sandstone with a steep wall rising 900 feet on the south side and 1,600 feet on the north.

Soils

Soils in the WSA are deep in the flatter canyon bottoms and shallow on slopes from 10 to 80 percent. Steeper slopes of over 40 percent have a critical erosion condition at present and high erosion hazard. Miscellaneous landforms such as rock outcrops and badlands make up 35 percent of the WSA. Table 2 summarizes soil erosion condition classes within the unit.

Table 2
Erosion Condition

Classification	Annual Soil Loss (cubic yards/acre)	Acres	Percent of WSA	Total Annual Soil Loss (cubic yards)
Severe	5.4	0	0	0
Critical	2.7	560	22	1,512
Moderate	1.3	900	37	1,710
Slight	0.6	160	6	144
Stable	0.3	0	0	0
Barren (rock	0.0	876	35	0
Total		2,496	100	3,366

Sources: USDI, BOR, 1975; USDI, BLM, 1984e; USDA, SCS, 1978.

The salinity class is estimated as non-saline. Because most of the soils are in a slight to moderate erosion condition, annual salt loss is estimated at 15 lb per acre. Most of the WSA (75 percent) is judged to be unsuitable for reseeding, due to rock outcrops and steep slopes of up to 80 percent. The rehabilitation potential of the remainder of the WSA is poor to fair due to channery/gravelly loams. The 10 to 18 inches of annual precipitation generally offsets the adverse soil conditions to support vegetative cover.

Vegetation Including Special Status Species

Three major vegetation types are in the WSA (refer to Table 3). The WSA also includes barren land, mostly rock outcrops and badlands.

Table 3
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Shrubs, grasses, forbs	635	25
Barren	876	35
Pinyon-juniper and sagebrush	950	39
Conifer	35	1
Total	2,496	100

Source: USDI, BLM, 1984e

Vegetation changes with aspect. The upper northern slopes consist of heavy shrub cover of mountain mahogany, serviceberry, and big sagebrush. Scattered pinyon pine trees also grow here with densities of both juniper trees and pinyon pine increasing at lower elevations. Southern exposed slopes are dominated by pinyon-juniper woodland with a low density understory of shrubs and grass. At the highest elevation and on the eastern and northern edges of the WSA are small stands of Ponderosa pine totaling approximately 35 acres. The flat canyon bottoms consist of greasewood, big sagebrush, and various grasses. Surrounding the spring and along the stream in lower Daniels Canyon are patches of box elder trees. No threatened or endangered plant species are known to occur in the WSA. One Category 2 candidate species, Oenthera acutissima, may occur in the WSA (see Appendix 4 in Volume I).

The WSA also contains potential habitat for two endemic plant species, Astragalus chloodes and Astragalus saurinus. These plants may be found in the lower western portions of the unit. They are, however, locally abundant in the Uintah Basin with numerous populations and no serious threats to the survival of the species exist. No other special status plant species are known to occur in the WSA.

The Daniels Canyon WSA is located in the Rocky Mountain Forest Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, USGS, 1978). The PNV type in the WSA is sagebrush steppe.

Water Resources

The main drainage in the Daniels Canyon WSA is Cub Creek, which flows into the Green River in the Upper Colorado River hydrologic subregion.

Water resources of the Daniels Canyon WSA include Cub Creek, two springs, and several seeps. The two reservoirs in the WSA hold water most of the year. Their capacity is less than 1 acre-foot. No information is available on the quality or quantity of water in the springs.

One of the two springs is located in the bottom of Daniels Canyon. The spring is perennial and is a principle contributor to Cub Creek. The second spring produces only sufficient water to maintain a stockwatering trough and is located near the head of Daniels Canyon.

The amount of water stored in reservoirs and flowing from seeps and springs is adequate at the present time for livestock and wildlife needs.

The WSA is within Water Right Adjudication Area 45. The waters in this area are not fully appropriated. This area is closed to filing on surface waters, except for isolated springs. Groundwater and isolated springs will be considered for 0.015 cfs only, together with uses limited to domestic purposes for one family, 0.25-acre of irrigation and reasonable stockwatering. Fixed time (normally approved for 5 years) and temporary applications may be approved in excess of the 0.015 cfs limit (UDNRE, DWR, 1988).

BLM has several claims to water for stockwatering within the unit. Table 4 shows the water claim numbers and location for all BLM claims.

Table 4
BLM Water Claims

Water User Claim No.	Source	Location	Use
49-779	Lower Doc's Valley Reservoir	T. 4 S., R. 25 E., Sec. 31	Stockwatering
49-780	Upper Doc's Valley Reservoir	T. 4 S., R. 25 E., Sec. 31	Stockwatering
49-949	Cub Creek	T. 4 S., R. 25 E., Sec. 33	Stockwatering
49-950	Tributary to Cub Creek	T. 4 S., R. 25 E., Sec. 33	Stockwatering
49-951	Cub Creek	T. 4 S., R. 25 E., Sec. 31	Stockwatering
49-952	Tributary to Cub Creek	T. 4 S., R. 25 E., Sec. 31	Stockwatering
49-953	Tributary to	T. 5 S., R. 25 E., Sec. 5	Stockwatering

Source: BLM File Data.

A local rancher in this area claims that all waters of Cub Creek drainage have been decreed to his ranch by a court decision dated April 6, 1916, Fourth Judicial District Court. He indicates possible long-term plans for development and use of the water for irrigation downstream of the WSA.

Water quality standards for Cub Creek and tributaries from confluence with Green River to headwaters have not been set by the State. BLM will manage the creek waters, until the State classifies it, as follows: Class 3C (protected for non-game fish and other aquatic life) and Class 4 (protected for agricultural uses, including irrigation of crops and stockwatering). Water

quality of springs and reservoirs within the WSA is adequate for all existing benefitting uses.

Mineral and Energy Resources

The Daniels Canyon WSA has no past history of mineral significance and the occurrence of minerals is speculative. The energy and mineral resource rating summary for the Daniels Canyon WSA is given in Table 5. Appendix 5 in Volume I explains the mineral and energy resource rating system.

Table 5
Mineral and Energy Resource Rating Summary

Resource	Rating: Favorability[a]	Rating: Certainty[b]	Estimated Resource
Oil and Gas	f 2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas (in-place)
Geothermal	f 2	c2	Low temperature
Uranium/Vanadium	f 2	c1	Less than 500 tons

Source: SAI, 1982; USDI, BLM, 1987.

[a]Favorability of the WSA's geologic environment for a resource (f1 = lowest favorability or smallest size deposit; f4 = highest favorability or largest size deposit).

[b]The degree of certainty that the resource does or does not exist within the WSA (c1 = lowest and c4 = highest).

Although highly speculative, vanadium is the only critical material that may be found in the WSA (USDoD, 1988).

- Leasable Minerals

  - Oil and Gas

    Nearly all of the Uintah Basin can be considered prospectively valuable for energy-related minerals. The Uintah Basin is a major structural depression. At the northern and deepest end of the basin, sedimentary strata younger than pre-Cambrian age total about 32,000 feet, although 80 percent of this thickness is accounted for by Upper Cretaceous and Tertiary rocks (Ritzma, 1972). Rocks younger than Jurassic age are not preserved in the Daniels Canyon WSA.

    The principal oil and gas fields in the Uintah Basin produce from Tertiary rocks. The oldest productive unit is the Weber Sandstone of Permo-Pennsylvanian age in the Ashley Valley field about 10 miles southwest of the WSA. Because Jurassic and younger rocks are not preserved in the WSA (except for remnants of the Brown's Park Formation of Tertiary age), little correlation exists between the WSA and oil and gas production in the rest of the basin. The Daniels Canyon WSA is between two large anticlines: Split Mountain, 4 miles to the north; and the Section Ridge/Blue Mountain anticline, 4 miles to the south. The structural favorability of the WSA for oil and gas accumulations is, therefore, low. Furthermore, deep erosion by the Green River at Split Mountain and Whirlpool Canyon, a few miles to the north, has exposed the entire Paleozoic section. If oil and/or gas accumulations exist in the WSA, they are most likely to occur as small accumulations in stratigraphic traps (SAI, 1982). At best, the Dan-iels Canyon WSA has a favorability of (f2) for a shallow gas field (SAI, 1982). The certainty that oil and gas resources exist in the WSA is low be-cause few wells have been drilled in the vicinity. Currently, 2,176 acres, representing 87 percent of the unit, are leased for oil and gas.

    Table 6 summarizes the leasing status for the Daniels Canyon WSA.

Table 6
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Pre-FLPMA leases	0	0
2. Post-FLPMA leases	2,176	87
3. Unleased-Open to future	320	13
Total	2,496	100

Source: BLM File Data.

The entire WSA is covered by BLM's oil and gas category system. Category 1 contains 1,869 acres; Category 2 contains 160 acres; and Category 3 contains 467 acres (USDI, BLM, 1984e).

- Oil Shale and Tar Sand

  Oil shale is related to the sediments (comprising the Green River Formation) which were deposited in ancient Lake Uintah, a body of water that covered about 20,000 square miles in the present-day area of the Uintah and Piceance Creek basins. Oil shale is not known to exist in the vicinity of the WSA.

  Several of the 50 plus tar sand deposits identified throughout the State of Utah are located within the Uintah Basin. The in-place oil is found primarily in the sandstones and siltstones of the

Duchesne, Green River, and Mesaverde Formations. A minor oil-impregnated rock deposit occurs about 6 miles northwest of the WSA. The oil there occurs in limestone of the Park City Formation of Permian age. Permian rocks underlying Daniels Canyon may also contain some heavy oils but such deposits, if they indeed exist, are not considered to be a usable resource. On this basis, the WSA has no potential for tar sand. The certainty that this resource does not exist at depth in the WSA is (c3), or moderate (SAI, 1982).

- Coal

Bedrock at the surface of the WSA consists of sedimentary rocks of Triassic age, underlain by Paleozoic rocks. Because these rocks are not known to be favorable for coal resources anywhere in the region, there is a high certainty, (c4), that coal resources do not exist, and an (f1) favorability in this WSA (SAI, 1982).

- Phosphate

Although phosphate-bearing rocks occur west of the Split Mountain anticline, there is no evidence that phosphate beds occur in the vicinity of the WSA. The unit has an f1 favorability with a c4 or high certainty (SAI, 1982).

- Geothermal

The overall geothermal potential of eastern Utah is considered to be low. Thermal waters less than 60 degrees Centigrade (C) have been reported from many oil and gas fields in the Uintah Basin. At the Ashley field, 10 miles southeast of the WSA, thermal waters up to 56 degrees C have been produced at depths of about 4,200 feet. Near Split Mountain, about 5 miles northwest of the WSA, a warm spring discharges 30 degrees C water into the Green River (National Oceanic Atmospheric Administration, 1979).

Low-temperature thermal waters (less than 90 degrees C) could underlie the Daniels Canyon WSA at relatively shallow depths (less than 1,000 feet). Because of the low temperatures of nearby thermal springs and wells, the WSA has a low geothermal favorability. The certainty that geothermal resources exist is (c2).

- Locatable Minerals

Locatable mineral activity is governed by the mining law of 1872. Under this law, the mining claimant has the right to locate, develop, and produce mineral resources on open public land. The Daniels Canyon WSA has no existing mining claims. It has no demonstrated value for locatable minerals, no history of economic production of locatable minerals, and is not considered potentially valuable for locatable minerals.

- Uranium and Vanadium

The existing geologic environment may contain uranium-vanadium or copper deposits but this is highly speculative.

Remnants of the Chinle Formation are preserved in the WSA and it seems reasonable to speculate that small accumulations of uranium and/or vanadium may be contained in these rocks. Uranium is reported to occur about 2 miles southwest of the tract, within the Gartra Grit Member of the Chinle Formation. The ore is subeconomic and occurs in areas of carbonaceous material. Older rocks within the tract apparently have very little uranium potential. The favorability is (f2) with a very low certainty of (c1) (SAI, 1982).

- Copper

The most important copper mine in the vicinity of the Daniels Canyon WSA is the Dyer Mine located in the Uintah Mountains about 30 miles to the northwest. Copper was produced intermittently up until 1941 and probably less than 1,000 tons of copper ore were ever shipped from the Dyer Mine. In 1896, copper was discovered in the Manning Canyon Shale (Mississippian age) near the mouth of the Sage Creek where it empties into Whirlpool Canyon on the Green River. The prospect/mine is about 8 miles northeast of the WSA. It is reported that about 5 tons of ore containing about 55 percent copper and about 69 ounces of silver per ton were recovered at this locality in 1899.

Small pockets of copper-bearing rocks could be contained in Triassic and older sedimentary rocks in the WSA but such deposits would be more of a curiosity than a copper resource.

- Salable Minerals

There is currently a building stone quarry outside and 0.50 mile south of the southeast corner of the WSA. This is an unusual deposit where large blocks of sandstone have been exfoliated on the surface making them easily accessible. There is no similar occurrence within the WSA. Non-economic deposits of poorly sorted landslide material (rock fragments) occur within the eastern part of the WSA.

Wildlife Including Special Status Species

Wildlife present in the WSA include mule deer, mountain lion, coyote, cottontail, and jack rabbit, in addition to many small mammals and rodents such as deer mice and kangaroo rats. Limited numbers of sage grouse are sometimes found along the eastern boundary. A variety of non-game birds can be observed at various times of the year, ranging from golden eagle to scrub jay and downy woodpecker.

No threatened or endangered species are year-round residents of the WSA. Occasionally, peregrine falcon and bald eagle (both endangered species) may pass through the area during spring and fall migration. A small reintroduced population of peregrine falcon is known to exist near the Yampa River in Dinosaur National Monument. These birds occupy an area approximately 5 to 6 miles distant and are not known to have frequented this WSA. FWS has also identified the WSA as potential habitat for the endangered black-footed ferret. The golden eagle is a BLM sensitive species. Other special status species that could occur in the WSA are seven Category 2 candidate species. These are the ferruginous hawk, long-billed curlew, western snowy plover, western yellow-billed cuckoo, white-faced ibis, mountain plover, and Swainson's hawk. Refer to Appendix 4 in Volume I for details.

The lower elevations of the unit provide habitat for wintering mule deer; numbers depends on the severity of the weather. The area is popular for deer hunting, especially the eastern portion of the unit. The area is not classified as critical habitat by the UDWR.

No management facilities or treatments for wildlife have been proposed for the WSA.

Forest Resources

Historically, the WSA has never been important for firewood gathering or pine nut harvesting. A few small stands of Ponderosa pine, about 35 acres, grow in the area. Because of low site productivity and the difficulty to obtain reproduction, these stands are classified as nonproductive. The highest potential is for watershed protection and wildlife habitat.

The pinyon-juniper woodland (950 acres) has very low commercial value because it grows in a remote area not accessible by motor vehicle, and volumes per acre are less than seven cords. There is no harvest in the WSA at the present time nor is any expected in the foreseeable future.

Livestock and Wild Horses/Burros

The Daniels Canyon WSA includes parts of three grazing allotments used by six permittees. There are about 179 AUMs of forage produced annually within the WSA. Table 7 lists livestock grazing use data for the WSA.

Present livestock management facilities include one brush fence, one spring development, and two reservoirs. Livestock use some of the ways to trail through this unit from Cub Creek (Josie Morris Ranch) to the top of Blue Mountain.

Because of the rugged terrain and sparse quantities of desirable forage, use by livestock is low in comparison with adjacent areas. The entire area consists of steep slopes, shallow soils, and terrain best suited for wildlife. This rough topography precludes any type of range treatment and at the same time has created natural livestock fences and barriers. No agricultural lands exist.

There are no populations of wild horses or burros that range through this area.

The area has been under predator control. A total of 35 coyotes were taken in the three allotments in and around this WSA in 1986 and 1987. Eleven were taken from fixed wing aircraft, 17 from helicopters, four with M-44s, and three were shot (USDA, APHIS, 1988).

Visual Resources

Daniels Canyon consists of steeply sloping exposed rock outcrops. It is a boulder-filled canyon that intermittently runs water. The skyline is smooth to irregular. Line is expressed in the various rock formations, skyline, and intersecting planes of ridges. Soil colors vary from red-brown to sharply contrasting cream. Scattered pinyon-juniper woodland is grey-green.

DANIELS CANYON WSA

Table 7
Livestock Grazing Use Data

Allotments	Total Acres	Acres in WSA	Total AUMs	Number of AUMs in WSA	Number and Kind of Livestock	Season of Use	Number of Operators
Cub Creek	872	872	55	55	20 Cattle	06/01-08/20	1
Doc's Valley*	8,555	450	1,219	61	135 Cattle 1,760 Sheep 7 Horses	05/01-10/31	2
Green River*	19,178	1,171	1,174	63	154 Cattle 2,800 Sheep	11/01-01/24 04/06-05/07	3
Total	28,605	2,496	2,445	179			6

Source: BLM File Data.

*Dual use areas.

The area is scenic and affords some excellent panoramic views to the west. External sights and sounds visible from certain viewpoints, but not strongly intrusive, include glint from a metal building 6 miles to the west, townsites of Vernal and Jensen, at night the beacon at the Vernal Airport, distant vehicular traffic lights, radio transmission towers on top of Blue Mountain 3 miles to the south, and a dirt road on the north side of Blue Mountain. Positive external sights from certain viewpoints include spectacular views of the Green River, Pelican Lake, and the Uintah Mountains to the west. The townsites are at a distance far enough that no single building or road is discernable.

BLM visual resource evaluations assessed scenic quality as Class A on all 2,496 acres. Public concern for scenic quality preservation (expressed as sensitivity) is high; however, most of the area is seldom seen.

The resulting VRM class for the area (2,496 acres) is Class II. Refer to Appendix 7 in Volume I for an explanation of the BLM VRM rating system.

The modifications that have occurred in the unit are not highly visible. A fence created by bulldozing a linear pattern of juniper is out of context and creates contrast that is noticeable during the winter. The livestock trail is noticeable but not dominant and meets VRM Class II requirements.

Cultural Resources

There are 82 recorded archaeological sites in the vicinity of the WSA (USDI, BLM, 1988b). Most of these archaeological sites are concentrated outside the WSA, downstream along Cub Creek. These sites encompass a wide range of habitation and cultural utilization. The majority of the recorded sites belong to the Fremont Culture of 500 to 1250 A.D.

Daniels Canyon contains some rock shelters of which many had cliff dwellings and storage pit ruins. Dwellings show minimal vandalism.

Of historic interest is the Josie Morris Ranch within Dinosaur National Monument. Three to four thousand Monument visitors tour the ranch annually. This ranch, where the road ends, is a natural trailhead to Daniels Canyon and is located approximately 1.1 miles from the WSA's western boundary.

Recreation

Recreational activities available in the WSA include dayhiking, geologic sightseeing, and photography. Dayhiking opportunities are good because the area is very accessible and a trail already exists. The trail leads from the Josie Morris Ranch to the head of Daniels Canyon. Along the trail vistas of the Uintah Basin, the minarets of Split Mountain Gorge, the meandering Green River, the exposed red rock ledges of the Moenkopi Formation, and the white steeply sloping rock of the Weber Sandstone make the area one of high visual contrast.

DANIELS CANYON WSA

Erosional forces have exposed several geologic formations and are evident even to the casual observer. The geologic features, contrasts in vegetation, and panoramic views provide subjects for the photographer.

The existing trails lend themselves to the horseback rider. Extended rides to the mesa top of Blue Mountain and to observation points, within Dinosaur National Monument looking into the Split Mountain Gorge, afford recreational opportunities. However, steep rugged terrain makes it difficult for foot travel beyond this point. Deer and limited sage grouse hunting is popular in the fall, especially at the higher elevations of the WSA.

Daniels Canyon provides a highly rugged and scenic dayhike. Visitors park at the Josie Morris cabin and hike up Daniels Canyon or park on Blue Mountain, at the northeast boundary, and hike down. Forms and patterns are varied, with water chutes, slick rock ledges, smooth-sided potholes, and huge boulders jumbled together. A small stream flows from a spring in the lower portion of the canyon.

Visitor use within the unit is estimated at 150 visitor days, of which 50 days of use is attributed to hunting. No more than 15 of the 150 use days involve vehicular access on approximately 2 miles of way. There is no commercial recreational use in the WSA.

The entire WSA is open to ORV use, but the rough terrain limits this use to existing ways.

Land Use Plans

The BLM land use plan for this area (Book Cliffs RMP) indicates multiple-use management with restrictions on oil and gas drilling on 627 acres adjacent to Dinosaur National Monument and requires careful evaluation of any proposed developments.

The Book Cliffs RMP does not address wilderness designation or nondesignation. Wilderness designation is part of the BLM multiple-use concept and the BLM land use plan in linked to the Statewide Wilderness EIS through analysis of the present plan as the No Action/ No Wilderness Alternative.

Two commonly used points of access to the unit are from the Josie Morris Ranch in Dinosaur National Monument or from the top of Blue Mountain. From the Josie Morris side, a combined distance of 0.75 mile of State and NPS land must be crossed. No access problems are apparent for the Federal land. From Blue Mountain on the east side, approximately 0.50 mile of private land must be crossed. Roads cross the private land but no public easements have been secured. Public access across private land may cause problems in the future.

The Daniels Canyon WSA is contiguous with 186,114 acres in Dinosaur National Monument that are administratively endorsed for wilderness by the NPS.

In response to H.R. 1214, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit and found that with additional acreage the Daniels Canyon WSA would supplement the values of the monument (USDI, NPS, 1984a and 1984b). The Secretary of the Interior recommends the Daniels Canyon WSA and other adjacent land (totalling 5,818 acres) as suitable for inclusion into the adjacent unit of the National Park System (U.S. Secretary of the Interior, 1985). No congressional action has been taken on the NPS recommendation.

The WSA is BLM-administered public land. There are no State-owned lands in the WSA. However, the Utah State Legislature passed S.C.R. No. 1 in 1986 opposing any additional wilderness designation in Utah. There are no private lands in the WSA.

The Uintah County Commission has endorsed the Consolidated Local Government Response to Wilderness (Utah Counties, 1986) that opposes wilderness designation of BLM lands in Utah.

Socioeconomics

- Demographics

The WSA is in Uintah County. From 1970 to 1980, the population of Uintah County grew from 12,684 to 20,700, an overall increase of about 63 percent. Table 8 presents baseline and projected population data for Uintah County. It is estimated that between 1980 and 1987, the population increased to about 22,800. Population projections indicate that the number of people living in Uintah County in the year 2010 will be about 32,900 for about a 59 percent increase of 1980 levels (Utah Office of Planning and Budget, 1987).

- Employment

Table 8 shows the baseline and projected total employment for Uintah County to the year 2010.

Table 8
Baseline and Projected Population and Employment Growth
Uintah County

	1980	1990	2000	2010
Population	20,700	23,700	25,500	32,900
Employment	8,211	9,400	11,200	14,400

Source: Utah Office of Planning and Budget, 1987.

Uintah County is in the Uintah Basin MCD. Table 9 shows the baseline (1980) and projected employment by source for the MCD to the year 2010. In 1980, the leading employment sectors for the Uintah Basin MCD were mining (19 percent), government (17 percent), and trade (16 percent). Services provided approximately 12 percent of the direct employment in the MCD.

Table 9
Uintah Basin Multi-County District
Employment[a]

	1980	1990	2000	2010
Agriculture	1,427	1,300	1,300	1,300
Mining	2,741	1,700	2,000	2,700
Construction	573	600	900	1,300
Manufacturing	357	400	500	600
Transportation, Utilities	865	1,000	1,300	1,800
Trade	2,340	2,900	3,500	4,600
Finance, Insurance, Real Estate	237	300	300	400
Services	1,771	2,300	3,000	3,900
Government	2,426	3,100	3,100	4,000
Nonfarm Proprietors	1,662	1,800	2,300	3,000
Totals	14,399	15,400	18,200	23,600

Source: Utah Office of Planning and Budget, 1987.

[a]Includes Daggett, Duchesne, and Uintah Counties.

It is projected that by the year 2010, employment in the MCD will increase by up to 64 percent. Services will increase to 16 percent and trade to 19 percent of the total. Mining will decline to 11 percent. Government employment will remain at the same percentage.

- Sales and Revenues

Economic-related activities in the WSA include livestock production and recreation. Table 10 summarizes local sales and Federal revenues from the WSA. Appendix 9 in Volume I identifies the multipliers used to estimate sales and revenues.

The WSA has no mining claims. No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Table 10
Sales and Revenues

Source	Estimated Annual Local Sales[a]	Estimated Annual Federal Revenues
Oil and Gas Leases	None	$4,352
Livestock Grazing	$3,580	$276
Recreational Use	$ 615	0
Total	$4,195	$4,628

Sources: BLM File Data; Appendix 9 in Volume I.

[a]Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Six livestock operators have a total grazing privilege of 179 AUMs within the WSA. If all this forage were utilized, it would account for $3,580 of livestock sales and $895 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures are insignificant to the local economy. The WSA's motorized recreational use and related local expenditures are low. They are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). The Statewide average local expenditures per recreational visitor day for all types of recreation in Utah are approximately $4.10. The recreational use for Daniels Canyon WSA is estimated to be about 150 visitor days per year.

The WSA provides $4,352 in Federal revenues from seven oil and gas leases (2,176 acres). Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 179 AUMs per year. Based on a $1.54 per AUM grazing fee, the WSA can potentially generate $276 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM District for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section describes the environmental consequences of implementing the alternatives. The analysis is based on the BLM management actions and

anticipated activities presented in the Introduction to Volume VI and the Description of the Alternatives section for the Daniels Canyon WSA.

No Action/No Wilderness Alternative (Proposed Action)

- Impacts on Wilderness Values

Since the WSA would not be designated wilderness, the identified wilderness values would not receive the degree of protection afforded by application of the Wilderness Management Policy. Wilderness values in the WSA would be somewhat protected by limitations placed on potential surface-disturbing activities (i.e., VRM Class II management of all 2,496 acres and oil and gas Category 3 [no surface occupancy] management on 467 acres).

No development would be expected in the foreseeable future that would affect wilderness values.

The 2 to 7 percent increase in visitor use that would occur over time would not be expected to reduce wilderness values because the use is expected to be small and mainly primitive in nature.

This alternative would not enhance or complement wilderness values and management of the contiguous portion of Dinosaur National Monument, which is proposed by the NPS for wilderness designation and management.

The degree to which disturbance would occur over the long term and; therefore, the long-term loss of wilderness values that would occur is not accurately known. Loss would occur as intrusions increase.

Conclusion: Wilderness values would not be protected by wilderness designation, and loss would occur as intrusions increase. In the foreseeable future, no surface disturbing projects or other activities that would reduce the quality of wilderness values in the WSA are expected.

All Wilderness Alternative (2,496 Acres)

- Impacts on Wilderness Values

Designation and management of all 2,496 acres as wilderness would preserve the wilderness values in the Daniels Canyon WSA. The potential for surface- disturbing activities would be eliminated through closure of the entire area to future mineral leasing and location and to ORV use, and through management of the area as VRM Class I, which allows for only natural ecological change. Naturalness and outstanding opportunities for solitude would be preserved on all 2,496 acres which meet the standards for these values. Opportunities for primitive and unconfined recreation would also be preserved, although none of the WSA meets the standards for outstanding opportunities. Resources that could be considered as special features in the WSA, including Class A scenery, endangered and other special status species, archaeological values, and wildlife associated with wilderness, would also be preserved.

Increased visitor use that would occur over time would be managed so as to not result in loss of wilderness values.

Designation would enhance and complement wilderness values and management of the contiguous portion of Dinosaur National Monument, which is proposed by the NPS for wilderness designation.

Conclusion: Wilderness values would be preserved throughout the WSA.

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