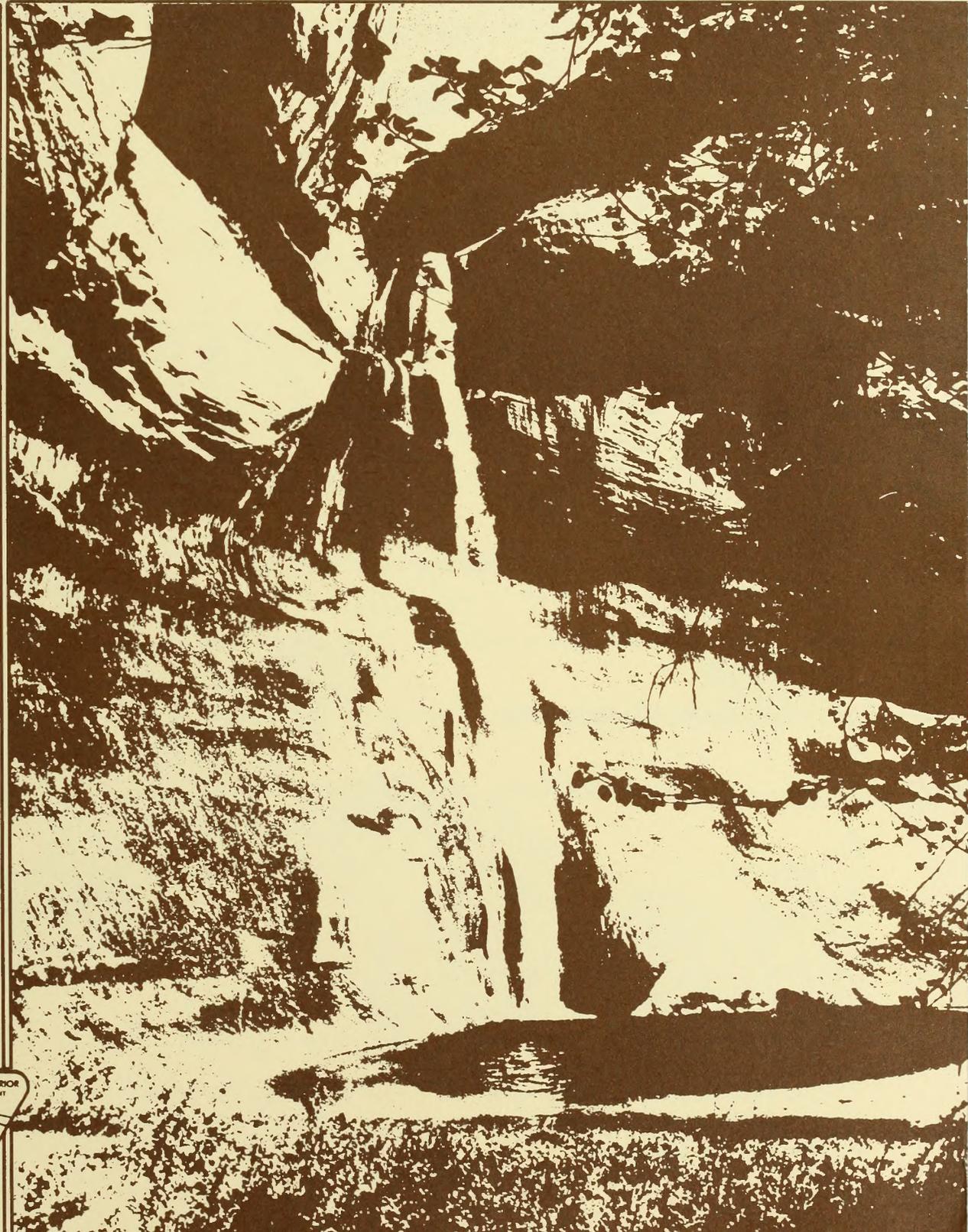


Utah BLM Statewide
Wilderness Draft
Environmental Impact
Statement

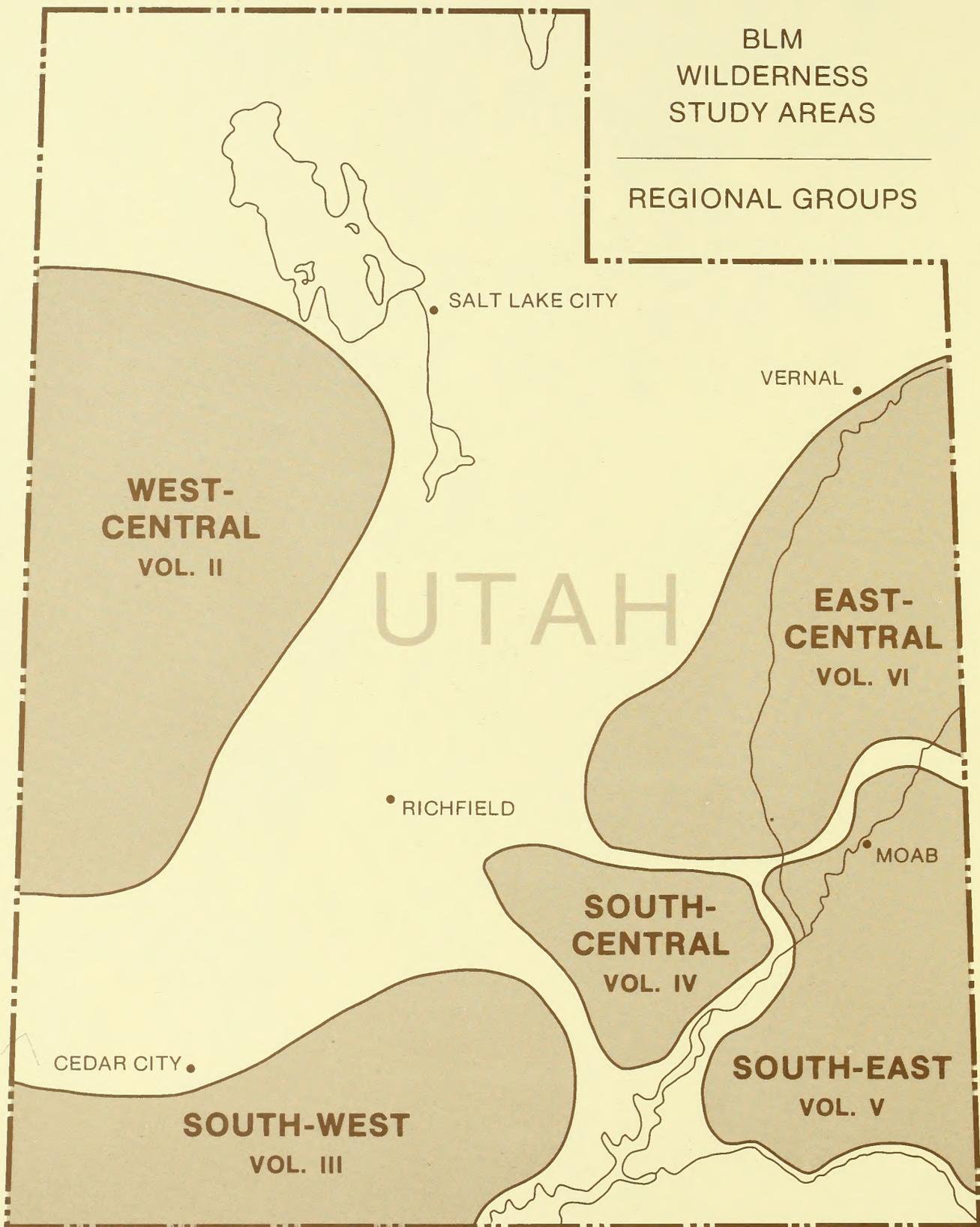
Volume III
Part A
South-West
Region



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

March 3





This is **Volume III** of a six volume set. Volume I is the statewide overview. It contains the Glossary and Appendices for all volumes. Volumes II-VI contain analyses for individual Wilderness Study Areas.

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Volume III Part A South-West Region

Cougar Canyon WSA	_____
Red Mountain WSA	_____
Cottonwood Canyon WSA	_____
LaVerkin Creek Canyon WSA	_____
Deep Creek WSA	_____
North Fork Virgin River WSA	_____
Orderville Canyon WSA	_____
Parunuweap Canyon WSA	_____
Canaan Mountain WSA	_____
Moquith Mountain WSA	_____
The Blues WSA	_____
Mud Spring Canyon WSA	_____
Paria-Hackberry WSA	_____
The Cockscomb WSA	_____

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Cougar Canyon WSA



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COUGAR CANYON WSA

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COUGAR CANYON WSA

(UT-040-123)

INTRODUCTION

General Description of the Area

The Cougar Canyon Wilderness Study Area (WSA) (UT-040-123 and NV-050-0166) is located in the northwest corner of Washington County, Utah, adjoining the northeast portion of Lincoln County, Nevada. The WSA contains 15,968 acres (10,568 in Utah and 5,400 in Nevada). There are no State or privately owned lands within the WSA.

The Cougar Canyon WSA is characterized by hot summers and relatively short, mild winters. Maximum temperatures in midsummer range from 80 degrees to over 100 degrees Fahrenheit (F). Maximum winter temperatures range from 34 to 44 degrees F, and minimum winter temperatures range from 10 to 28 degrees F. Cold spells in the winter are rare and of short duration. The average annual precipitation varies between 12 and 15 inches in the WSA.

The WSA is at the headwaters of Beaver Dam Wash and is adjacent to Clover Mountain, which extends east-west from Nevada to Utah. Dixie National Forest and Beaver Dam State Park border the WSA. Portions of the WSA are characterized by steep mountainous canyons, long ridges, and rough drainages. There are three main vegetation types in the WSA: pinyon-juniper, sagebrush, and riparian.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs and concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. General issues and concerns are discussed in the Scoping section of Volume I rather than in analyses for individual WSAs.

The issues and concerns specific to the Cougar Canyon WSA raised as part of the scoping process (USDI, BLM, 1984) are listed and responded to below:

1. *Comment:* Flood control development may be needed in Cougar Canyon. Would these structures or improvements be preserved if the area is designated wilderness?

Response: After designation developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness). Erosion condition in the

WSA is moderate to severe but no effects on water or other resources have been identified. No improvements are proposed in the area under current BLM land use plans.

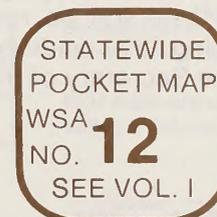
2. *Comment:* The occurrence of the sensitive plant species *Epilobium nevadense* in or near this WSA should be a factor in the decisionmaking process.

Response: According to present inventories *Epilobium nevadense* is found within and adjacent to the WSA. It has been collected from several locations on the Beaver Dam Mountains in Utah and Charleston Mountains in Nevada. It is currently a U.S. Fish and Wildlife Service (FWS) candidate species under review for threatened or endangered status. The analysis of the All Wilderness Alternative shows that a reduction in amount of disturbance would be beneficial to the species. However, even under the No Action Alternative, populations of *Epilobium nevadense* would be protected from surface-disturbing activities.

3. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs [headwaters of Beaver Dam Wash]) and impede development in local communities.

Response: This issue is not addressed in this analysis because there are currently no Federal or State plans for construction of reservoirs on streams within the WSA. Local communities have not identified a definite need for water sources within the WSA and it is not proposed to construct reservoirs within the WSA.

4. *Comment:* Size is adequate in terms of WSA guidelines. Size that meets wilderness qualifications is much less than the recommended size. All other normal considerations that are mandated as part of the Environmental Impact Statement (EIS) must be adequately treated to the satisfaction of the Commission.



Response: The size criteria is one of many factors used in analyzing wilderness quality. BLM acknowledges that other qualifications also are important. BLM has utilized, collectively, all of the standards and criteria set forth in the "Wilderness Study Policy" (USDI, BLM, 1982b) as qualifications for wilderness consideration.

5. *Comment:* Were the naturalness criteria consistently applied? Portions of this WSA are believed to contain significant intrusions.

Response: The naturalness criteria were applied based on the existing intrusions in the WSA. The *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) identifies only 6 miles of fence, a small vegetative treatment area, and a study enclosure within the boundaries of the WSA. There are no ways or roads in the unit.

6. *Comment:* The impact of air space use above the WSA for gunnery and bombing training by the U.S. Air Force should be addressed in the EIS. There would appear to be lack of solitude from these activities.

Response: The WSA is near an area frequently flown over by military aircraft from Nellis Air Force Base. The analysis indicates that this would not affect the opportunity for solitude within the WSA. However, visitors may hear aircraft from within the WSA which may prove to be an occasional nuisance.

7. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

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

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (15,968 acres). 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 ALTERNATIVE

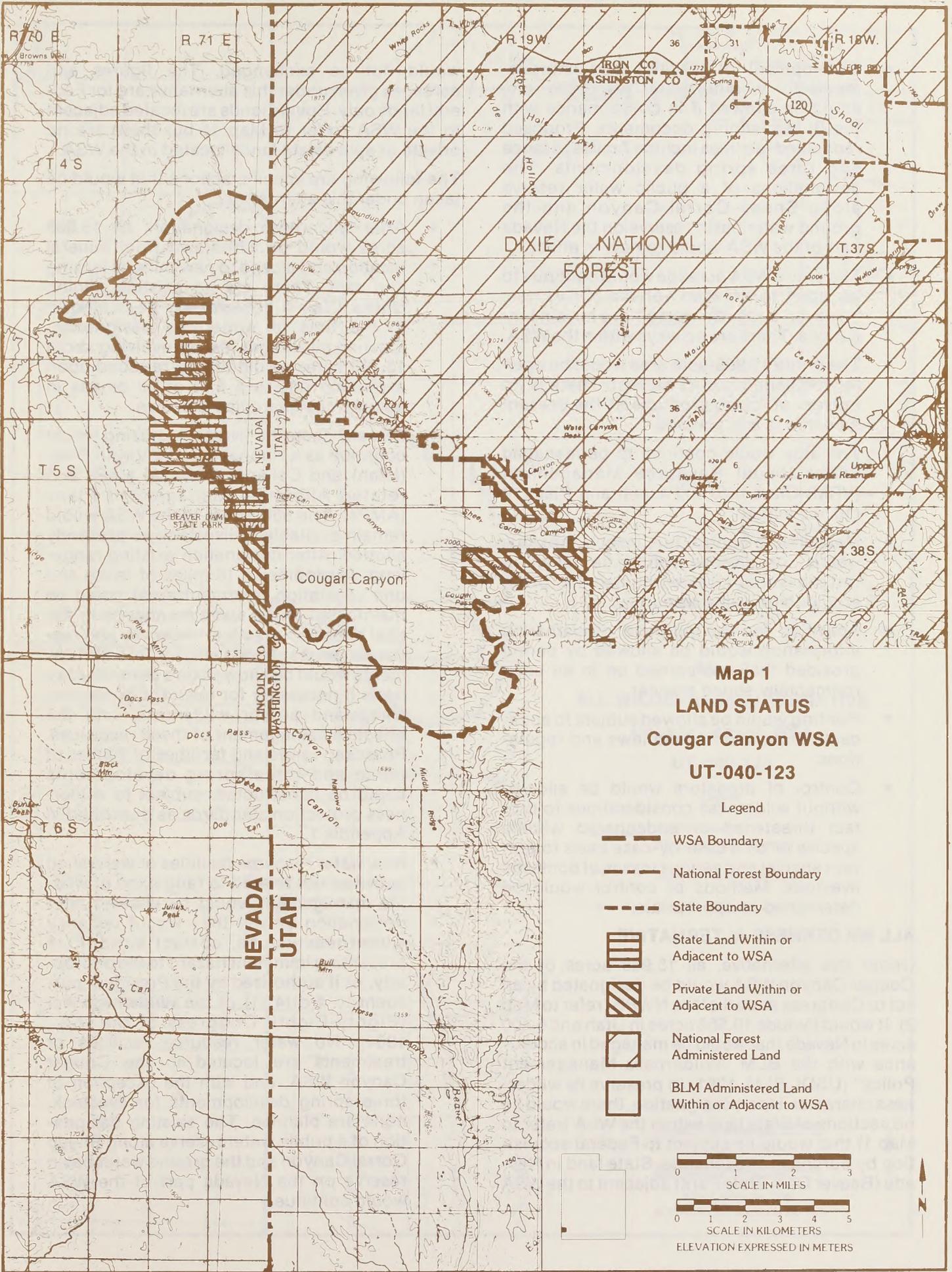
(PROPOSED ACTION)

Under this alternative, none of the 15,968-acre Cougar Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed for multiple uses in accordance with the Virgin River (Utah) and Caliente (Nevada) Management Framework Plans (MFPs) (USDI, BLM, 1979c and 1979d). There are no State lands involved (refer to Map 1).

The following are specific actions that would take place under this alternative:

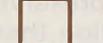
- All 15,968 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without consideration for wilderness values. Existing oil and gas leases (15,730 acres) and/or new leases could be developed under Category 1 (standard stipulations) without concern for wilderness values.
- Domestic livestock grazing use of the Cougar Canyon WSA would continue as authorized in the Utah and Nevada BLM planning documents (currently 560 Animal Unit Months [AUMs]). Existing rangeland developments (6 miles of fence and one vegetation treatment area) could be used and maintained, and new rangeland developments could be implemented without wilderness considerations.

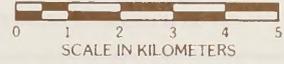
COUGAR CANYON WSA



Map 1
LAND STATUS
Cougar Canyon WSA
UT-040-123

Legend

-  WSA Boundary
-  National Forest Boundary
-  State Boundary
-  State Land Within or Adjacent to WSA
-  Private Land Within or Adjacent to WSA
-  National Forest Administered Land
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS



COUGAR CANYON WSA

- Development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the BLM planning documents. Proposed rangeland facilities include 7 miles of fence and three spring developments. The designations of a public water reserve along Sheep Corral Canyon and the ground water basin reserve on the Nevada part of the WSA would remain in effect.
- The entire WSA acreage would continue to be open to off-road vehicle (ORV) use; however, such use would have terrain limitations. There are no ways within the WSA.
- The entire 15,968-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (5,400 acres) and Class IV (10,568 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

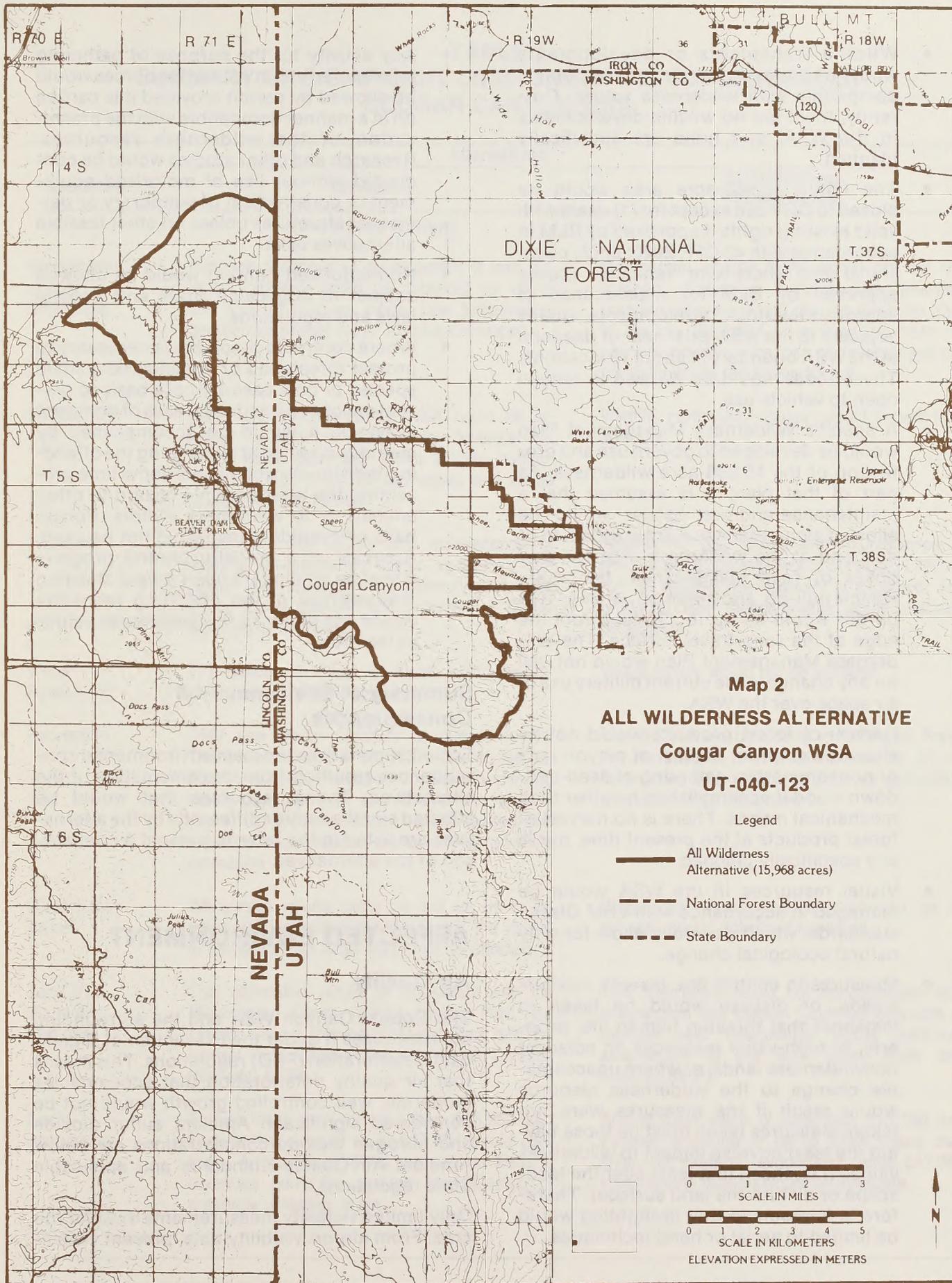
Under this alternative, all 15,968 acres of the Cougar Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would include 10,568 acres in Utah and 5,400 acres in Nevada that would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, there would be no sections of State land within the WSA (refer to Map 1) that would be subject to Federal acquisition by purchase or exchange. State land in Nevada (Beaver Dam State Park) adjacent to the WSA

would not be exchanged. The figures and acreages given under this alternative are for Federal lands only. Private lands are located adjacent to the WSA (refer to Map 1) but there are no private or split estate lands located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 15,968 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. There are no existing mining claims. Claims, however, can be located up to the time of wilderness designation. Existing oil and gas leases involving about 15,730 acres would not be reissued upon expiration unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would continue as authorized in the Virgin River (Utah) and Caliente (Nevada) MFPs and related Allotment Management Plans (AMPs). The 560 AUMs in the WSA would remain available to livestock as presently allotted. After designation existing rangeland developments (6 miles of fence and one vegetation treatment area) 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. Proposed rangeland facilities of 7 miles of fence and three spring developments could be constructed, subject to wilderness protection standards as described in Appendix 1.
- 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 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). No water resource facilities or treatments are located in the Cougar Canyon WSA, and with the exception of three spring developments for livestock, none are planned. The existing designation of a public water reserve along Sheep Corral Canyon and the ground water basin reserve on the Nevada part of the WSA would continue.

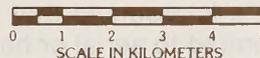
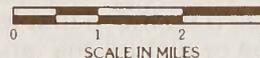
COUGAR CANYON WSA



Map 2
ALL WILDERNESS ALTERNATIVE
Cougar Canyon WSA
UT-040-123

Legend

-  All Wilderness Alternative (15,968 acres)
-  National Forest Boundary
-  State Boundary



ELEVATION EXPRESSED IN METERS



COUGAR CANYON WSA

- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA, and none are specifically planned.
- The entire 15,968-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 2920; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Roads adjacent to the WSA exist near or deadend at the WSA boundary in about 10 locations. These roads would be allowed to remain open to vehicle use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 15,968-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or deadend at the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface. The Wilderness Management Plan would not call for any change in the current military use of air space over the WSA.
- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources in the WSA would be managed in accordance with 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 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 must 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 aerial or hand techniques.
- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The Cougar Canyon WSA and the surrounding area are Class II under the Prevention of Significant Deterioration (PSD) regulations. This means that air quality deterioration that accompanies moderate, well controlled growth would not be considered significant. Ambient sulfur dioxide and nitrogen dioxide concentrations are below Ambient Air Quality Standards and applicable State regulations.

Only limited visibility measurements exist for the area. From airport visibility data, present visibili-

COUGAR CANYON WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES COUGAR CANYON WSA

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (15,968 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 500 tons of uranium oxide. Low temperature geothermal energy might also be developed.	Geothermal energy likely would not be developed. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these resources, however, the loss of development opportunity would not be significant.
Wildlife	About 0.2 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Three springs could be developed and would improve wildlife habitat.	Wildlife, particularly cougar, would benefit from solitude.
Livestock	Grazing of 560 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of three spring developments and 7 miles of fence, could be constructed.	Grazing of 560 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. The proposed new developments would probably be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 30 acres.	Visual quality would not be impaired.
Recreation	ORV use would continue at current levels. There are no ways in the WSA. Overall recreational use could increase from the present 500 visitor days per year to 745 over the next 20 years. Up to 30 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 30 acres (0.2 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, as no mineral-related activity is expected.
Land Use Plans and Controls	This alternative would be consistent with the <i>Washington County (Utah) Master Plan</i> , the <i>Lincoln County (Nevada) Master Plan</i> , and the current BLM Virgin River (Utah) and Caliente (Nevada) MFPs.	This alternative would not be consistent with Washington and Lincoln Counties' concepts of multiple use. Designation would constitute amendment of the BLM Virgin River and Caliente MFPs.
Socio-economics	Annual local sales of less than \$13,250 and Federal revenues of up to \$47,794 would continue. An additional \$714 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$13,250 and Federal revenues of up to \$784 would continue, but Federal revenues of up to \$47,904 from mineral leasing would be foregone.

ties in the nonurban areas of the southwestern United States are among the highest in the United States at approximately 65 to 80 miles.

Geology

The Cougar Canyon WSA is located in the Basin and Range Physiographic Province. Elevations range from 5,000 to 6,700 feet, and the WSA consists of steep canyons, peaks, long ridges, and rough drainages. The portion of the unit in Washington County is composed of three southeast- to northwest-trending ridges separated by Cougar Canyon, Sheep Canyon, and Pine Park Canyon which drain into the Beaver Dam Wash. The portion of the unit in Lincoln County contains southern-trending steep slopes draining into the headwaters of the Beaver Dam Wash. The unit's most dramatic topographic features are Pine Park Canyon, Sheep Corral Canyon, and Big Mountain.

The unit lies along the east-west trending Clover Mountains which extend from Nevada into Utah. Exposed bedrock consists almost entirely of Tertiary volcanic rocks with a small exposure of Tertiary intrusive rock. The eastern portion of the area is dissected by several north-south faults.

Soils

Erosion classes are moderate (10,000 acres) and severe (5,968 acres) (refer to Table 2). The soils are formed from coarse-grained acid igneous rocks resulting in coarse-grained, cobbly and gravelly sandy loams and loamy textured soil. The soil depth varies inversely, according to the steepness of slopes, and ranges from 3 to 30 inches over bedrock. Slopes are rolling to very steep (5 to 65 percent or more). Much of the WSA is exposed rock outcrop. The Soil Conservation Service capability classes are VII and VIII, which are unsuitable for agriculture uses other than rangeland and wildlife habitat, and are not suitable for mechanical vegetative manipulation practices because of steep slopes, rock outcrops, erosion hazard, and infestation of shrubs such as Gambel's oak.

Vegetation

Existing vegetation in the WSA consists of three major vegetative types: pinyon-juniper (14,328 acres), sagebrush (1,600 acres), and riparian (40 acres). With the exception of portions of the riparian zone, the vegetative aspect is sparse and open.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	5,968	37	32,227
Critical	2.7	0	0	0
Moderate	1.3	10,000	63	13,000
Slight	0.6	0	0	0
Stable	0.3	0	0	0
Total		15,968	100	45,227

Sources: USDI, BLM, 1978c and 1979b; Leifeste, 1978.

The pinyon-juniper type makes up about 90 percent of the area. Some of the more common plants of this type are pinyon pine, Utah juniper, Utah serviceberry, live oak, Gambel's oak, cheatgrass, muttongrass, curly grass, lupine, eriogonum, and penstemon. A typical vegetative composition would be perennial grasses, 5 percent; shrubs and trees, 80 percent; and forbs and annuals, 15 percent.

The sagebrush type occurs mainly in the northeastern portion of the WSA and makes up about 10 percent of the area. Some of the more common plants of this type are big sagebrush, rubber rabbitbrush, antelope bitterbrush, squirreltail grass, and cheatgrass. A typical vegetative composition would be perennial grasses, 15 percent; shrubs, 75 percent; and forbs and annuals, 10 percent.

Riparian vegetation occurs in Cougar Canyon, Sheep Corral Canyon, Sheep Canyon, Pine Park Canyon, and Headwaters Wash. This vegetative type makes up less than 1 percent of the area. Some of the more common plants are cottonwood, willow, salt cedar, rushes, and sedges.

Sheep Corral, Sheep, and Cougar Canyons have extremely narrow and dense riparian zones and are practically inaccessible. Headwaters Wash and Pine Park Canyon have much broader riparian areas and are generally accessible via stock trails.

Vegetative condition in terms of livestock forage ranges from fair to poor. Areas of fair condition are located in the northeastern one-half of the area. The ecological vegetative stage of this WSA is estimated to be at or near climax.

No threatened or endangered plants are known to occur in the area. However, *Epilobium nevadense*, a U.S. FWS candidate species under review for threatened or endangered status, has

COUGAR CANYON WSA

been collected within the WSA as well as from several other locations in the Beaver Dam Mountains of Utah and the Charleston Mountains in Nevada. It is an understory plant in pinyon, juniper and ponderosa pine areas at an elevation of about 7,000 feet.

The Cougar Canyon WSA lies in the Intermountain Sagebrush Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is pinyon-juniper. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

Surface waters in the Cougar Canyon WSA include five perennial streams (approximately 5 to 7 miles) and seven perennial springs, none of which are improved. Headwaters Wash, in Nevada, is fed by Tunnel Springs in the northwest corner of the area and flows south to the West Fork of the Beaver Dam Wash. The Beaver Dam Wash is outside the west boundary of the WSA. Pine Park Canyon runs from east to west on the north end of the WSA. Its headwaters are in Utah, and it also empties into the Beaver Dam Wash in Nevada.

The remaining waters lie entirely within the Utah portion of the area. Sheep Corral Canyon flows from the east boundary northwesterly into Pine Park Canyon. Two unnamed springs help feed this stream. The two remaining streams (Sheep Canyon and Cougar Canyon) both flow from east to west into the Beaver Dam Wash. Sheep Spring feeds Sheep Canyon, and Cougar Spring feeds Cougar Canyon. Willow Spring and Middle Ridge Spring both lie at the southern extreme of the WSA.

Surface waters are used by livestock and wildlife. In Nevada, there are recreational uses for water at the Beaver Dam State Park, downstream from Headwaters Wash and Pine Park Canyon. There is no water quality information available for Nevada waters. Data from other water sources in the Caliente Resource Area indicate there are no nutrient or heavy mineral problems. Coliform bacillus is common and fecal streptococcus is possible.

In Utah, the only available water quality information is from Pine Park Creek. The stream has a

moderately soft water and low bicarbonate system compared to other streams in the region. The overall water quality of the area is sufficient for existing uses.

There are no existing wells, water developments, or irrigation systems within the WSA. Three springs (Cougar, Willow, and Middle Ridge), with a combined potential of about 20 acre-feet per year (12 gallons/spring/winter), are proposed for development as livestock waters in the *Hot Desert Grazing Management EIS* (USDI, BLM, 1978b). There are no Bureau of Reclamation withdrawals, but Sheep Corral Canyon has been withdrawn along its length as a public water reserve.

There is danger of flash floods during the summer rainy season (July through September), especially in the steep, narrow canyon bottoms.

There are no existing private or State water rights in the Utah portion of the WSA. The area is presently closed to applications, but some applications could be considered, depending on the water use and location. There are also no existing water rights in the Nevada portion of the WSA, but an old proof of appropriations exists along Headwaters Wash near Tunnel Springs. Its validity is unknown. The Nevada area is a designated ground water basin and is not open to applications.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy, had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 1+ was assigned to the Cougar Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

The mineral and energy resource rating summary is given in Table 3.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available

to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f1	c1	Little or no potential
Uranium	f2	c1	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c1	Low heat value
Hydroelectric	f1	c4	None
Other minerals	f1	c1	Little to none

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

There are no known deposits of leasable minerals in the WSA. There are no current exploration, drilling, or mining activities for leasable minerals occurring in the WSA. None of the leases show evidence of commercial quantities nor is any evidence expected prior to designation.

Oil and Gas

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application,

before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Approximately 15,730 acres of the WSA are under oil and gas lease. Eight leases, approximately 5,170 acres, are pre-FLPMA and 10,560 acres are post-FLPMA. The entire WSA is in Category 1 (open to leasing with standard stipulations). There is little to no potential for oil or natural gas within the WSA.

Geothermal

Geothermal resource possibilities have been rated f2/c1. Although this unit lies in an area commonly considered to have a high geothermal potential (crustal instability, high heat flow, young igneous rock, and seismic activity), there are no hot springs or young (less than 1 million years old) igneous rocks to indicate that this WSA is favorable for geothermal resources. Any potential geothermal resources would most likely be associated with the fairly extensively faulted area in the northeast portion of the WSA. However, with known geothermal resource areas east of the WSA, it is unlikely that potential geothermal resources in this area would have much possibility of development.

LOCATABLE MINERALS

There are no known commercial deposits of locatable minerals in the Cougar Canyon WSA. There are no mining claims within the WSA. Locatable minerals with a probability of occurring in the area would be almost exclusively uranium minerals in volcanic vein deposits. There is no evidence of uranium occurrence within the WSA. The closest known deposit is 25 miles to the north. If uranium deposits do exist they would be

small, containing less than 500 tons of uranium oxide.

Wildlife

The primary big game animal in the WSA is mule deer. The WSA lies within the summer range of Deer Herd Unit 61-C (Utah) and 242 (Nevada). A habitat management plan (HMP) has been completed for the Utah portion of this area, with mule deer being the target species. No habitat manipulation practices were recommended in this HMP. However, the WSA has been identified as an area having potential for prescribed burning to improve forage composition (USDI, BLM, 1979c), but no prescribed burn plans have been developed. No critical forage has been identified.

The Nevada portion has a completed HMP which does not identify site-specific projects within the WSA, but does identify practices such as spring development and vegetative treatments which could be applied within the unit.

Cougars use the WSA extensively. In 1976 seven cougars were harvested in Herd Unit 61-C.

A variety of raptors occupy the WSA with most nesting activities centered around the main drainages. The most common raptors are red-tailed hawk, golden eagle, and Cooper's hawk.

Other game animals found in the WSA are Gambel's quail, mourning dove, and cottontail. Various nongame mammals, birds, and reptiles occur in the WSA.

No threatened or endangered animals are known to occur in the WSA. However, the Virgin River spinedace, which may occur within the WSA, is a candidate species for threatened or endangered status.

Rainbow trout can be found in Cougar Canyon, Sheep Canyon, Sheep Corral Canyon, Pine Park Canyon, and Headwaters Wash Streams. During low flow periods, these fish are generally found only in Pine Park Canyon and Headwaters Wash Streams. Approximately 5-7 miles of fish habitat are within the WSA. Because speckled dace, desert sucker, and Virgin River spinedace occur in the Beaver Dam Creek, there is likelihood they also inhabit the tributary streams within the WSA.

Forest Resources

No significant harvestable forest resources occur in the WSA. The dominant tree species are pinyon

pine and juniper. Historically, juniper trees may have been cut occasionally to repair fences or other projects. There are 140,000 cords of pinyon-juniper but the terrain is not suitable for harvest.

The potential use of forest products (primarily pinyon-juniper) in this area would be very small due to the ruggedness of the area and sparse tree density (approximately 10 cords/acre).

Livestock and Wild Horses/Burros

Seven livestock permittees utilize forage in the Cougar Canyon WSA which lies within the boundaries of three grazing allotments. Big Mountain (two permittees) and Cougar Canyon (one permittee). Allotments are in Utah, and the Barclay Allotment (four permittees) is in Nevada. Total grazing use on these allotments is currently 2,674 AUMs (703 AUMs in Utah and 1,971 in Nevada). Season of use is generally May to October. The livestock are mostly cattle (452) with a few horses (four).

There are 560 AUMs within the WSA boundaries. Most of the Nevada portion of the WSA is considered unsuitable for livestock because of steep rough terrain, low forage production and lack of livestock water. Thus, Nevada grazing is limited to the extreme western portion of the WSA and that provides less than 1 percent of the allotted forage, approximately 20 AUMs.

About two-thirds of the Utah portion of the WSA are considered suitable for livestock grazing and provide forage for approximately 90 cattle (540 AUMs). The rest of the unit is considered too steep and rough and has low forage production. Livestock are released from roads on the perimeter of the WSA and are allowed to drift through the area. They are later gathered by horseback riders.

There are approximately 6 miles of barbed-wire fence in the WSA used to restrict livestock movement. The only other Nevada improvement is a tree and shrub planting (1971) for erosion control around Tunnel Springs. Current status is unknown. The Middle Ridge Enclosure, at the extreme south end of the WSA, is used for grazing studies.

The *Hot Desert Grazing Management EIS* proposes construction of 3.50 miles of allotment boundary fence from the Dixie National Forest south along the Utah/Nevada State line. An additional 3.50 miles of livestock fencing were proposed for pasture divisions on the two Utah allot-

ments. Three spring developments (Cougar Spring, Willow Spring, and Middle Ridge Spring) are proposed to water livestock. No land treatment potential was identified due to the rough terrain.

There are no wild horses or burros in the area.

Visual Resources

The BLM visual resource inventory classified approximately 5,400 acres as Class A and 10,568 acres as Class C scenery. VRM Class II includes 5,400 acres and VRM Class IV includes 10,568 acres. (Refer to Appendix 7 for a detailed discussion on BLM's VRM system.) Although the WSA displays some unusual landscapes, the most esthetically appealing landscape is limited to the Pine Park and Pine Park Canyon areas.

Cultural Resources

There are no identified cultural values within the boundaries of the unit. However, it is likely that some exist because several sites yielding Anasazi and Southern Paiute ceramics have been found in relatively close proximity. Probable affiliation would be Archaic, Fremont, Virgin Anasazi, and Southern Paiute.

Recreation

The recreational use of the WSA is currently estimated at 500 visitor days annually, all of which are attributed to primitive activities such as hiking, rockhounding, and fishing. No ORV use is attributed to the WSA. The entire WSA is open to ORV use but the rough terrain limits such use. There are no ways within the WSA.

Scout troops sometimes hike from Pine Park Campground down Pine Park Canyon to Beaver Dam State Park. Most of the hiking, hunting, and nature study use of the WSA is day use originating from Cougar Pass on the east WSA boundary. At Beaver Dam State Park, most of the visitation occurs between June and August.

Visitor use data from Beaver Dam State Park indicate that approximately 7,000 visitors used the State Park in 1980. This is an increase of 15 percent from 1979. Length of stay at the park averages 2 or 3 days, but State Park employees believe that few of the visitors venture into the WSA.

Wilderness Values

SIZE

The Cougar Canyon WSA is approximately 10 miles long (northwest to southeast) and about 4

miles at its greatest width. It encompasses 15,968 acres.

NATURALNESS

The only human intrusions in the WSA are from approximately 6 miles of range fences, a tree and shrub planting, and a study enclosure. Imprints are substantially unnoticeable and the 15,968-acre area is natural.

SOLITUDE

The WSA affords outstanding opportunities for solitude that are most closely identified with topographic and vegetative screening situations in the canyon bottoms. There are 1,300 acres of outstanding solitude and 14,668 acres that do not meet the standard. The size and configuration of this WSA neither enhances nor detracts from the outstanding opportunities for solitude present in the WSA.

The WSA contains portions of eight canyons—Headwaters Wash, Barn Pole Hollow, Pine Park Canyon, Split Pine Canyon, Sheep Corral Canyon, Sheep Canyon, Cougar Canyon, and an unnamed canyon between Sheep and Pine Park Canyons.

The Headwaters Wash-Barn Pole Hollow is a wide and open canyon system that offers few opportunities for solitude. Cougar Canyon is not entrenched and exhibits little topographic or vegetative screening. Although Sheep Canyon and the unnamed canyon immediately to the north exhibit some of the natural screening attributes, neither canyon possesses them to the degree sufficient to provide outstanding opportunities. In the Pine Park Canyon-Split Pine Hollow system, these attributes are all present and an outstanding opportunity for solitude is considered to exist in the canyons. The south rim area of Pine Park Canyon near the State line also possesses short tributary canyons and rocky outcroppings that exhibit excellent topographic screening opportunities. The lower portion of Sheep Corral Canyon possesses topographic and vegetative screening situations of high quality.

Although the sights and sounds of human activities are not present from places within the WSA it would be easy for a visitor to find seclusion only in certain canyons of the WSA; vistas from the WSA are not sufficient to give a feeling of vastness. The topography does not provide for a dispersion of recreation uses.

The WSA is near the flight path for flights of military aircraft from Nellis Air Force Base. The closest major training route is approximately 6 miles east of the WSA near Enterprise Reservoir. Flights over the Cougar Canyon WSA mainly consist of fighter planes flying at a minimum of 100 feet. These flights are sub-supersonic and are made by four aircraft two to three times a week (Nellis Air Force Base, 1985). Engine noise accompanying these flights would probably not detract from the solitude of the area.

PRIMITIVE AND UNCONFINED RECREATION

Outstanding opportunities for primitive recreation are available on approximately 400 acres (3 percent of WSA) in Pine Park Canyon and the eastern portion of Sheep Corral Canyon. The remaining 15,568 acres are not outstanding. The 400-acre strip is considered outstanding because several activities are available in conjunction with excellent hiking (i.e., high quality scenery, fishing, bird watching, wading, picnicking, and photography). This area is too rugged for horses and not conducive to big game hunting because of rough terrain. These canyons have relatively easy access from nearby Pine Park Campground on the National Forest.

SPECIAL FEATURES

There are no known ecological, geological, scientific, educational, or historical values in the WSA. Some public comments suggested the streams may be considered special features of this WSA because of their trout fishery values. However, they do not contribute to educational, scenic, historic, or scientific values.

The most scenic portion of the WSA includes Pine Park Canyon and the Pine Park white rock formations adjacent to this canyon. However, the WSA cannot meet the scenic quality standard of Section 2(c) of the *Wilderness Act* because such scenery is not unusual to southern Utah and Nevada and, therefore, is not considered to possess the special feature of scenic values.

Land Use Plans and Controls

There are no private in-holdings, private subsurface rights, or rights-of-way in the WSA. Both Lincoln County, Nevada (Brisio et al., 1981), and Washington County, Utah (Planning and Research Associates, 1971), have master plans stressing multiple use on public lands. The BLM manages the area under the Virgin River and Caliente MFPs (USDI, BLM, 1979c and 1979d) which allow multiple use of the area. There are

AMPs in use and wildlife HMPs have been completed or are in progress.

Dixie National Forest's Enterprise Unit Land Use Plan stresses multiple use for the Pine Park area on the northern boundary of the unit.

Socioeconomics

The Cougar Canyon WSA lies in both Washington County, Utah, and Lincoln County, Nevada.

DEMOGRAPHICS

The 1980 Census (U.S. Department of Commerce [USDC], Bureau of the Census, 1981) estimated the Washington County population at 26,065 and Lincoln County at 3,732. A major portion of the Washington County population is centered in the St. George and Hurricane areas approximately 55 miles south and east of the WSA. Much of the remainder of Washington County is as sparsely populated as Lincoln County. The nearest Nevada community is Caliente which is some 40 miles to the west.

EMPLOYMENT

Both Washington County and Lincoln County have similar economic structures. Although there is a large difference in the size of the work forces and economic sectors, the economies of both counties are centered around three sectors: retail trade, services, and government. The retail trade sector is the most important sector, in terms of employment, in the Washington County economy. The government sector provides the greatest amount of employment in Lincoln County. Table 4 presents 1980 employment and personal income figures for the two counties.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, livestock production, and recreation. Table 5 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has no mining claims. If claims were located, regulations would require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which would be spent in the local economy.

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 4
1980 Employment and Personal Income
Washington County, Utah and Lincoln County, Nevada

Industrial Sectors	Lincoln County		Washington County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	1,630	25,764	7,866	83,449
Proprietors	194	1,346	1,469	14,010
Farm Proprietors	78	386	343	2,386
Nonfarm Proprietors	116	960	1,126	11,624
By Industry Source				
Farm	86	1,423	98	3,031
Nonfarm	1,350	24,341	6,299	80,418
Private	950	19,745	4,805	63,399
Ag. Serv., For., Fish., and Other	(L)	(L)	29	724
Mining	296	7,546	70	1,347
Construction	(D)	(D)	537	9,425
Manufacturing	(D)	(D)	698	9,759
Nondurable Goods	(D)	(D)	441	5,986
Durable Goods	0	0	257	3,773
Transportation and Public Utilities	79	1,725	236	4,996
Wholesale Trade	(D)	(D)	263	3,963
Retail Trade	229	2,101	1,673	14,741
Finance, Insurance, and Real Estate Services	26	372	424	5,201
Government and Government Enterprises	244	6,068	875	13,243
Federal, Civilian	400	4,596	1,494	17,019
Federal, Military	25	386	193	2,725
State and Local	12	(L)	161	425
	363	4,177	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

TABLE 5
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$47,190
Mineral Production	0	0
Livestock Grazing	\$11,200	\$784
Woodland Products	0	0
Recreational Use	Less than \$2,050	0
Total	Less than \$13,250	Up to \$47,914

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

Seven livestock operators have a total grazing privilege of 560 AUMs within the WSA. If all this forage were utilized, it would account for \$11,200 of livestock sales and \$2,800 of ranchers' returns to labor and investment.

Some woodland products are harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use is low. Related local expenditures are also low. These expenditures are insignificant to both the local economy and individual businesses. The WSA has no motorized recreational use. 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 statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Cougar Canyon WSA is estimated as about 500 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Washington and Lincoln Counties.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 5).

Oil and gas leases in the WSA cover approximately 15,730 acres. At \$3 per acre, lease rental fees generate up to \$47,190 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.

Livestock permittees in the WSA can use up to 560 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$784 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as noted in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturb-

ance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.

4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: uranium, 20 acres; and geothermal, 10 acres. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Disturbance of 30 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with minerals (i.e.,

uranium and geothermal) exploration and development activities would probably not exceed 30 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 30 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 30 acres would increase from 39 cubic yards/year to 81 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 42 cubic yards (0.09 percent) over current annual soil loss. This is an extremely small increase in sediment yield. Because the soils in the WSA are not suitable for mechanical vegetation manipulation practices, no erosion control practices have been planned, and erosion would likely continue at present levels in the future.

VEGETATION

The anticipated maximum of 30 acres disturbed would not significantly affect the WSA's vegetation. Depending on the location of disturbance, there could be conflicts with protection of *Epilobium nevadense*, a FWS candidate species under review for threatened or endangered status. Because the acreage to be disturbed is small it is doubtful that this plant would be affected.

However, before authorizing surface-disturbing activities (30 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the FWS as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

No significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 42 cubic yard increase in annual soil loss from 30 acres of surface disturbance. Development and maintenance of three additional spring

developments with a potential yield of up to 20 acre-feet per year could occur as allowed under the BLM Virgin River MFP.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells and would not significantly impact ground water. Because the ground water in the area is not open to appropriation and the potential for mineral development is low, little effect on ground water is anticipated. Geothermal operations generally reinject water to the same aquifers from which it is taken. Therefore, potential geothermal operations would not affect ground water quality or quantity. The three proposed spring developments would result in small draw downs (about 20 acre-feet/year on aquifers, based on 12 gallons per minute).

MINERAL AND ENERGY RESOURCES

The unit would remain open to mineral entry and energy leasing. However, because of the lack of known energy or mineral potential, little development is anticipated.

Leasable Minerals

The entire area would remain in Category 1 (open to oil and gas leasing with standard stipulations) but, due to the low potential for oil and gas deposits, no development is expected under this alternative. About 15,730 acres of existing leases could be renewed or released. The 238 acres presently unleased for oil and gas could be leased. Potential geothermal energy could be developed, although the likelihood is low.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposits of up to 500 tons of uranium oxide could be developed at some time in the future. Approximately 30 acres could be disturbed due to exploration and development of these mineral resources. However, the likelihood of development is thought to be minimal because of low resource potential and economic considerations (e.g., transportation, low potential, etc.)

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of three spring developments. The disturbance of an estimated 30 acres (0.19 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife for short periods of time. Deer, cougar, and mobile nongame animals would be dispersed from the area for the lifetime of these activities.

Less mobile wildlife would either perish or coexist with these disturbances at smaller population levels.

Although none are presently proposed, habitat manipulation for big game and fish could occur in the future, which would be a benefit to fish and wildlife. If roads were constructed for energy and mineral development, increased recreation and harassment of wildlife would result. This could lead to harassment and loss of natural habitat for deer and cougars. Cougars, whose numbers are limited in the state, would be most affected by harassment. No impacts on terrestrial threatened or endangered species would result because there are none in the WSA. Sediment yield increases of .19 percent would not be measurable in streams within the WSA and no impact of aquatic wildlife, including the Virgin River spinedace (a candidate threatened and endangered species) would result. However, before authorizing surface-disturbing activities (30 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the FWS as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect this fish species, it can be reasonably concluded that the viability of populations of Virgin River spinedace would be preserved under the No Action Alternative.

FOREST RESOURCES

Since minimal surface-disturbing activities (30 acres) are anticipated, no significant impacts to forest resources are expected. Complete clearing of vegetation in the pinyon-juniper type would make approximately 300 cords of wood available for harvest by firewood cutters. However, remoteness, rough terrain, and poor access would limit harvest of the wood.

LIVESTOCK

Domestic livestock would continue to use 560 AUMs as authorized in the BLM Virgin River and Caliente MFPs. Current management practices would continue. If roads were built in connection with mineral and energy development, increased use of motorized vehicles in livestock management would result. The three proposed spring developments and 7 miles of fence could be completed without regard for wilderness values and the existing 6 miles of fence could be maintained, which would result in improved livestock distribution.

VISUAL RESOURCES

Visual values in areas affected by the estimated 30 acres of surface disturbance from mineral and energy exploration and development would be degraded, and if within VRM Class II areas, management objectives would not be met. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

There are presently no cultural resource sites known within the WSA. Any National Register sites that may be discovered in the future would receive protection under the National Historic Preservation Act and other regulations. Disturbance of 30 acres by mineral exploration and development under this alternative could affect presently unknown National Register sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts.

Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism would continue to be a problem and would increase in proportion to the general population increase.

RECREATION

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 500 current visitor days per year to 745 visitor days at the end of 20 years. Overflow from Beaver Dam State Park could further increase use. If development resulted in road development, motorized recreational use would likely increase slightly (approximately 25 percent or 125 additional visitor days).

Up to 30 acres could be disturbed by mineral and energy activities. The quality of primitive recreational opportunities could be diminished on the affected areas.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing

Virgin River and Caliente MFPs. Expected mineral and energy exploration and development could disturb an estimated 30 acres. Wilderness values in this WSA (i.e., naturalness and opportunities for solitude and primitive recreation) could be lost or diminished in affected areas. However, the impacts to these values probably would not be significant due to the limited surface disturbance anticipated.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Washington and Lincoln County Master Plans* which allow for multiple uses. The No Action Alternative is based on implementation of the current BLM Virgin River and Caliente MFPs and is, therefore, in conformance with them.

SOCIOECONOMICS

Under this alternative, no changes are expected in existing patterns and trends of population, employment, and personal income.

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 uranium and geothermal resources in the WSA were developed it would not lead to a significant increase in employment and income for Washington and Lincoln Counties. 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).

There would be no livestock-related economic losses because the existing grazing use (560 AUMs) and ability to maintain, replace, and build new range improvements 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 percent per year over the next 20 years (49-percent increase over 20 years). Because estimated recreational use in the area is estimated to increase only 245 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy) recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 238 acres in the WSA open to oil and gas leases that are currently not

leased. If leased they would bring up to \$714 additional Federal lease fee revenues per year in addition to new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$784 per year) would continue.

All Wilderness Alternative (15,968 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 15,968-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be managed under VRM Class I.

For the following analysis it is assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas or geothermal energy would not be allowed. Because there are no existing mining claims in the WSA and none are expected, it is assumed that no mineral development would occur. Because no surface disturbance related to mineral and mining development would result, there would be no adverse impacts on resources under the All Wilderness Alternative from development and surface disturbance.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities. The erosion rate for the WSA would remain at about 45,227 cubic yards per year. This is approximately 42 cubic yards or .09 percent smaller than under the No Action Alternative.

VEGETATION

Epilobium nevadense (candidate threatened or endangered species) could benefit slightly from this alternative because there would be no surface disturbance. Any potential loss of individual plants of this species would be avoided.

WATER RESOURCES

Additional improvements or expansion of existing water improvements might not occur. Opportunity for three spring developments with a potential yield of about 20 acre-feet per year could be foregone. No negative impacts to ground water would occur because development from mineral extraction would not take place. The opportunity

for use of ground water for geothermal energy would be foregone.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 15,730 acres (5,160 acres pre-FLPMA and 10,560 acres post-FLPMA) are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued.

Due to lack of potential deposits, the low certainty that any exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of the oil and gas resource.

The opportunity for potential development of low heat geothermal energy could be lost. Because of the remoteness of the area and low heat of the potential resource, no significant loss in potential energy would result.

Locatable Minerals

There are no mining claims within the WSA. However, there is a potential for up to 500 tons of uranium oxide that could be recoverable within the WSA. If the potentially recoverable minerals are not within mining claims filed before designation, the potential for recovery of up to 500 tons of uranium oxide would be foregone.

Because there are no mining claims within the WSA, production of uranium is not currently occurring, and economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant impact to uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. If future spring developments were curtailed, potential habitat for deer, cougar, and nongame species would be reduced. However, it is anticipated that the spring development could meet wilderness protection criteria and therefore would be allowed. Disturbance of wildlife due to exploration and development of mineral resources would be avoided.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Virgin River and Caliente MFPs. Use of the 560 AUMs currently allocated in the WSA would continue. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. In the case of the three spring developments and 7 miles of fence proposed, which, if any, of these would be allowed is unknown since each would be considered on a case-by-case basis. It is estimated that they would be constructed to meet wilderness protection criteria.

VISUAL RESOURCES

A slight benefit would occur to the visual resources of the WSA because the VRM class would change from Classes II and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities from 30 acres under the No Action Alternative to 0 acres under this alternative. No significant impact in the area would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity and the overall impact would be positive.

RECREATION

Recreation use is currently low (500 visitor days a year). The WSA has outstanding primitive recreational values on only 400 of the 15,968 acres. If designated, those high quality recreational opportunities would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in

primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 125 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Because there are currently no ways existing in the WSA and there are other suitable ORV play areas in the vicinity, ORV use would probably not experience an overall decline in the vicinity of the WSA.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values.

WILDERNESS VALUES

Designation and management of all 15,968 acres as wilderness would assure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude (including approximately 1,300 acres that meet and 14,668 acres that do not meet the standards) and primitive and unconfined recreation (including 400 acres that meet and 15,568 acres that do not meet the standards). Flights of military aircraft near the WSA would continue but would not reduce the outstanding opportunities for solitude within the WSA. However, they could prove to be a periodic nuisance to visitors. There are no identified special features in this WSA that would be protected and preserved.

Although recreational use could increase (refer to Recreation section above), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Thus, it is concluded that designation and management of all 15,968 acres of the Cougar Canyon WSA as wilderness would protect and preserve the wilderness values of naturalness and opportunities for solitude (outstanding on 1,300 acres) and primitive recreation (outstanding on 400 acres).

LAND USE PLANS AND CONTROLS

The existing BLM Virgin River and Caliente MFPs do not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to these MFPs.

This alternative would conflict with the multiple-use concepts of the *Washington and Lincoln*

County Master Plans because restrictive conditions would be placed on mineral development and oil and gas leases would be phased out. However, this alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions.

SOCIOECONOMICS

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 5) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

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 oil and gas leases could be developed but designation would preclude new leases and mining claims 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 under the No Action Alternative. Because the potential for mineral devel-

opment is low, it is estimated that potential mineral-related local 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 \$11,200 of livestock sales and \$2,800 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increased ranchers' income.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is nonexistent and there would be no change because of designation.

The loss of 15,730 acres now leased for oil and gas would cause an eventual loss of up to \$47,190 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$714 annually in Federal revenues from the 238 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone. However, no oil and gas development is anticipated within this WSA even without wilderness designation.

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Red Mountain
WSA



RED MOUNTAIN WSA

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RED MOUNTAIN WSA

(UT-040-132)

INTRODUCTION

General Description of the Area

The Red Mountain Wilderness Study Area (WSA) consists of 18,250 acres of public land located approximately 9 miles northwest of St. George, Utah. The WSA also contains 745 acres of State land and 40 acres of privately owned land. It is managed by the BLM, Cedar City District, Dixie Resource Area.

Red Mountain is a large Navajo Sandstone plateau rising to an elevation of 4,600 feet. The WSA is characterized by very hot summers and relatively short, mild winters. This unit is comprised of two main vegetation types: pinyon-juniper and sagebrush.

The climate in Washington County, Utah is semi-arid and characterized by low precipitation, low humidity, bright sunshine, and daily variations in temperature. The Red Mountain WSA is characterized by very hot summers and relatively short, mild winters. Maximum temperatures in mid-summer range from 90 degrees to over 100 degrees Fahrenheit (F). Maximum winter temperatures range from 44 degrees to 54 degrees F, and minimum winter temperatures range from 20 degrees to 28 degrees F. Cold spells in the winter are rare and of short duration.

The average annual precipitation varies between 8 and 12 inches in the WSA. Maximum precipitation occurs in winter, associated with storm systems from the Pacific Ocean. A second maximum occurs during July and August, associated with summer thunderstorms. Intense summer thunderstorms occasionally cause local flash floods in mountainous areas and canyons. The driest months are May and June.

Specific Issues Identified In Scoping

Issues and concerns specific to this WSA raised in the public scoping process (USDI, BLM, 1984) are responded to below.

1. *Comment:* This unit has a relatively high favorability (f3) for oil and gas potential. Nearly 16,000 acres are under lease. How would wilderness designation impact these leases?

Response: The impact on oil and gas leases from wilderness designation is addressed in the Description of the Alternatives and Envi-

ronmental Consequences of Alternatives sections of this document. Under the No Action Alternative the 15,980 acres under lease in the WSA could continue to be leased under no surface occupancy or activity. With wilderness designation the existing leases would have to be developed prior to expiration or they would be phased out.

2. *Comment:* Manageability problems exist with WSA boundaries on the south side where they extend below the cliffs. This area borders residential development.

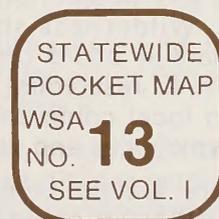
Response: The 800 acres along the Santa Clara Bench would be difficult to manage or enforce as wilderness because of indiscriminate uses stemming from adjacent residential areas. The Partial Wilderness Alternative eliminates the 800 acres along the Santa Clara Bench from that portion that would be designated as wilderness.

3. *Comment:* The WSA contains a relatively small proportion of mandatory wilderness characteristics and special features.

Response: Two-thirds of the WSA (12,100 acres) do not meet the *Wilderness Act* quality 2(c) standard (Eighty-Eighth Congress of the U.S., 1964) because this area does not possess outstanding opportunities for primitive recreation and solitude. A discussion of opportunities and primitive recreation can be found in the Affected Environment section.

4. *Comment:* Local officials are very concerned that wilderness designation will greatly increase the possibility of changing the air quality classification of this area to a more restrictive Class I.

Response: The classification and reclassification of areas under Prevention of Significant Deterioration (PSD) standards is the responsibility of the State of Utah. The analysis in this document assumes that the PSD class will remain at Class II.



5. *Comment:* If designated, trail bike riding on Red Mountain would be eliminated.

Response: A discussion of the impacts of wilderness designation to trail bike riding can be found in the Recreation sections under Environmental Consequences of Alternatives. Under wilderness designation, the WSA would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 Code of Federal Regulations (CFR) 2920. The first mile of a 5-mile vehicular way would be "cherry-stemmed" (refer to Glossary) to remain open to vehicles.

6. *Comment:* There is local government opposition; Washington County Commission made a policy statement indicating they did not support wilderness designation of the WSA.

Response: This policy statement has been included in the Environmental Consequences of Alternatives section under Land Use Plans and Controls.

7. *Comment:* Flood control development may be needed in this WSA. Would these structures or improvements be preserved if the area were designated wilderness?

Response: There are no flood control measures in the WSA and none have been planned because the soils are generally rock outcrop or are sandy. Sediment production is only low to medium, and future erosion and flood control measures are unlikely. Under wilderness designation new developments would be allowed on a case-by-case basis. Wilderness protection standards would have to be met.

8. *Comment:* Some flood control development has already been completed at the base of the cliffs in this WSA and may be within the WSA boundaries. If designated, would this flood control development be maintained?

Response: The flood control developments are outside the WSA boundary and would not be affected by wilderness designation.

9. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede development in local communities such as the nearby Town of Ivins and others.

Response: There are no permanent water supplies in the WSA that could be utilized by local communities.

10. *Comment:* Roads and towns near this WSA detract from the wilderness values (solitude) of the area.

Response: In the Affected Environment section under Wilderness Values, it states that 77 percent of the WSA does not meet the outstanding criteria for solitude for lands under wilderness review and that there are significant outside sights and sounds on Santa Clara Bench which some could consider to detract from solitude.

11. *Comment:* What will be the impacts to solitude resulting from air traffic routes above this WSA?

Response: No military routes are identified over Red Mountain. However, Nellis Air Force Base does operate a flight path that is located approximately 1 mile from the northwest corner of the WSA. It has been concluded that this would not affect the solitude of the area but could prove to be an occasional nuisance. Intrusions would result from private and commercial flights approaching or leaving the St. George Airport. Because there are no set flight paths to and from the airport and the number of flights per day is low, any intrusions on Red Mountain from aircraft would be sporadic and infrequent. An analysis of air traffic over Red Mountain is, therefore, not included in the Environmental Consequences of Alternatives section.

12. *Comments:* (1) Even though there may be in excess of 5,000 acres identified in the preliminary study that could qualify for designation, other concerns have not been addressed or adequately addressed at this point. The total acreage now qualifying could be reduced during further study. All other normal considerations mandated as a part of the Environmental Impact Statement (EIS) must be adequately addressed to the satisfaction of the Commission. (2) Apparently there were irrational deletions of all or parts of the WSAs and ISAs. After review of Site-Specific Analysis (SSA) summaries in the scoping document, it becomes apparent that many areas have no resource conflicts and excellent wilderness qualities, yet no acres were recommended for wilderness.

Response: During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five

Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

During scoping, it was suggested that a new partial alternative be defined that would eliminate resource conflicts. Since the intent of the existing partial alternative is to resolve the major potential conflict (community expansion potential), it was determined that another alternative would not result in substantially different information. Therefore, a second partial alternative was eliminated from detailed study.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (18,250 acres); and (3) Partial Wilderness (17,450 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 ALTERNATIVE

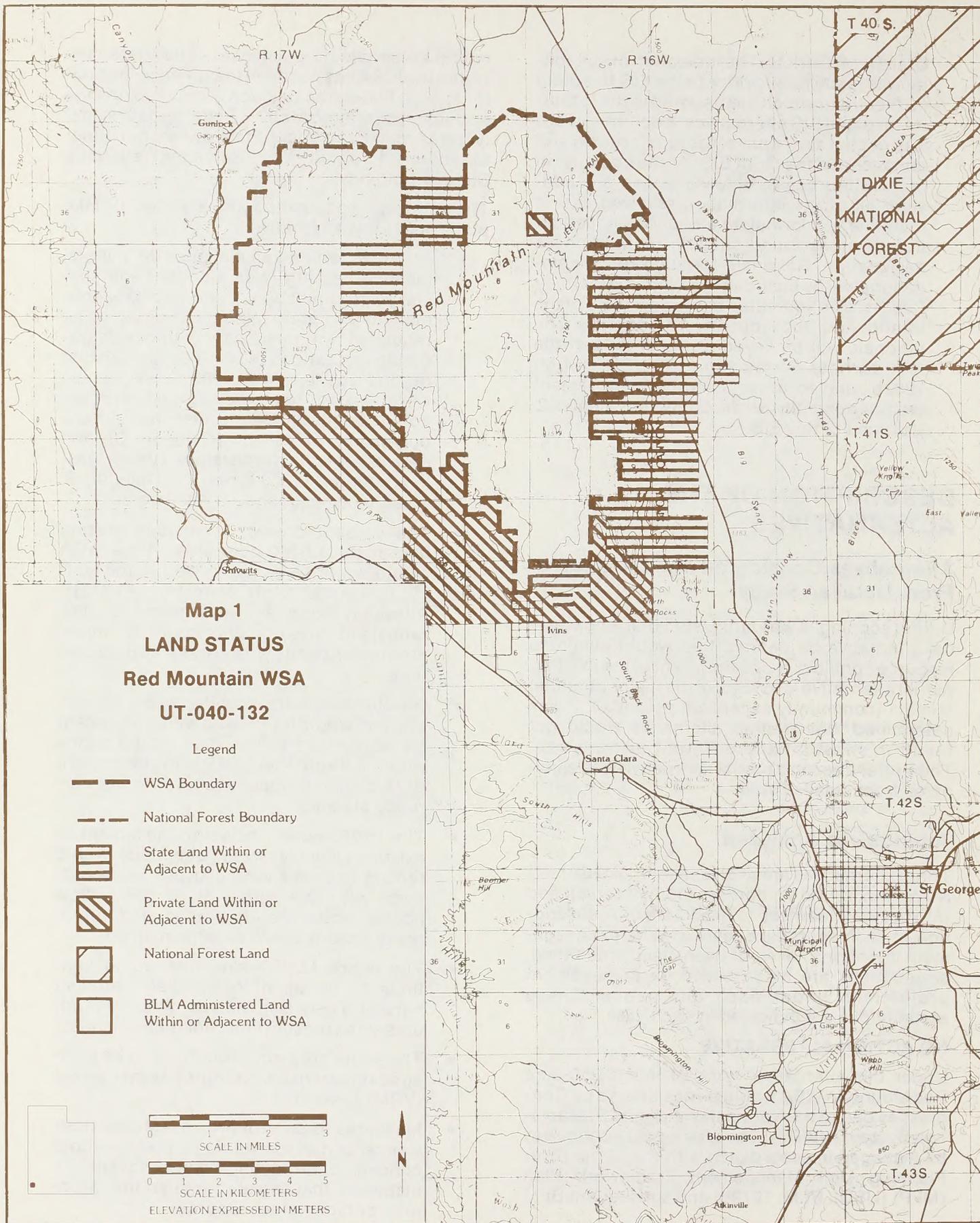
Under this alternative, none of the 18,250-acre Red Mountain WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Virgin River Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1979b) and subsequent BLM

multiple-use planning activities. The State land within the WSA has not been identified in the MFP for special Federal acquisition through exchange or purchase (refer to Map 1). State lands are analyzed as remaining under State ownership. Refer to Volume I for further information regarding State in-holdings.

The following are specific actions that would take place under this alternative:

- All acres would remain open to mineral location, leasing (with standard and special lease stipulations), and sale. Development of any future mining claims would be regulated by unnecessary or undue degradation regulations (43 CFR 3809). Existing oil and gas leases (15,980 acres), which were issued for blocking-up purposes could be developed under no surface occupancy or activity (Category 3), and new leases could be developed under leasing Category 1 (800 acres) and Category 3, no surface occupancy (17,450 acres).
- The present domestic livestock grazing use of the 18,250-acre area of the WSA would continue as authorized in the MFP (117 Animal Unit Months [AUMs]). Although none are now planned, new rangeland developments could be implemented without wilderness considerations.
- Developments for wildlife, water resources, etc. would be allowed without concern for wilderness values if in conformance with the Virgin River MFP and subsequent BLM planning documents. None are currently planned.
- The 18,250 acres, including the 5 miles of existing vehicular ways (jeep trails), would remain open for vehicular use in accordance with the Virgin River MFP. New access could be developed and future realty actions could be implemented.
- The entire 18,250-acre area would continue to be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.

RED MOUNTAIN WSA



- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

Under this alternative, all 18,250 acres of the Red 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 "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character.

Upon designation, acquisition of 1¼ sections of State land (745 acres) within the WSA (refer to Map 1) is likely and would be authorized by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) Seven State sections adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. About 40 acres of private land are located in the WSA.

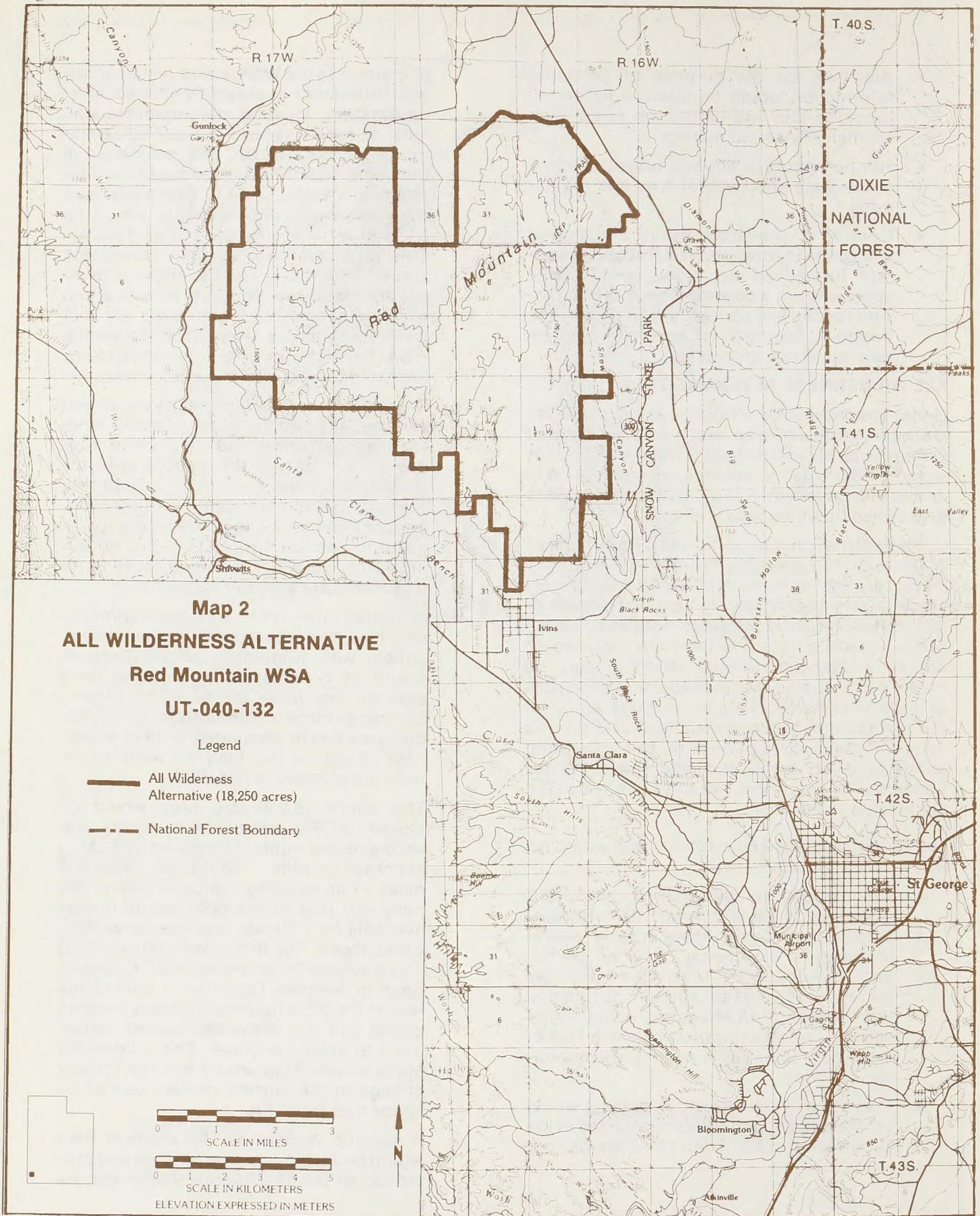
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 18,250 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. There are currently no mining claims in the WSA. Existing oil and gas leases, involving no surface occupancy stipulations on 15,980 acres, would not be reissued upon expiration unless a find of oil or gas resources in commercial quantities is shown.
- Present domestic livestock grazing would be allowed to continue as authorized in the Virgin River MFP. The 117 AUMs on four

allotments in the WSA would remain available to livestock as presently allotted. After designation, existing developments (0.5 mile of fenceline and a livestock water trough) would be used and 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, provided that wilderness protection standards are met (refer to Appendix 1). No areas within the WSA have been currently identified for future rangeland developments for livestock.

- 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*. No water resource facilities or treatments are presently planned.
- Wildlife transplants and developments would be allowed after designation if compatible with wilderness values. Projects would be considered for approval on a case-by-case basis and would be allowed as long as certain criteria (refer to Appendix 1) are met to adequately protect wilderness values. At this time, no wildlife projects are planned in this WSA.
- The entire 18,250-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with CFR rules. About 4 miles of an existing vehicular way in the northeast part of the WSA would not be available for vehicular use except as indicated above. The first mile of this existing way would be "cherry-stemmed" to remain open to vehicles. Less than 1 mile of the rest of the WSA boundary follows existing gravel and dirt roads that would remain open to vehicular travel. The Wilderness Management Plan would not call for any change in the current military use of air space over the WSA.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 18,250-acre wilderness. As

RED MOUNTAIN WSA



Map 2
ALL WILDERNESS ALTERNATIVE
Red Mountain WSA
UT-040-132

- Legend
- All Wilderness Alternative (18,250 acres)
 - National Forest Boundary

0 1 2 3
 SCALE IN MILES

0 1 2 3 4 5
 SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS

part of that plan, it is assumed that a maintenance-and-use border would be allowed along "cherry-stemmed" or other roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

- 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. There is no harvest of forest products at the present time nor is any specifically planned.
- Visual resources on 18,250 acres would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 18,250-acre area would be taken 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 must 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 in the 18,250-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE

(PROPOSED ACTION)

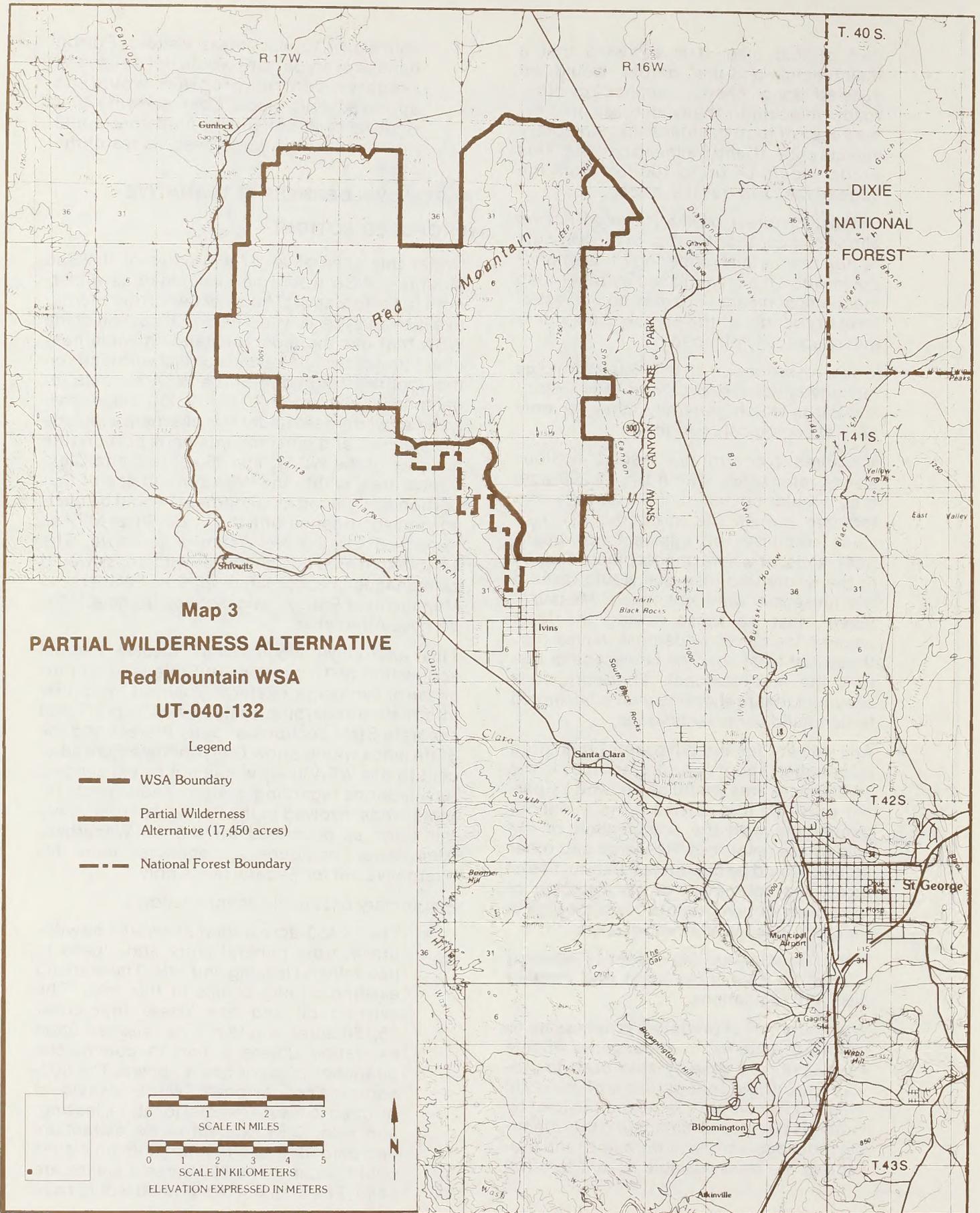
Under this alternative, 17,450 acres of the Red Mountain WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that has the most outstanding wilderness characteristics and to avoid conflict with lands on the southwestern edge of the WSA suitable for community expansion. The 17,450 acres analyzed as wilderness under this alternative include the steepest and most mountainous portion (the majority of the WSA). The 800-acre Santa Clara Bench area, within the WSA but outside of that portion designated as wilderness, would be managed in accordance with the Virgin River MFP as described for the No Action Alternative. The 17,450-acre area designated as wilderness would be managed in accordance with the "Wilderness Management Policy" as described in the All Wilderness Alternative.

This alternative would likely involve Federal acquisition of 1¼ sections of State land by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) Three separate State sections or parts thereof and the State lands within Snow Canyon State Park adjacent to this WSA likely would not be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 17,450-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. There are no existing mining claims in this area. The existing oil and gas leases that cover 15,180 acres would not be reissued upon expiration unless a find in commercial quantities of oil or gas is shown. The 800-acre area not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of any future mining claims could occur in the 800 acres if claims are valid. The area not designated would have

RED MOUNTAIN WSA



the existing no surface occupancy stipulations removed and would be managed as leasing Category 1 (standard stipulations). Existing leases (800 acres) and future leases in this area could be developed without concern for wilderness values.

- Domestic livestock grazing would continue to occur in the 17,450 acres designated wilderness. The 117 AUMs in the 17,450 acres would remain available to livestock as presently allotted. New rangeland developments (none currently planned) could be allowed in the 17,450-acre wilderness if necessary for protection and management of the rangeland and/or wilderness resource, provided that wilderness protection standards are met. In the 800-acre nonwilderness area, no grazing use now occurs and probably will not occur in the future.
- In the 17,450-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 the remaining 800 acres, water resource facility developments would be allowed without concern for wilderness values if in accordance with the MFP. None are now proposed.
- In the 17,450-acre wilderness, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the remaining 800-acre area, wildlife transplants or developments would be allowed without concern for wilderness values. None are now proposed.
- The mountains, which would comprise the 17,450-acre wilderness, would be closed to ORV use. About 4 miles of existing ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the WSA, including the existing mile of "cherry-stemmed" road and other road segments that border the WSA, would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 17,450 acres of wilderness. As part of that plan, it is assumed that a

maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface. The Wilderness Management Plan would not call for any change in the current military use of air space over the WSA.

- The 800-acre Santa Clara Bench could be available for realty activities, including rights-of-way, exchanges, and other transfer actions that may be associated with future community growth, to the extent that such realty actions would be consistent with applicable BLM land use plans.
- Harvest of forest products in the 17,450 acres of wilderness would not be allowed except for harvest of pinyon nuts or non-commercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 800 acres would be open to woodland harvest, although little opportunity exists there.
- Visual resources on the 17,450-acre wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The remaining 800 acres would be managed as VRM Class II.
- Within the 17,450-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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 must 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. In the 800-acre nonwilderness area, measures of control would be taken without wilderness considerations.
- In the 800-acre nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 17,450-acre wilderness such activity would be allowed by permit provided it was accomplished in a

manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.

- In the 800-acre area, hunting would be allowed subject to applicable State and Federal laws and regulations. In the 17,450 acres of wilderness, hunting would be allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means.
- In the 800-acre area, control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 17,450-acre wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 presents the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The Red Mountain WSA and most of the surrounding area have been designated Class II under PSD regulations. This means that air quality deterioration that accompanies moderate, well-controlled growth would not be considered significant. Ambient sulfur dioxide and nitrogen dioxide concentrations are below Ambient Air Quality Standards and applicable State regulations. This is attributed to the lack of any high concentration of fossil-fuel powered industrial

sources in the area. Only limited visibility measurements exist for the area. Visibility data from the St. George Airport indicate that daily visibilities usually range from 65 to 100 miles. Visibility measurement in Warner Valley, approximately 22 miles from the WSA, during 1977 and 1979 showed mean visual ranges of 80 miles and 76 miles respectively (USDI, BLM, 1980c).

Geology

The Red Mountain WSA is located in the Basin and Range Colorado Plateau Physiographic Province Transition Zone. Red Mountain is a large Navajo Sandstone plateau abruptly rising 1,400 feet above the Santa Clara Bench to an elevation of 4,600 feet. The top is weathered, rolling, broken sandstone with peaks up to 5,432 feet. The plateau fades to the north into rolling pinyon-juniper hills. On the east it drops sharply into Snow Canyon State Park. The Gunlock Fault runs north-south through the western portion of the WSA. The Navajo Sandstone Formation consists almost entirely of ancient desert dunes. These are truncated by topset beds resulting in frequent crossbedding, often producing fantastic patterns on the exposed sandstone surfaces.

Soils

The soils of the Red Mountain WSA are almost entirely derived from sandstone. The texture is a fine sand that is easily moved by wind or water. There are no soils of prime or unique farmland quality.

The WSA contains four major soil types: rockland, rock outcrop, mespun fine sand, and rockland stony. Their following descriptions are taken from the *Washington County Soil Survey* (U.S. Department of Agriculture, Soil Conservation Service, 1977).

- Nearly the entire area falls into the Rockland type. It is found on the mesa tip from Snow Canyon on the east to the cliffs above Gunlock and Ivins on the west and south and to the WSA boundary on the north. Rockland consists of 60 to 80 percent rock outcrop and 20 to 40 percent soils that are very shallow over bedrock. Soils have formed in a few small secluded areas, but the kinds of soils are not identified because of their wide variation.
- Rock outcrop occurs in the cliffs surrounding the WSA and in the white sandstone

RED MOUNTAIN WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES RED MOUNTAIN WSA

Resource	Alternatives		
	No Action (Proposed Action)	All Wilderness (18,250 Acres)	Partial Wilderness Designation (17,450 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 15 million barrels of oil, 180 billion cubic feet of natural gas, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 1 million barrels of oil, 2 billion cubic feet of natural gas, and 25 tons of uranium oxide could be recovered.
Wildlife	About 1.8 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.	Wildlife in the designated area would benefit from solitude. About 2 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 117 AUMs and maintenance of existing developments (0.5 mile of fence and one water trough) would continue. New developments could be constructed; however, none are now proposed.	Grazing of 117 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 330 acres.	Visual quality could be impaired on up to 20 acres.	Visual quality could be impaired on up to 35 acres, including 19 acres in the designated portion. About 96 percent of the Class A scenery would be within the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 5 miles of ways at current low levels. Overall recreational use could increase from the present 500 visitor days per year to 745 over the next 20 years. Up to 330 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 4 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV recreational use could continue on the 800 acres not designated. Four miles of vehicular ways would be closed to ORV use.

RED MOUNTAIN WSA

TABLE 1 (CONTINUED) SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES RED MOUNTAIN WSA

Resource	Alternatives		
	No Action (Proposed Action)	All Wilderness (18,250 Acres)	Partial Wilderness Designation (17,450 Acres)
Wilderness Values	Wilderness values could be lost on up to 330 acres (1.8 percent of the WSA) due to mineral and energy development and on 800 acres on the Santa Clara Bench if residential development occurred. Opportunities for solitude and primitive and unconfined recreation are less than outstanding on Santa Clara Bench.	Wilderness values would be protected, except on up to 20 acres (less than 1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 19 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on the 800 acres not designated. Overall, wilderness values could be lost on about 5 percent of the WSA. However, 96 percent of the area meeting the standards for naturalness and all of the area meeting the standards for outstanding opportunities for solitude and primitive recreation would be in the designated area and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Washington County Master Plan</i> , State of Utah policies, and the current BLM Virgin River MFP. This alternative would not complement the management of the adjacent Snow Canyon State Park.	This alternative would not be consistent with Washington County's concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute amendment of the BLM Virgin River MFP. Wilderness designation would complement management of Snow Canyon State Park.	Partial designation would be the same as for the All Wilderness Alternative, except that the portion not designated would be consistent with Washington County's plans.
Socio-economics	Annual local sales of less than \$4,390 and Federal revenues of up to \$48,104 would continue. An additional \$6,810 per year in Federal revenues could be derived from leasing of presently unleased areas. Property valued at \$2.4 to \$4 million dollars could be transferred from Federal to private ownership and made available for residential development.	Annual local sales of less than \$4,390 and Federal revenues of up to \$164 would continue, but Federal revenues of up to \$54,750 would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA. Property valued at \$2.4 to \$4 million would not be available for residential development.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$52,350. Property valued at \$2.4 to \$4 million could be transferred from Federal to private ownership and made available for residential development.

buttes and mesas on the southeastern side of the WSA. Rock outcrop consists of exposures of bare bedrock, mostly sandstone, limestone, conglomerate, or basalt. Slopes are variable, ranging from sloping to very steep or nearly vertical.

- Mesquite fine sand type occurs in the center of the WSA in conjunction with an existing wash. It encompasses less than 1,000 acres. These soils are hummocky eluvial sand deposits derived from sandstone.
- Rockland stony type occurs in a small area on top of the mesa just above Snow Canyon and consists of stony and bouldery soils that have slopes of 30 to 70 percent. Sandstone outcrops and cliffs occur mainly on the upper parts of the slopes in this WSA. The stones and boulders originate from these cliffs and are commonly underlain by sand, shale, or siltstone and weathered, shattered remnants of the rock. Soil development is minor because of continual deposits of material from higher lying positions.

Erosion in the WSA is moderate, and the sediment production is low to medium depending upon the amount and kind of vegetation. Approximately 3,650 acres of the WSA are in moderate erosion condition and 14,600 acres are in slight. Total estimated annual soil loss at 1.3 cubic yards/acre for soils in moderate erosion condition and 0.6 cubic yards/acre for soils in slight erosion condition is 13,505 cubic yards (USDI, BLM, 1979a and Leifeste, 1978).

Vegetation

The Red Mountain WSA is located on the edge of the Colorado Plateau Physiographic Region where it meets the Great Basin. While the vegetation types of this WSA are found in various locations in Utah, the understory plants tend to make the area unique in some respects. The Red Mountain area, due to its closeness to the Hot Desert area and the high Great Basin and mountainous areas to the north, comprises a variety of plants found in both. This ecotone includes ponderosa pine, Utah agave, pinyon pine, manzanita, and yucca plants growing in close proximity. Other species such as Gambel's oak and cliffrose may be found along the high rocky ridges. Typical grass species occurring in the area are curly grass, sand dropseed, Indian ricegrass, and cheatgrass.

There are approximately 17,400 acres of pinyon-juniper-sage, 849 acres of sagebrush, and 1 acre of riparian vegetation inside the WSA boundaries.

No sensitive, threatened, or endangered plant species are known to occur in the area.

The Red Mountain WSA lies in the Intermountain Sagebrush Province Ecoregion, as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

The presence of surface water supplies in the WSA is limited. There are no springs or creeks. Small amounts of surface water are available in potholes in sandstone areas. Two potholes probably maintain water throughout the season. The remaining holes contain water only during and immediately following precipitation.

Quality of the water is good following a storm but deteriorates as the water stagnates. Past use of this water has been for stock purposes. There are no present uses of the water except for wildlife and livestock. Water quality data are available on one of these sources (USDI, BLM, 1978b) indicating Class C water standards (water is soft and has low alkalinity, neutral pH, low total dissolved solids [TDS], moderately low nutrients, and low fecal coliform count).

There are small seeps occurring within the canyon areas. These are probably reliable only following a storm and decrease as the water held in the soils and rocks is exhausted.

The entire WSA is underlain by an aquifer contained within the Navajo Sandstone. The depth, productivity, and economic feasibility of developing this unit is uncertain, but successful wells supplying St. George have been drilled in adjacent Snow Canyon in the same aquifer.

This aquifer is within the Santa Clara drainage basin which is presently closed to further water rights appropriation. There are no known water rights on Red Mountain. Washington County is interested in keeping all potential water supplies open to exploration and development.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and min-

eral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3- was assigned to the Red Mountain WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent investigation report. Reports will be made available to the public and submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider the reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

The mineral and energy resource rating summary is given in Table 2.

LEASABLE MINERALS

Oil and Gas

The oil and gas potential for Red Mountain is f3 (moderately favorable), c1 (lowest degree of certainty). Thus, there is a reasonable possibility of oil and gas based on interpretation of similar thrust structures, but there are no specific data pertaining to this particular structure. It has been estimated that there could be up to 50 million barrels of oil and 600 billion cubic feet of gas in-place, with 15 million barrels of oil and 180 billion cubic feet of gas recoverable within the WSA.

TABLE 2
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c1	10 to 50 million barrels of oil; 60 to 600 billion cubic feet of gas
Uranium	f2	c3	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c3	None
Hydroelectric	f1	c4	.05 to 15 megawatts

Source: SAI, 1982.

¹ Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

² Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

Medium-sized oil and gas fields in Utah typically have an areal extent of about 5,000 acres and require about 310 acres for developmental facilities such as roads, pads, etc. Due to the relatively small size of the WSA (18,250 acres) it is unlikely that more than one such field would be present.

The Virgin River MFP closed Red Mountain to oil and gas leasing (USDI, BLM, 1979b). However, some leases were issued prior to the MFP. This closure (Category 4) was later amended to no surface occupancy (Category 3) on about 17,450 acres and leasing with standard stipulations (Category 1) on 800 acres.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Currently, there are 15,980 acres under post-FLPMA leases with either no surface occupancy or no surface activity stipulations. These post-FLPMA leases have been issued for blocking purposes with the explicit agreement that such issuance would prohibit occupancy and might never afford any beneficial use.

Coal

Because there are no coal-bearing formations anywhere in the vicinity, Red Mountain has been assigned a coal favorability of f1 (lowest favorability) with c4 (highest certainty of knowledge).

Geothermal

The unit has been assigned a relatively high certainty (c3) for the occurrence (f2) of low-temperature geothermal resources (less than 90 degrees Centigrade [C] at depths generally less than 1 kilometer). With the occurrence of the Exxon Known Geothermal Resource Area immediately to the north, it is unlikely that potential low-temperature resources such as these would have any possibility of utilization.

LOCATABLE MINERALS

According to the U.S. DOE (1983) the entire WSA is within an area considered to have a moderately high certainty (c3) for the occurrence (f2) of small deposits of uranium. This area is identified by the U.S. DOE as the Southwest Utah favorable area. A favorable area is defined by the U.S. DOE as a geographic area in which the available data indicate the existence of geologic environments favorable for the concentration of uranium. A small deposit of this type (f2) would have an estimated areal extent of about 100 acres based on a maximum size of 500 tons of uranium oxide, a minimum grade of 0.01 percent, and an average thickness of 5 meters. Any mining development would be by underground methods with surface facilities consisting of a portal and air vent(s). It is estimated that surface disturbance would be approximately 20 acres. It should be noted that, since none of the favorable host rocks occur at depths less than 1,000 feet and some occur at depths up to 4,000 feet, it is very unlikely that deposits of this limited size at these depths represent potentially economic deposits. This

formation is not known to be valuable for other locatable minerals and presently there are no mining claims in the WSA.

Wildlife

The primary big game animal in the WSA is mule deer although deer numbers are low. The WSA lies within the boundaries of Deer Herd Unit 61B. Severe deer herd declines occurred during 1973 and 1974 in this unit, and little recovery has occurred since then. Much of the area is used as winter range by mule deer, with light use occurring yearlong, depending on water availability. Habitat in this area is in poor to fair condition, rabbitbrush and bitterbrush being the key forage species of deer during the winter (USDI, BLM, 1978b).

Hunting pressure in the area is very light due to the ruggedness of the area and low wildlife population densities.

In the WSA there are no existing wildlife improvements, critical habitat, or crucial habitat. There are no plans to initiate wildlife improvement projects within the WSA.

The WSA contains no known threatened and endangered species. The bald eagle is an endangered species known to use the WSA. Primarily a winter visitor, the bald eagle utilizes the area periodically for hunting. No roosting areas or special use areas have been identified and bald eagle use of the area is believed to be light (USDI, BLM, 1978b).

Other game animals that may be found in the WSA are mountain lion, mourning dove, and possibly Gambel's quail (USDI, BLM, 1978b).

Various nongame mammals, birds, and reptiles occur in the WSA. This diversity is due primarily to the variety of habitats in the area. However, populations are low due to the scarcity of a primary food chain. Falcons have been seen hunting on Red Mountain, but the degree of use is believed to be light because of low prey densities.

Forest Resources

No significant harvestable forest resources occur in the WSA. Historically, juniper trees may have been cut occasionally. The potential use of forest products (primarily pinyon-juniper) in this area would be very small due to sparse tree density.

Livestock and Wild Horses/Burros

Under present land management practices (Allotment Management Plans) portions of four allotments are found in the WSA. The Sand Wash Custodial Allotment (one permittee) grazes four cattle from November 16 to May 31. The Veyo Allotment (two permittees) has 104 cattle from October 16 to May 28. The Sand Cove Reservoir Custodial Allotment (one permittee) has two cattle from October 16 to May 31, and the Gunlock Allotment (two permittees) runs 65 cattle from October 16 to May 31. Grazing on the four allotments is currently licensed at 1,308 AUMs. One-hundred and seventeen or less than 10 percent of these AUMs come from within the WSA. Table 3 shows the grazing status on Red Mountain.

Because of steep terrain, low forage production, and lack of water, approximately 85 percent of the WSA is unsuitable for livestock grazing. The remaining 15 percent of the area has forage in only poor to fair condition.

Most of the area has low treatment potential due to the rough terrain, making the area marginal for a livestock operation. The only existing range improvement within the WSA is 0.5 mile of livestock fence. Under existing planning efforts, no developments are proposed for the area.

There are no wild horses or burros within the WSA.

TABLE 3
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	Suitable Acres in WSA ¹	Unsuitable Acres in WSA ²	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Gunlock	7,892	1,670	310	1,360	16	2
Sand Cove Reservoir	1,810	480	260	220	10	1
Sand Wash	5,360	3,488	1,464	2,024	18	1
Veyo	20,404	3,500	1,830	1,670	73	2

Source: USDI, BLM, 1979a.

¹ The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

Visual Resources

The BLM visual resource inventory classified all 18,250 acres as Class A and rated the entire WSA a VRM Class II. (Refer to Appendix 7 for a detailed

discussion of BLM's VRM system.) The mountain top is not unusual scenery, but approximately 5,000 acres along the south side and above Snow Canyon are spectacular. The red cliffs paralleling old Highway 91 are the dominant landscape features in the WSA because they provide striking contrast against the blue sky and change to multi-farious hues at sunrise and sunset.

Cultural Resources

Cultural resource data for Washington County, where Red Mountain is located, were derived from existing publications and site forms and a 1-percent random stratified sample of the project area conducted by BLM personnel in 1976. The projected archaeological site density for the Red Mountain area, based on the 1-percent random stratified sample, varies between 4 to 40 sites per square mile depending on the location (USDI, BLM, 1978b).

The Red Mountain WSA contains seven known Southern Piute archaeological sites. These sites are generally in good to fair condition; however, two sites have apparently been picked over by relic hunters.

None of the known sites are on or have been nominated to the National Register of Historic Places. One site is composed of extensive surface scatter of lithics and represents significant archaeological data.

Recreation

Although the Red Mountain WSA offers opportunities for both primitive and nonprimitive types of recreation use, present use of Red Mountain is very light. Probably less than 500 visitor days per year occur within the WSA. Most recreationists (estimated at 400 visitor days annually) use motorbikes or jeeps for access to the end of the trail and hike to view the scenery from the rims overlooking Snow Canyon State Park and the St. George Basin. A hiking trail leading up the south face behind Ivins is a popular day hike increasingly used by youth groups (estimated at 100 visitor days annually). The Town of Ivins has erected a large wooden sign on the edge of town engraved with "Ivins, the Home of Red Mountain." The scarcity of drinkable water, extreme summer temperatures, and sand flies deter use from June to November. The WSA is presently a limited ORV use area and vehicles are restricted to the single access trail leading in from the northeast, approximately 5 miles. Red Mountain also provides

opportunities for nonmotorized, more primitive forms of recreation such as hiking, backpacking, and horseback riding.

Wilderness Values

SIZE

The Red Mountain WSA encompasses 18,250 acres of public land and is approximately 6 miles wide and 7 miles long.

NATURALNESS

By policy, the naturalness characteristic is defined as an area where the evidences of man are substantially unnoticeable to the average visitor and where individual minor imprints of man exhibit no cumulative impact that is substantially noticeable. The policy also dictates that this characteristic be present throughout the WSA. Imprints of man that remain in the WSA include a jeep trail, remnants of fencing (.5 mile), and a livestock watering trough near a pond above Snow Canyon. These imprints combined involve about 5 surface acres; 18,245 acres of the WSA are natural.

In the Red Mountain WSA, the high quality of naturalness has not changed since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the *Interim Management Policy* (USDI, BLM, 1979c). Indiscriminate uses are occurring immediately adjacent to developing subdivisions on the Santa Clara Bench.

SOLITUDE

The WSA affords outstanding opportunities for solitude due to topographic features and natural screening. The size of this WSA is neither considered to enhance nor detract from the outstanding opportunities for solitude present in the WSA. Likewise, the configuration of the WSA neither enhances nor detracts from the outstanding opportunities present. The degree to which the outstanding opportunity for solitude is present in the WSA is most influenced by topographic natural screening. Opportunities for solitude are also associated with the plateau top isolation of a major portion of the WSA.

Approximately 4,200 acres (23 percent) of the WSA present opportunities that meet the outstanding criterion for lands under wilderness review; 14,050 acres do not meet the criterion. Although the WSA possesses qualities to give visitors a feeling of vastness, including topographic

screening enabling visitors to find a secluded spot in a few selected areas of the WSA and topography which provides for a dispersion of recreation uses over parts of the WSA, there are significant outside sights and sounds on Santa Clara Bench which some might consider to detract from the solitude found in the WSA.

The northwestern corner of the WSA is located approximately 1 mile from a military flight path used by fighter planes from Nellis Air Force Base. The flight path is utilized 2 to 3 times per week by flights of four fighters flying at subsonic speeds at minimum 200-foot elevations (Nellis Air Force Base, 1985).

PRIMITIVE AND UNCONFINED RECREATION

The outstanding opportunity for primitive and unconfined recreation within the WSA is influenced by the quality of four types of recreation: hiking, hunting, backpacking, and horseback riding. The WSA does not possess a great diversity in the number of possible primitive and unconfined recreation activities.

Similar types of recreation activities occur to a greater degree on public lands surrounding each community. However, the hiking, backpacking, hunting, and horseback riding opportunities in the WSA are of higher quality than the opportunities on surrounding lands.

The primitive hiking opportunity within the WSA is associated with the sightseeing resource. There are hiking opportunities to observe views into Snow Canyon and, off the southern rim of the plateau, to observe the sandstone formations of the plateau top and to visit the natural slickrock tanks in one branch of Snow Canyon. With the exception of Snow Canyon State Park, a developed recreation area, these opportunities are superior to other hiking opportunities in the immediate vicinity. Certain areas with high scenic values cannot be traversed by hikers.

The backpacking opportunity within the WSA is closely associated with the hiking opportunity. The overnight nature of this activity allows participants to extend their sightseeing range to the remainder of the southern rim and the west rim above the Santa Clara River. The configuration of the WSA makes it possible for backpackers to spend two nights on the plateau at different locations and experience different sightseeing objectives. The backpacking opportunity is also related to the sense of primitive isolation from civilization obtainable from an unintruded plateau top. The horseback riding opportunity is the equivalent of

the hiking and backpacking opportunities. However, lack of water generally limits the use of horses to day rides.

Analysis shows that the primitive recreation opportunities on 2,600 acres (14 percent) of the WSA meet the outstanding criterion for lands under wilderness review and that 15,650 acres do not meet the outstanding quality criterion. The WSA possesses three recreational opportunities of outstanding quality.

SPECIAL FEATURES

Because the *Wilderness Act* does not require that scientific, educational, scenic, or historical values be present, these values are considered optional wilderness characteristics or special features. No specific scientific, historical, or educational values were identified. The Red Mountain WSA does possess scenic values, a special feature. The Snow Canyon portion of the WSA possesses exceptional scenic value. The WSA also provides spectacular views of the surrounding area.

Land Use Plans and Controls

The Red Mountain WSA is within 10 miles of the most populated portion of Washington County, Utah and also adjacent to Snow Canyon State Park on the east and Gunlock State Beach on the west. These recreational areas are operated by the State of Utah. Snow Canyon State Park is oriented toward sightseeing, while Gunlock State Beach provides water-based recreational activities. There is no established access from these areas into the WSA.

There are no existing or proposed rights-of-way within the WSA.

The public lands in the WSA lie within the BLM Virgin River Planning Unit. According to the Virgin River MFP (USDI, BLM, 1979b) Red Mountain was recommended to be designated as recreational lands to protect primitive and natural values. Vehicle use is currently limited to existing roads and trails. A powersite classification (CI 259) extends into the WSA in the northwest portion (Township 40 South, Range 17 West, Sections 33, 34, and 35). This classification is currently undergoing review.

Current in-holdings include about 40 acres of private land, a 745-acre State section (Township 41 South, Range 17 West, Section 2) which is under a State mineral lease, and an additional quarter section of State land (Township 41 South, Range 16 West, Section 16, Northwest $\frac{1}{4}$). The policy of the

State of Utah is to maximize economic return from State school lands. No specific plans have been identified for the isolated private acreage.

The WSA is zoned open space by the *Washington County Master Plan* which states: "It is the recommendation of the Master Plan that most of the State school land, as well as the BLM land, can best serve this generation and the period of this plan by continuing to be used for open space" (Planning and Research Associates, 1971). The west subdivision (under development) is located north of the Town of Ivins and adjacent to the southern boundary of the WSA (Township 41 South, Range 17 West, Section 29; Township 41 South, Range 17 West, Sections 19, 30, and 31). This development is south of the cliffline in the above-mentioned areas. Completion of the residential development would allow individual residential units to border the WSA boundary.

Socioeconomics

DEMOGRAPHICS

The Red Mountain WSA lies in Washington County, Utah.

The 1980 population of Washington County was estimated at 26,065. The communities of Santa Clara and Ivins showed the greatest relative growth between the 1970 and 1980 censuses; both grew approximately 300 percent (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Much of the growth in these two communities is apparently attributable to the growing popularity of Washington County for retirement and winter homes. Both of these communities lie in close proximity to the Red Mountain WSA.

EMPLOYMENT

Employment and personal income in Washington County are presented in Table 4. The three dominant sectors in terms of employment are retail trade (21 percent of total employment), government (19 percent), and services (11 percent). Personal income is in similar proportions.

Washington County is strategically located near or along routes leading to many major recreation areas. Some of the larger tourist attractions include Zion National Park, Glen Canyon National Recreation Area, and Bryce Canyon National Park. Much of the county's economy is based on the tourism industry, as indicated by the high levels of employment and income in the trade and services sectors.

TABLE 4
1980 Employment and Personal Income
Washington County, Utah

Industrial Sector	Employment (Full & Part Time Jobs)	Personal Income (\$1,000)
Total	7,866	83,449
Proprietors	1,469	14,010
Farm Proprietors	343	2,386
Nonfarm Proprietors	1,126	11,624
By Industry Source	—	—
Farm	98	3,031
Nonfarm	6,299	80,418
Private	4,805	63,399
Ag. Serv., For., Fish., and Other	29	724
Mining	70	1,347
Construction	537	9,425
Manufacturing	698	9,759
Nondurable Goods	441	5,986
Durable Goods	257	3,773
Transportation and Public Utilities	236	4,996
Wholesale Trade	263	3,963
Retail Trade	1,673	14,741
Finance, Insurance, and Real Estate	424	5,201
Services	875	13,243
Government and Government Enterprises	1,494	17,019
Federal, Civilian	193	2,725
Federal, Military	161	425
State and Local	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

TABLE 5
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$47,940
Mineral Production	0	0
Livestock Grazing	\$2,340	\$164
Woodland Products	0	0
Recreational Use	Less than \$2,050	0
Total	Less than \$4,390	Up to \$48,104

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production and recreation. Table 5 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

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.

Six livestock operators have a total grazing privilege of 117 AUMs within the WSA. If all this forage were utilized, it would account for \$2,340 of livestock sales and \$535 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures are insignificant to both the local economy and individual businesses. The WSA's motorized recreational use and related local expenditures are low. They are also 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 from 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 Red Mountain WSA is estimated at about 500 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Washington County.

The WSA generates Federal revenues from mineral leases, livestock, and recreation sources (refer to Table 5).

Oil and gas leases in the WSA cover approximately 15,980 acres. At \$3 per acre, lease rental fees generate up to \$47,940 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.

Permittees in the WSA can use up to 117 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$164 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

Analysis Assumptions and Guidelines For All Alternatives

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

2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation and economic factors. Appendix 10 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and uranium exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that oil and gas and uranium would be developed sometime in the future and would cause the following disturbance: oil and gas, 310 acres; and uranium, 20 acres. (Appendix 10 lists surface disturbance assumptions and estimates.) Disturbance from oil and gas activity would be limited to the 800-acre area that is not included in Category 3, a no surface occupancy area.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If oil and gas and uranium were developed, air quality could be reduced up to the PSD Class II limitations. Disturbance of 330 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with oil and gas and uranium exploration and development activities would probably not exceed 330 acres. This is a small area and would not significantly affect geology.

SOILS

It is estimated that up to 330 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 330 acres would increase from 429 cubic yards/year to 891 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 462 cubic yards (approximately 3.4 percent) over the current annual soil loss to approximately 13,976 cubic yards per year.

VEGETATION

The anticipated maximum of 330 acres (1.8 percent of the WSA) disturbed would not create a major change in any of the vegetation types in the WSA.

WATER RESOURCES

Because of the limited presence of surface water supplies in the WSA, the small anticipated acreage disturbance would not significantly impact surface water; however, two potholes used by livestock and wildlife totalling about 1 surface acre could be destroyed if exploration and development occurred within the immediate area.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells. This would not significantly alter the quantity or quality of ground water in the WSA.

MINERAL AND ENERGY RESOURCES

The area would remain open to both energy and mineral development under the restrictions of a limited ORV use area and the existing oil and gas lease stipulations of no surface occupancy or no surface activity on 17,450 acres and standard measures on 800 acres.

Leasable Minerals

There is a potential for up to 15 million barrels of recoverable oil and up to 180 billion cubic feet of recoverable natural gas within the WSA. These oil and gas resources could be explored and developed on 18,250 acres under existing stipulations. However, the 15,980 acres currently under lease would be subject to no surface occupancy or no surface activity stipulations. Under these stipulations oil and gas may not be recoverable from the WSA. There is a possibility for developing a facility with up to approximately 310 acres of surface disturbance.

Locatable Minerals

There is potential to recover less than 500 tons of uranium oxide from this WSA, which would result in approximately 20 acres of surface disturbance. The area would be open for mineral entry under 43 CFR 3809 regulations; however, it is very unlikely that deposits of this limited size located at depths of 1,000 to 4,000 feet would represent potential economic deposits. Therefore, no production of the uranium resource is anticipated, even though location and production would be allowed.

WILDLIFE

Impacts to wildlife habitat could possibly occur under multiple-use management, but no specific activities are anticipated. The possible 330 acres of surface disturbance would not adversely affect wildlife populations because numbers are low and there are no crucial or critical habitats in the WSA.

No impacts are expected to occur to the endangered bald eagle because it is only an occasional visitor to the WSA; prey densities within the WSA are low and no special use areas are found.

FOREST RESOURCES

There are no commercial forest products and trees are sparse; thus, there would be no harvest or loss of the forest resource.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Virgin River MFP (117 AUMs to six permittees). There would be no changes in

or effect on current livestock use and management under this alternative. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA and no livestock management facilities are proposed, few, if any, changes in livestock management techniques are expected.

VISUAL RESOURCES

No impacts to visual resources would occur in the WSA. With a possible 330 acres of surface disturbance from mineral and energy exploration and development, visual values in affected areas would have to be considered within the VRM Class II objectives of the MFP. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity. VRM objectives would probably not be met in VRM Class II areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. Roads, vehicular ways, and drill pads would not be located throughout the area and visual quality would not be significantly reduced in the WSA as a whole because 17,450 acres would be managed under no surface occupancy or activity for oil and gas production. Even after mitigation and rehabilitation, some permanent localized degradation would result. In the WSA as a whole, however, the scenic values would not be significantly altered.

CULTURAL RESOURCES

Disturbance of 330 acres by mineral exploration and development could affect seven archaeological sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area but such loss is expected to be minimal. Vandalism would continue to be a problem and would increase in proportion to the general population increase.

RECREATION

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational

use is expected to increase from 500 current visitor days per year to 745 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 100 visitor days per year to about 149 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing etc.) would increase from 400 visitor days per year to 596 visitor days. ORV use would continue as at present.

If 330 acres were disturbed by mineral and energy activities, primitive recreational opportunities would be diminished on the affected areas and the projected increase in recreation use might not occur.

WILDERNESS VALUES

The wilderness values in the 18,250-acre WSA would not be included in the NWPS. However, these values would likely remain on 17,450 acres because of the ORV restrictions and continuation of the no surface occupancy oil and gas stipulations. Wilderness values on the 800-acre Santa Clara Bench would be lost if residential development occurred.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Washington County Master Plan* that designates the area as open space. The Washington County Commission indicates in the Master Plan that they do not support wilderness designation of the WSA. This alternative would not complement the adjacent Snow Canyon State Park because the WSA would not be recommended as wilderness. This alternative is based on the implementation of the current BLM Virgin River MFP and is, therefore, in conformance with it. The No Action Alternative would be consistent with the State of Utah's policy of maximizing economic return from State school lands.

SOCIOECONOMICS

Washington County's economy is strongly based on the nearby recreation areas. This dependence is illustrated by the relative strengths of the trade and services sectors. It is projected that Washington County will continue to be strong in these two sectors as use of southern Utah's many recreation areas continues to grow.

Future population growth in Washington County is difficult to predict. Washington County's population increased by more than 80 percent between 1970 and 1980 (USDC, Bureau of the Census,

1981). Much of this growth can be attributed to southern Utah's increasing popularity for winter and retirement homes. This type of growth is especially likely in the areas immediately surrounding the WSA. This projection is based on current growth patterns and the location of desirable valley property. Retirement-related growth is expected to continue as is growth in the accompanying economic sectors such as medical-related services.

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 uranium, oil, and gas in the WSA were developed it would not lead to a significant increase in employment and income for Washington County. The probability of economic development of minerals within the WSA is low to moderate.

There would be no livestock-related economic losses because the existing grazing use (117 AUMs) and ability to maintain, replace, and build new range improvements 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 percent per year over the next 20 years (49-percent increase over 20 years). Because estimated recreational use in the area is estimated to increase only 245 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy) recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 2,270 acres in the WSA open to oil and gas leases that are currently not leased. If leased, they would bring up to \$6,810 additional Federal lease fee revenues per year in addition to potential royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$164 per year) would continue.

Eight hundred acres on the Santa Clara Bench below the cliffs is prime development property valued at \$3,000 to 5,000 per acre (or \$2.4 to \$4 million). If these acres were transferred from Federal to private ownership the amount of revenue that would reach the local economy is unknown.

All Wilderness Alternative (18,250 Acres)

As cited in the Description of the Alternatives section, the major changes that could occur in the 18,250-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). Existing oil and gas leases involving no surface occupancy stipulations on 15,980 acres would not be reissued upon exploration unless a find of oil or gas resources in commercial quantities is shown. About 4 miles of existing vehicular ways in the northeastern part of the WSA would be closed to vehicular use except for approvals by BLM as cited in the Description of the Alternatives section. The first mile of the existing way would be "cherry-stemmed" to remain open to vehicles. The WSA would be managed as VRM Class I.

For the following analysis, it is assumed that mining claims would be located prior to designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. There are currently no mining claims in the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because there would be 20 acres of potentially disturbed areas under this alternative, the impacts from development and surface disturbance on air quality, geology, soils, vegetation, water, wildlife, forest, and cultural resources, and livestock would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection for these resources.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Currently there are 15,980 acres under post-FLPMA oil and gas leases with either no surface occupancy or no surface activity stipulations. 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. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be re-issued.

Exploration for and development of a potential resource of up to 50 million barrels of oil in-place

and less than 600 billion cubic feet of natural gas, with 15 million barrels of oil and 180 billion cubic feet of natural gas recoverable, could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant impacts to the oil and gas resource.

Locatable Minerals

Currently, there are no mining claims within the WSA. However, if minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of the locatable mineral resources. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 500 tons of uranium oxide would be foregone. However, it is unlikely that deposits of this limited size represent a potential for economic development.

VISUAL RESOURCES

Upon designation the VRM classes would be changed on 18,250 acres from the existing Class II to Class I. VRM Class I provides primarily for natural ecological changes; however, it does not preclude very limited management activity (BLM Manual 8411). Mineral-related surface disturbance on up to 20 acres could cause only localized impairment of values. However, impacts to the visual resource would not be significant on the WSA as a whole.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 400 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation

would be eliminated from the WSA through closure of 4 miles of the 5-mile way. 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 vicinity of the WSA.

WILDERNESS VALUES

Designation and management of all 18,250 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude (including approximately 4,200 acres that meet and 14,050 acres that do not meet the standards) and primitive and unconfined recreation (including 2,600 acres that meet and 15,650 acres that do not meet the standards). The scenic values on 4,700 acres (special features in this WSA) would also be protected and preserved. With a potential for only 20 acres of surface disturbance related to development of valid mining claims, no loss of wilderness values would result in the area as a whole.

LAND USE PLANS AND CONTROLS

Designation would not be consistent with *Washington County Master Plan* nor would it be consistent with expansion of Ivins and Santa Clara. The current BLM Virgin River MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Virgin River MFP. If State lands within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns from State school lands. Access to the 40 acres of private land within the WSA would not be precluded.

SOCIOECONOMICS

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 5) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate to low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Pre-

cluding 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 Alternative. Because the potential for mineral development is moderate to low, it is estimated that potential mineral-related local 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 \$2,340 of livestock sales and \$585 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. No such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light, 400 visitor days per year. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 15,980 acres now leased for oil and gas would cause an eventual loss of up to \$47,940 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$6,810 annually in Federal revenues from the 2,270 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

To the State of Utah there would be a loss of potential sale values of 800 acres on Santa Clara Bench (present estimated value of \$3,000 to 5,000 per acre).

Partial Wilderness Alternative (17,450 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the WSA are the same as those described for the All Wilderness Alternative. For the nondesignated portion management would be as described for the No Action Alternative. The specific actions that would take place within the 17,450-acre area designated as wilderness and the 800-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. However, a surface disturbance of 19 acres could occur from uranium exploration and development.

It is assumed that, within the nondesignated area, only 16 acres would be disturbed sometime in the future due to locatable mineral and oil and gas exploration and development (1 acre from uranium and 15 acres from oil and gas). This would amount to 305 acres less than under the No Action Alternative and 15 acres more than under the All Wilderness Alternative. Appendix 10 lists the surface disturbance assumptions and estimates for the WSA.

The analysis of the No Action Alternative, based on 330 acres of surface disturbance within the WSA, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, wildlife, forest, livestock, and visual resources. Therefore, these resources would not be significantly affected by the Partial Wilderness Alternative which is based on only 35 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same impacts on development of water sources, mineral and energy resources, wildlife, livestock grazing, cultural resources, and land use plans as noted in Description of the Alternatives section for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The area that would be designated wilderness would be placed in Category 4 status with no leasing. There are approximately 15,180 acres of oil and gas leases in the area that would be designated. Activities on these leases would occur subject to the stipulations issued at the time of leasing. The oil and gas categories would remain in effect. The 800 acres that would not be designated wilderness would be leased without special stipulations.

It cannot be determined how much of the existing potential resource of 50 million barrels of in-place oil and less than 600 billion cubic feet of natural gas falls within the area that would be designated

as wilderness under this alternative. Of these amounts, 15 million barrels of oil and 180 billion cubic feet of natural gas are estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potential resource of up to 14 million barrels of oil and 178 billion cubic feet of natural gas could be foregone. This would allow recovery of 1.0 million more barrels of oil and 2 billion more cubic feet of natural gas than under the All Wilderness Alternative.

It is concluded that, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, this alternative is not expected to result in any significant loss in recovery of the oil and gas resource.

Locatable Minerals

The potential opportunity for recovering up to 475 tons of uranium oxide within that portion of the WSA that would be designated wilderness would be foregone. Twenty-five tons of uranium oxide could possibly be developed in that portion of the WSA that would not be designated. However, it is very unlikely that deposits of this size and depth would ever be explored or developed.

RECREATION

Impacts on recreation values and opportunities for the 17,450-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. ORV use on the 800 acres that would not be designated as wilderness would increase with adjacent subdivision development.

WILDERNESS VALUES

Conforming the wilderness boundaries to the top (or the sides) of the cliffs along the south boundary of the WSA would maintain the integrity of the wilderness quality while only deleting 800 acres with the naturalness characteristic.

Impacts to wilderness values would be the same as under the All Wilderness Alternative on 17,450 acres that would be designated wilderness. Size, naturalness, outstanding opportunities for solitude (including 4,200 acres that meet the standards) and primitive recreation (including 2,600 acres that meet the standard), and special features (including 4,700 acres of scenic special features) would receive NWPS protection. With a potential of only 35 acres of surface disturbance related to development of valid mining claims, no loss of wilderness values would result in the WSA

as a whole due to mineral and energy development. Wilderness values (less than outstanding) could be lost on the 800 acre non-designated portion if residential development occurs.

LAND USE PLANS AND CONTROLS

A boundary adjustment to exclude all areas below the cliffs would be consistent with Washington County planning. This alternative would allow community expansion. However, this alternative does not alter the county's basic position against wilderness in the county.

The current BLM Virgin River MFP does not provide for wilderness designation. Congressional designation of 17,450 acres as wilderness would be an amendment to the Virgin River MFP.

If State lands in the designated portion of the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns from the State school lands. Access to the 40 acres of private land would not be precluded.

SOCIOECONOMICS

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 5) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low to moderate. Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the designated portion of 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 under the No Action Alternative. Because the potential for mineral devel-

opment is low to moderate, it is estimated that potential mineral-related local income would not be significantly reduced by partial 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 \$2,340 of livestock sales and \$585 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. No such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

Motorized recreational use of the WSA is light, 400 visitor days per year. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 15,380 acres now leased for oil and gas in the designated area would cause an eventual loss of up to \$46,140 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$6,210 annually in Federal revenues from the 2,070 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone. However, 800 acres of leased and unleased land in the undesignated area could provide up to \$2,400 in revenues to the Federal Treasury.

There could be economic benefits from probable community expansion on the 800 acres that would not be designated wilderness.

Eight-hundred acres of prime developable land not necessary for other BLM programs in an area of rapid community development could be replanned for disposal. Estimating \$3,000 to \$5,000/acre (future values), the 800 acres dropped from wilderness could generate from \$2.4 to \$4 million in local revenue.

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Cottonwood Canyon WSA



COTTONWOOD CANYON WSA

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COTTONWOOD CANYON WSA

(UT-040-046)

INTRODUCTION

General Description of the Area

The Cottonwood Canyon Wilderness Study Area (WSA) is located in Washington County, Utah, approximately 3 miles north of the Town of Washington. The WSA contains 11,330 acres of land administered by the BLM Cedar City District, Dixie Resource Area Office.

The WSA is characterized by hot summers and relatively short, mild winters. Maximum summer temperatures range from 90 to 100 degrees Fahrenheit (F). Maximum winter temperatures range from 44 to 54 degrees F, and minimum winter temperatures range from 20 to 28 degrees F.

Cold spells in the winter are rare and of short duration because of the protection from cold air masses offered by the high mountains to the north and east. The average date of the last frost in spring is March 31, and the average date of the first frost is October 30, with an average frost-free period of 213 days.

The average annual precipitation varies between 8 and 16 inches. At Leeds, Utah, approximately 2 miles from the WSA, rainfall averaged 12.69 inches per year over a 27-year period. Maximum precipitation amounts occur in winter, associated with storm systems from the Pacific Ocean. A second maximum occurs during July and August, associated with summer thunderstorms. Intense summer thunderstorms occasionally cause local flashfloods in mountainous areas and canyons. The driest months are May and June.

The WSA lies along the transition zone separating the American Desert Physiographic Province on the west from the Colorado Plateau on the east. Elevations range from 3,200 feet to 4,870 feet, and the WSA is characterized by sharp, steep, jagged relief features.

Specific Issues Identified in Scoping

The community of St. George desires to develop a municipal (water) well field in the southern portion of the WSA. Another issue is that approxi-

mately 50 percent of the WSA lacks outstanding wilderness quality as defined by the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). Local officials are also very concerned that wilderness designation will greatly increase the possibility that the air quality classification of this area may be changed to a more restrictive Class I.

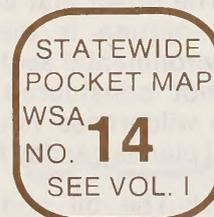
General issues pertaining to the WSA are discussed in Volume I. Issues and concerns specific to the Cottonwood Canyon WSA that were raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below:

1. *Comment:* Flood control development may be needed in Cottonwood Canyon WSA. Would these structures or improvements be preserved if the area were designated wilderness?

Response: New flood control developments would be allowed in the WSA, as noted in the Description of the Alternatives section of this document. Existing structures could remain and be maintained.

2. *Comment:* Why delete Cottonwood Canyon when it meets all the criteria?

Response: During scoping for the Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input that has assisted in the formulation of the EIS alternatives. Additional



input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy," (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

3. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede development in local communities.

Response: The impact of wilderness designation on water developments is described in the Environmental Consequences section of this document. Wilderness designation would conflict with potential municipal water development in this WSA.

4. *Comment:* Once areas have been removed from the original WSA because of reasons that would disqualify the area for designation, there are less than 5,000 acres remaining. Size would disqualify this area for wilderness designation. All other normal considerations that are mandated as a part of the EIS must be adequately treated to the satisfaction of the Commission.

Response: A Partial Wilderness Alternative designed to reduce resource conflicts is described in the Description of the Alternatives section.

5. *Comment:* This WSA is under the direct air traffic route of commercial airlines serving the St. George airport. Planes flying at a low altitude on approach to the airport degrade solitude in this WSA.

Response: The effect that air traffic has on the WSA's solitude is discussed in the Affected Environmental section. Noise from aircraft is not considered significant or impairing to wilderness values since fewer than 10 small planes per day fly over the area.

6. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential

of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping it was suggested that a new partial alternative be defined to eliminate conflict with the St. George municipal water supply. Since the intent of the existing Partial Wilderness Alternative is to resolve this same issue, it was determined that another partial alternative would not result in substantially different information. Therefore, a second partial alternative was eliminated from detailed study.

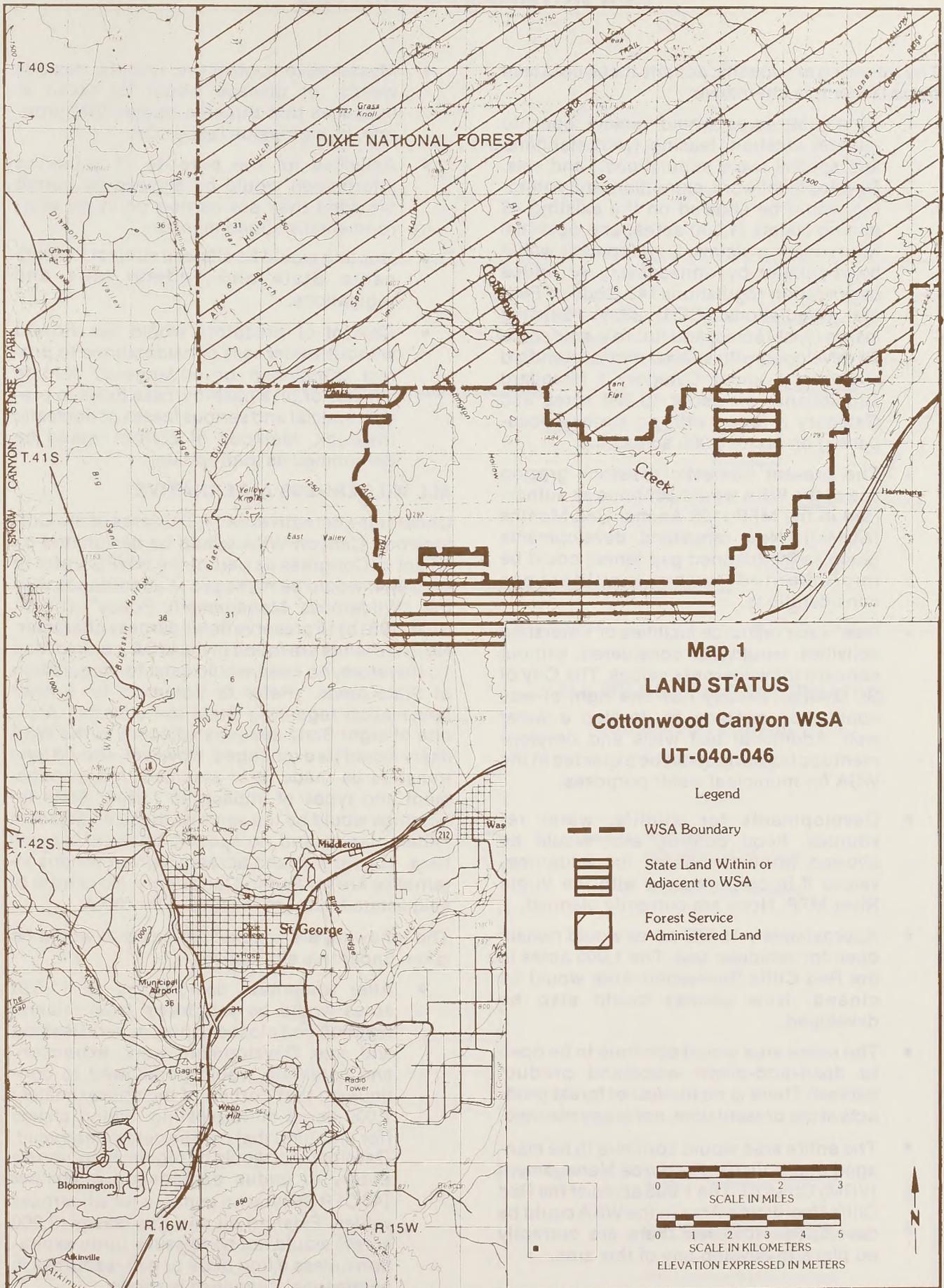
Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (11,330 acres); and (3) Partial Wilderness (9,853 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 ALTERNATIVE

Under this alternative, none of the 11,330-acre Cottonwood Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Virgin River Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1979c). No State land is located within the WSA (refer to Map 1), and adjacent State lands have not been identified in the MFP for Federal acquisition through exchange or purchase.

COTTONWOOD CANYON WSA



The following are specific actions that would take place under this alternative:

- All 11,330 acres would remain open to mineral location, leasing (with standard and special lease stipulations), and sale. Development work, extraction, and patenting would be allowed on the existing 48 mining claims (1,000 acres) and potential future mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809). Existing leases (9,900 acres) and future leases could be developed with special and/or standard stipulations under Category 1 (standard stipulations) on about 10,330 acres and Category 3 (open with no surface occupancy) on about 1,000 acres.
- The present domestic livestock grazing use of the WSA would continue as authorized in the MFP (193 Animal Unit Months [AUMs]). New rangeland developments (such as the planned gap fence) could be implemented without wilderness considerations.
- New water resource facilities or watershed activities would be considered without concern for wilderness values. The City of St. George already has one right-of-way application pending to develop a water well. Additional test wells and development applications could be expected in the WSA for municipal water purposes.
- Developments for wildlife, water resources, flood control, etc., would be allowed without concern for wilderness values if in conformance with the Virgin River MFP. None are currently planned.
- Approximately 10,325 acres would remain open for vehicular use. The 1,005 acres in the Red Cliffs Recreation Area would be closed. New access could also be developed.
- The entire area would continue to be open to dead-and-down woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class III. The 1,005 acres of the Red Cliffs Recreation Area in the WSA could be developed. However, there are currently no plans to develop any of this area.

- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

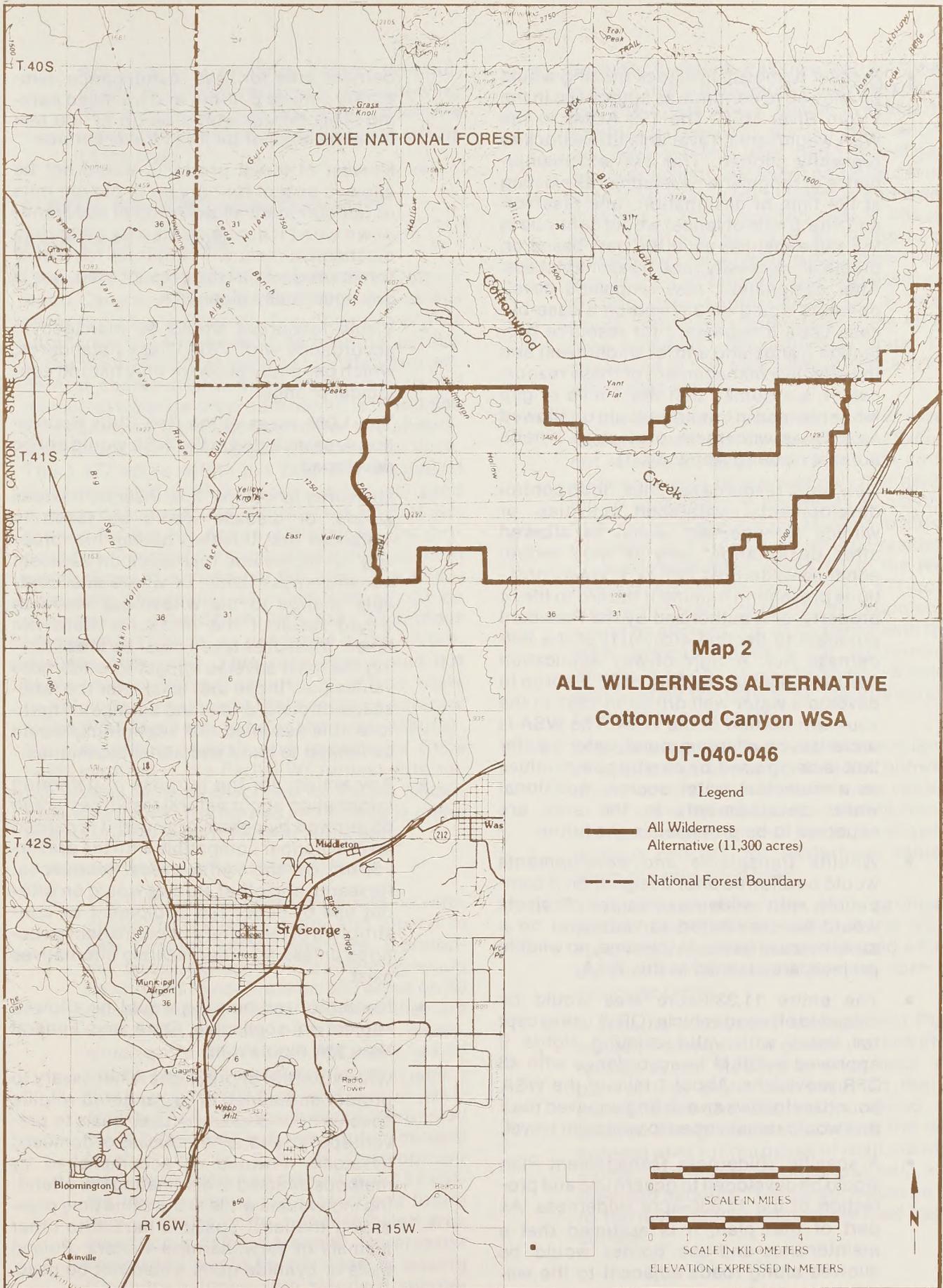
ALL WILDERNESS ALTERNATIVE

Under this alternative, all 11,330 acres of the Cottonwood 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" (USDI, BLM, 1981b) to preserve its wilderness character. No State lands are found in the WSA (refer to Map 1); therefore, no need would exist for acquisition of State lands. (Refer to Volume I for further information regarding State in-holdings.) Also, one of eight State sections adjacent to the WSA likely would be exchanged. However, should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 11,330 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 1,000 acres of 48 existing mining claims (for uranium) that may be determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with concern for wilderness values. Existing oil and gas leases (9,900 acres) would not be reissued upon expiration unless a find of oil or gas resources in commercial quantities is shown.

COTTONWOOD CANYON WSA



Map 2
ALL WILDERNESS ALTERNATIVE
Cottonwood Canyon WSA
UT-040-046

Legend

-  All Wilderness Alternative (11,300 acres)
-  National Forest Boundary



ELEVATION EXPRESSED IN METERS



COTTONWOOD CANYON WSA

- Present domestic livestock grazing would be allowed to continue as authorized in the Virgin River MFP. The 193 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 (one reservoir and one .5 mile of fence) would continue in the same manner as in the past based on practical necessity and reasonableness. After designation, 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. It is assumed that the 1 mile of gap fence planned in this area would be allowed as long as wilderness protection criteria are met (refer to Appendix 1).
- New water resource facilities, flood control developments, watershed activities, 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*. A right-of-way application has been filed by the City of St. George to develop a water well drilled in 1982 in the southern portion of the WSA. The WSA is underlain by a large ground water aquifer that is being used by nearby communities as a municipal water source. Additional water developments in the area are expected to be proposed in the future.
- Wildlife transplants and developments would be allowed after designation if compatible with wilderness values. Projects would be considered for approval on a case-by-case basis. At this time, no wildlife projects are planned in this WSA.
- The entire 11,330-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 provisions. About 1 mile of the WSA boundary follows an existing unpaved road that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 11,330-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- The 1,005 acres of the Red Cliffs Recreation Area included in the WSA would not be developed.
- Measures to control fire, insects, noxious weeds, or disease would be taken 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 must 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 on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used.

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 area.

PARTIAL WILDERNESS ALTERNATIVE

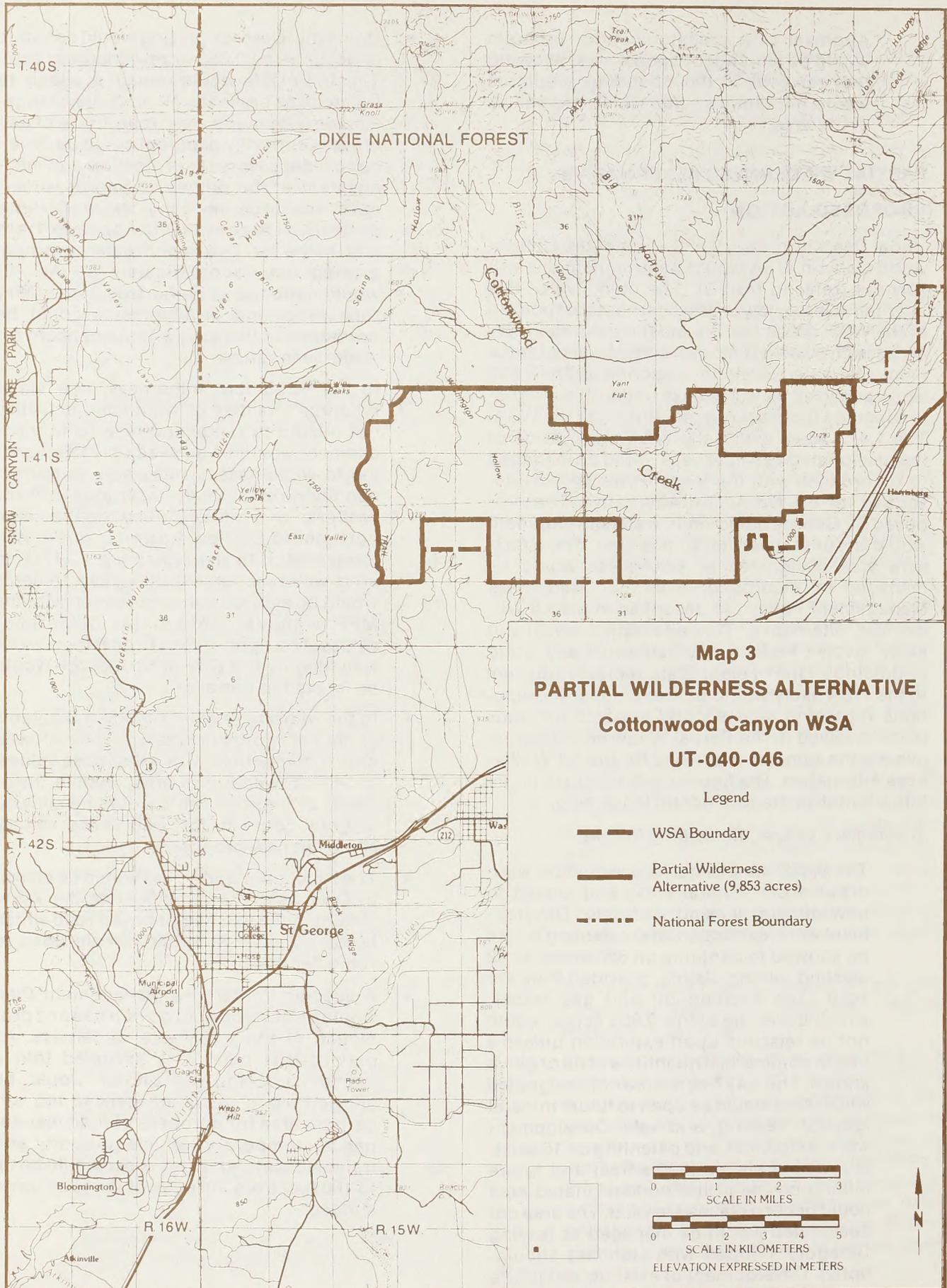
(PROPOSED ACTION)

Under this alternative, 9,853 acres of the Cottonwood 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 which has the most outstanding wilderness characteristics and is free from potential municipal water development conflicts. The 9,853 acres analyzed as wilderness under this alternative include the most rugged portion of the WSA. The 1,477 acres within the WSA but outside of that designated as wilderness would be managed in accordance with the Virgin River MFP as described for the No Action Alternative. The proposed St. George community water development would occur in a portion of this area. The 9,853-acre area designated as wilderness would be managed in accordance with the "Wilderness Management Policy" as described in the All Wilderness Alternative. This alternative would not likely involve Federal acquisition of any State in-holdings. One of eight State sections adjacent to the WSA likely would be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 9,853-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 680 acres on 33 existing mining claims, provided they are valid. The existing oil and gas leases, which cover the entire 9,853 acres, would not be reissued upon expiration unless a find in commercial quantities of oil or gas is shown. The 1,477-acre area not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting on 15 existing mining claims (320 acres) and future mining claims in the nondesignated area could occur if claims are valid. The area not designated would be managed as leasing Category 1 (open with standard stipulations). Development of existing and future leases in this area would occur without concern for wilderness values.
- Domestic livestock grazing would continue to occur in the 9,853-acre wilderness area. The 163 AUMs would remain available to livestock as presently allotted. New rangeland developments (less than 1 mile of gap fence is currently planned) could be developed if necessary for protection and management of the rangeland and/or wilderness resource as long as wilderness protection criteria (refer to Appendix 1) are met. In the 1,477-acre nonwilderness area, grazing use (approximately 30 AUMS) would continue as authorized in the MFP. New rangeland developments could be developed in this area without concern for wilderness values.
- In the 9,853-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 the remaining 1,477-acre area, water resource facility developments would be allowed if in accordance with the MFP without concern for wilderness values. The right-of-way to develop a water well filed by the City of St. George would be located in this area.
- In the wilderness area, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the nonwilderness area, wildlife transplants or improvements would be allowed without concern for wilderness values. None are now proposed.
- The 9,853-acre wilderness would be closed to ORV use. The remainder of the WSA, including the existing unpaved road which borders the WSA, would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 9,853-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

COTTONWOOD CANYON WSA



- Harvest of forest products in the wilderness area 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. The nonwilderness area would be open to woodland harvest.
- Visual resources in the wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The remaining acres would be managed as Class III, as outlined in the Virgin River MFP.
- The 1,005 acres of the Red Cliffs Recreation Area in the WSA would be in the wilderness area and would not be developed.
- Within the wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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 must 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. In the non-wilderness area, measures of control would be taken without wilderness considerations.
- In the nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the wilderness area such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations in the nonwilderness area. In the wilderness area, hunting would be allowed subject to applicable laws and regulations but use would be limited to nonmotorized means.
- In the nonwilderness area, control of predators would be allowed without wilderness considerations to protect threatened or

endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the wilderness area, control of predators would be allowed to protect threatened or endangered species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimal disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Only those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The Cottonwood Canyon WSA and most of the surrounding area have been designated Class II under the Prevention of Significant Deterioration (PSD) regulations. This means that air quality deterioration that accompanies moderate, well-controlled growth would not be considered significant. Ambient sulfur dioxide and nitrogen dioxide concentrations are below ambient air quality standards and applicable State regulations. This is attributed to the lack of any high concentrations of fossil-fuel powered industrial sources in the area (USDI, BLM 1980c). Zion National Park, located approximately 17 miles to the east of the WSA, has been designated as Class I area under the PSD regulations.

Only limited visibility measurements exist for the area. St. George airport visibility data indicate that visibilities in the nonurban areas of the southwestern United States are approximately 65 to 80 miles. Visibility measurements in Warner Valley, approximately 15 miles from the WSA, during 1977 and 1978 showed mean visual ranges of 80 miles and 76 miles, respectively (USDI, BLM, 1980c).

However, windblown dust due to strong winds can cause as much as 70-percent reduction in visual range on winter mornings and late afternoons, and as much as 80-percent reduction on summer mornings (USDI, BLM, 1980c).

COTTONWOOD CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
COTTONWOOD CANYON WSA**

Resource	Alternatives		
	No Action	All Wilderness (11,330 Acres)	Partial Wilderness Designation (9,853 Acres) (Proposed Action)
Water Resources	The WSA could be utilized as a future municipal water source of approximately 14,000 to 84,000 acre feet per year.	The opportunity for development of ground water for municipal use would be foregone.	The effect of this alternative would be about the same as with All Wilderness.
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 4,700 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 1 million barrels of oil, 2 billion cubic feet of natural gas, and 4,700 tons of uranium oxide could be recovered.
Wildlife	About 8 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.	Wildlife in the designated area would benefit from solitude. About 9 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 193 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of 1 mile of fence, could be constructed.	Grazing of 193 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new developments might be allowed.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 900 acres.	Visual quality could be impaired on 750 acres.	Visual quality could be impaired on 770 acres (including 625 acres in the designated portion). About 87 percent of the Class B scenery would be within the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue at current levels. Overall recreation use could increase from the present 3,150 visitor days per year to 4,694 over the next 20 years. Up to 900 acres of mineral-related disturbance could reduce the quality of primitive recreation. Approximately 16 percent of current use is for ORV play activities and this would continue.	The WSA would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV use could continue in the undesignated portion (approximately 1477 acres).

COTTONWOOD CANYON WSA

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
COTTONWOOD CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (11,330 Acres)	Partial Wilderness Designation (9,853 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 900 acres (8 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 750 acres (6.6 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 625 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on 10 percent of the 1,477 acres not designated. Overall, wilderness values could be lost on 7 percent of the WSA. However, 87 percent of the area meeting the standards for naturalness, 92 percent of the area meeting the standards for solitude, and 89 percent of the area meeting the standards for primitive recreation would be in the designated portion and would be protected by the reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Washington County Master Plan</i> , City of St. George water development plans, State of Utah plans and policies, and the current BLM Virgin River MFP.	This alternative would not be consistent with Washington County's concept of multiple use or with water development plans of the City of St. George. Designation would constitute an amendment of the BLM Virgin River MFP.	Partial designation would be the same as the All Wilderness Alternative except that the portion not designated would be consistent with the City of St. George's water development plans.
Socio-economics	Annual local sales of less than \$21,575 and Federal revenues of up to \$29,970 would continue. An additional \$4,290 per year in Federal revenues could be derived from leasing of presently unleased areas. Water, valued at \$1.8 to \$11 million annually, could be developed for municipal use.	Annual local sales of less than \$21,575 and Federal revenues of up to \$270 would continue, but Federal revenues of up to \$33,990 from mineral leasing would be foregone. The opportunity for future energy, mineral and water development and local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$30,000. Water, valued at \$1.8 to \$11 million annually, could be developed for municipal use.

Geology

The WSA lies along the transition zone separating the American Desert on the west from the Colorado Plateau on the east. Exposed bedrock consists largely of flat-lying to gently dipping sandstone of Triassic and Jurassic Age and minor exposures of Quaternary basalt. From a structural standpoint, the tract lies along the west limb of the Virgin anticline.

The elevations of the Cottonwood Canyon WSA range from 3,200 feet to 4,870 feet in a mosaic of sharp, steep, jagged relief features. The Navajo Sandstone ridges trend southwest to northeast dissected by Washington Hollow, Mill Creek, Quail Canyon, Heath Canyon, Cottonwood Canyon, and smaller unnamed tributary channels.

The terrain features are being carved through the weathering processes into a slashed, ragged-appearing landscape interspersed with soft, swirling rock sculptures.

Soils

About 80 percent of the WSA is rock outcrop, stony colluvial land, and badland. These land types are highly dissected and slopes are dominantly very steep to vertical. Runoff is rapid and erosion and sediment yields are variable. Vegetation is very sparse with shrubs and trees growing in crevices or pockets of soil.

The soils on the mesa, ridge tops, valley fans, and bottoms are sandy and gravelly and cobbly sandy loams of various depths. Slopes are nearly level to rolling. Runoff is very slow to medium, and erosion hazard is slight to severe.

The soils and land types are mapped and more fully described in the *Washington County Area Soil Survey* (U.S. Department of Agriculture, Soil Conservation Service, 1977).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	1,100	10	1,430
Slight	0.6	1,700	15	1,020
Stable	0.3	8,300	75	2,559
Total		11,330	100	5,009

Sources: USDI, BLM, 1979a; Leifeste, 1978.

Erosion condition was determined by using soil surface factors, as summarized in Table 2 (terms are defined in the Glossary).

Vegetation

The existing pinyon-juniper type comprises approximately 18 percent of the WSA (2,000 acres) and occurs above elevations of 4,000 feet. The trees are scattered over very rugged terrain. Species associated with the dominant pinyon pine and Utah juniper are generally low-growing shrubs such as desert ceanothus and blackbrush. The higher regions of the area near Dixie National Forest have understory shrubs of big sagebrush, antelope bitterbrush, Utah serviceberry, and mountain mahogany. Perennial grasses such as muttongrass and Indian ricegrass are found at variable elevations throughout this type. Vegetation in this type is not scattered evenly throughout the landscape. Large areas of slickrock occur with vegetation only where pockets of soil have formed.

Vegetation density in this area is less than 5 percent of the land surface.

The blackbrush-desert shrub vegetation type (approximately 80 percent of the WSA [9,000 acres]) occurs in the lower elevation areas of the WSA. Blackbrush, a shrub species, is the most dominant plant in this vegetation type. Shrub species such as bursage, Brigham tea, and desert bitterbrush are often found intermixed with the blackbrush. Grass species such as cheatgrass and curly grass are found but are usually not abundant.

This type is also broken up by slickrock and rock outcrops. Vegetation density in this type is from 10 to 15 percent of the land surface. Associated with these two major vegetation types are five main drainages, including Quail Creek, Heath Wash, Cottonwood Canyon, Washington Hollow, and Mill Creek.

Some riparian vegetation (2 percent, 330 acres) such as Fremont cottonwood, velvet ash, single-leaf ash, and screwbean mesquite occasionally occurs. Other desert plants such as desert almond and live oak predominate in these drainages. Due to additional moisture, these plants are much larger and more robust than those that occur in the upland areas. Vegetation density along the drainages is quite variable depending on moisture pockets.

No sensitive, threatened, or endangered plants are known to occur in the WSA, but there is a

possibility that the listed purple-spined hedgehog cactus (*Echinocereus erigilmannii* var. *purpureus*) may occur in the Southwest $\frac{1}{4}$, Section 27, Township 41 South, Range 15 West. Habitat extends up Mill Creek to ledges.

The Cottonwood Canyon WSA lies in the transition zone separating the American Desert and the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) types of the WSA are blackbrush and juniper-pinyon woodland. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because the biological potential of a site.

Water Resources

Surface water is intermittently present in Mill Creek, Quail Creek, and Heath Wash. These streams enter the WSA from Forest Service land to the north, crossing the WSA and eventually merging with the Virgin River a few miles south of the WSA. Flows vary from a trickle in late summer to very high flows during flash floods. There are no known plans for flood control structures on these drainages. There is a small stock watering pond in the Southeast $\frac{1}{4}$ Northwest $\frac{1}{4}$, Section 28, Township 41 South, Range 14 West. No springs or seeps have been identified in the WSA.

The WSA is underlain with a large ground water aquifer contained within an approximate 2,000-foot layer of Navajo Sandstone. Depth to the aquifer varies greatly depending on location. Both St. George and Washington cities have drilled water wells in this formation (Township 41 South, Range 15 West, Southeast $\frac{1}{4}$ Northeast $\frac{1}{4}$, Section 31, Northeast $\frac{1}{4}$ Southeast $\frac{1}{4}$, Section 27, and Township 42 South, Range 15 West, Southwest $\frac{1}{4}$ Northeast $\frac{1}{4}$, Section 2). The wells drilled by St. George struck water at approximately 335 feet, some 50 feet deeper than that encountered by the Washington City well. This northerly trend of increased depth to the ground water probably is caused by two factors: the increased depth of overlying landforms and a northerly tilt of the water-bearing strata. Exploration of the aquifer has not occurred to the point that it is possible to determine the extent of feasible development within the WSA. The City of St. George has a water right for 1,500 acre-feet of water from this aquifer with full intentions of developing this

right. A test well was drilled in the WSA in 1982. The test well was successful, and a good potable water source was found. A right-of-way application to develop the water has been filed. An analysis of the application has not been completed. Further development proposals of St. George's water system and this aquifer are expected. The St. George water system contributes water to six local communities: Ivins, Santa Clara, St. George, Bloomington, Bloomington Hills, and Washington.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 2 was assigned to the Cottonwood Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of silver that is currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

The energy and mineral rating summary is given in Table 3.

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Uranium (58 Percent)	f4	c4	Approximately 4,200 tons of uranium oxide
Uranium (42 percent)	f2	c3	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c3	Low temperature
Hydroelectric	f2	c4	Low possibility

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

This WSA has a low certainty (c1) for the occurrence of small (less than 10 million barrels of oil and less than 60 billion cubic feet of gas) oil and gas fields (f2). There are no known structures within or near the WSA that might represent potential exploration targets, and accordingly the probability for exploration and development occurring in the WSA is low. If a field of this size did exist, it would have an estimated areal extent of about 2,500 acres. In Utah, fields of this size typically require about 150 acres for developmental facilities such as roads, pads, and disposal ponds.

The WSA is considered to have a low potential for exploration by oil and gas companies. Most wild-cat drilling in this region is centered in the thrust belt to the west, near the intersection of Nevada, Arizona, and Utah.

Oil and gas leases issued prior to the passage of the Federal Land Policy and Management Act (FLPMA) in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right asso-

ciated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

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). Wilderness designation would not affect the termination of existing leases.

There are nine oil and gas leases (9,900 acres within the WSA). Two additional leases (280 acres) are presently under application. Three of the leases (2,400 acres) are pre-FLPMA. There have been no previous ground activities associated with these leases.

Coal

The favorability for coal is low with a high degree of certainty based on an abundance of direct evidence.

Geothermal (f2/c3)

This WSA has been assigned a relatively high certainty (c3) for the occurrence of low temperature (less than 90 degrees Centigrade [C] at depths generally less than 1 kilometer) geothermal resources (f2). With other known high temperature geothermal resource areas in the region, it is unlikely that potential low temperature resources would represent any potential energy source. The potential for their utilization, if they did exist, would have to be considered as extremely low.

Hydroelectric

Development of a small-scale hydroelectric facility on Leeds Creek along the east side of the tract may be possible, but a cost-benefit analysis, a market-availability study, and an engineering study would be required to determine the feasibility of such a project. Thus, the potential for the hydroelectric resource is relatively low with a high degree of certainty.

LOCATABLE MINERALS

Uranium

Approximately 6,600 acres of the WSA are located

within an 1,100-square-mile area considered to have a high certainty (c4) to contain relatively large potential resources of uranium (f4). The remaining 4,730 acres of the WSA are considered by SAI (1982) to be in an area favorable for small deposits of uranium (f2/c3). These areas are identified as the Leeds speculative potential resource area and the southwest Utah favorable area.

Speculative potential resource areas are defined by SAI as those estimated to occur in undiscovered or partly defined deposits: (1) in formations or geologic settings not previously productive within a productive geologic province; or (2) with a geologic province not previously productive. SAI estimates that there is a 90-percent probability for the Leeds speculative potential resource area to contain a total of about 4,200 tons of uranium oxide. The areal extent of such a deposit would be about 750 acres (based on a 0.01-percent minimum grade and a 6-meter average thickness for host rock).

Favorable areas are defined by SAI as geographic areas in which the available data indicate the existence of geologic environments favorable for the concentration of uranium. No estimate was made by SAI for possible tonnages in the favorable area. However, the f2 rating assigned to the area indicates that any deposits would not be expected to exceed 500 tons of uranium oxide at a forward cost of \$100/lb. The areal extent of a 500-ton deposit is estimated to be about 100 acres (based on 0.01-percent minimum grade and a 5-meter average thickness for host rock).

Any mining operations in the speculative potential resource area would be by open pit. The entire areal extent of any deposit would be required for this type of mining operation. Mining operation in the favorable area would probably be by underground methods. Underground mines in a small deposit (less than 500 tons of uranium oxide) typically require only a few acres for surface facilities such as portals, air vents, and leaching sites. Developmental drilling, especially for detailed delineation of a deposit to be mined by underground methods, could require significantly more surface area than actual mining operations. This would depend largely on the size and complexity of the potential deposit and how much drilling would be involved. A closely spaced drilling program could require anywhere from only a few acres for a small deposit with a blanket-type configuration to many more acres for larger deposits with more complex configuration.

Silver

Silver was not rated by SAI (1982).

Although the eastern portion of the WSA is within the Silver Reef Mining District, its mineral values are believed to be minimal. Dalness (1977) concluded that "the lands are nonmineral in character as to locatable and salable minerals" (eastern portion of the WSA).

There are 48 recorded mining claims on the eastern portion of the WSA. These claims may have been made in response to the land's proximity to the Silver Reef mining properties. The minerals data available indicate that their validity for silver is questionable. However, they may also have been located for uranium.

Wildlife

Various species of mammals, birds, and reptiles occur in the WSA. This diversity exists because the WSA is located in the transition between the Colorado Plateau and the American Desert Ecoregions, with species from both these regions represented.

Mule deer is the primary big game animal in the WSA. The mule deer occur mainly in the northern portions of the area, with the highest concentration in the northeast. Most use occurs during the winter months. Habitat condition in the area is poor to fair with cliffrose and antelope bitterbrush being the key forage species (USDI, BLM, 1979b). Hunting pressure is light due to lack of accessibility and the presence of better hunting areas in the immediate vicinity.

Mountain lion, bobcat, and coyote also occur throughout the WSA. Habitat for these species is generally in fair to poor condition. Neither population estimates nor information on use of the area is available, but both are expected to be light.

Gambel's quail and mourning dove, important game birds in Washington County, occupy the WSA. Gambel's quail are found in a variety of habitats within the area, but the heaviest densities occur along the main drainages where greater cover exists. Population estimates in the WSA are not known, but several trappings of quail for transplant to other areas have been conducted by the Utah Division of Wildlife Resources (UDWR). Mourning dove are also found in a variety of habitats in the area. Most nesting occurs along the main drainages and northern portion of the WSA where pinyon and juniper trees are found. Quail and mourning dove hunting in the area is light, mainly due to accessibility.

The bald eagle and peregrine falcon are two endangered birds that may use the WSA. The bald eagle is primarily a winter visitor. No roosting or special use areas have been identified. The bald eagle currently utilizes the area periodically for hunting, but use is not believed to be extensive (USDI, BLM, 1979b). Several sightings of peregrine falcons have been reported in the St. George area. Cliff areas in the WSA are suitable for nesting and could be used by peregrine falcons; however, none have been found.

A number of other raptors use the WSA, including two sensitive species, the prairie falcon and golden eagle. Nesting sites of these two species have been reported in the extreme northern portion of the WSA. Other species commonly using the area include red-tailed hawk, Cooper's hawk, and sharp-shinned hawk.

The gila monster and chuckwalla are found along the rocky shelves and canyons of the WSA. Because of the restricted habitat of these two large lizards they are included on the Utah State Sensitive List. Southern Utah is the northernmost extent of their range. Concentration areas or special use areas have not been identified.

The only stream in the WSA known to support fish is Mill Creek. While most of this stream may dry up during parts of the year, the desert sucker and the speckled dace survive in deep pools. While not game fish, these species add to the aesthetic value of the area (USDI, BLM, 1979b).

The WSA does not contain crucial or critical habitat for threatened and endangered species. Also, no management facilities exist or are planned within the WSA.

Forest Resources

No harvestable forest resources occur in the WSA because trees are very sparse.

Livestock and Wild Horses/Burros

The Cottonwood Canyon WSA is included within two grazing allotments (Red Cliffs and Washington). The Red Cliffs permittee grazes 133 cattle from January 16 through May 15, and the Washington permittee runs 45 cattle from November 16 to April 30. Total annual grazing use on the two allotments is authorized at 775 AUMs. About 25 percent of the AUMs (193 AUMs) on these allotments comes from within the WSA.

Approximately 8,990 acres in the WSA are classified as unsuitable for livestock grazing due to steep, rough terrain and low forage production. The remainder of the area is potentially suitable, depending on the availability of water for livestock use. Thus, grazing is sporadic. There are no sources of permanent livestock water in the WSA. At the present time, the Washington Allotment grazing use is totally dependent on hauling water to the potentially suitable areas. Watering locations are outside the WSA boundary.

The only range improvements in the WSA are one small livestock reservoir (less than 1 surface acre) and about .50 mile of allotment division fence between the Red Cliffs and Washington Allotments. Both projects are in the southeast part of the WSA. The only proposed improvements are a series of gap fences to control livestock movement. These would be located along the west side of the WSA and involve less than 1 mile of fencing.

The *Hot Desert Grazing EIS* (USDI, BLM, 1978b) proposes continued water hauling or water development by the permittee on the Washington Allotment. Without water, there can be no grazing on the allotment.

The WSA does not contain lands with treatment potential for range management or other agricultural uses. Table 4 gives livestock grazing use

**TABLE 4
Livestock Grazing Use Data**

Allotment	Total Acres	Acres in WSA	Suitable ¹ Acres in WSA	Unsuitable ¹ Acres in WSA	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Red Cliffs	14,330	3,330	1,910	1,420	61	1
Washington	10,085	8,000	1,890	6,110	132	1

Source: USDI, BLM, 1979b.

¹The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

data, while Table 5 identifies existing and proposed range improvements in the WSA.

There are no wild horses or burros in the WSA.

TABLE 5
Existing and Proposed Livestock Management Improvements

Allotment	Existing Improvement	Proposed Improvement
Red Cliffs	Reservoir (1) Fence (1/2 mi.)	None
Washington	None	Fence (1 mi.)

Source: USDI, BLM, 1979a.

Visual Resources

The BLM visual resource inventory classified the whole unit as Class B scenery. Visual sensitivity (VRM) is rated as Class III for the entire WSA. (Refer to Appendix 7 for a detailed description of BLM's VRM rating system.) Much of the WSA exhibits a red-colored Navajo Sandstone landscape with recognized aesthetic value.

Cultural Resources

There are two known archaeological sites along Quail Creek. Cultural affiliation is unknown. One site is adjacent to the major hiking trail in Quail Creek and has been heavily vandalized, with the stratigraphy likely destroyed. The other site has also been heavily vandalized. These sites are not of National Register potential.

Recreation

The Cottonwood Canyon WSA offers opportunities for both primitive and nonprimitive types of recreation use. The major recreational uses of the WSA occur in the vicinity of the Red Cliffs Recreation Area. The developed portion of the Recreation Area contains camping facilities, restrooms, and a culinary water development. Although the developed site is outside of the WSA, visitors use the adjacent Quail Creek Canyon portion of the WSA for many types of recreation. According to 1980 traffic counter data (USDI, BLM, 1980d), there were approximately 9,000 visitor days of use in the Red Cliffs Recreation Area. It is estimated that 25 percent of these visitors hike in the adjacent WSA. Therefore, the WSA receives an estimated 2,250 primitive visitor days in the Quail Creek area. The visitor use season extends from

the fall through the spring. Excessive heat deters visitor use during the summer months.

Recreation use in the remainder of the WSA probably does not exceed 900 visitor days per year. ORV use in Washington Hollow is estimated to be less than 500 visitor days. Hunting associated with vehicle access along the western boundary of the WSA is estimated at less than 200 visitor days per year. Although approximately 13 miles of hiking opportunity are available, hiking accounts for less than 200 visitor days outside of Quail Creek Canyon.

The major recreational use of the WSA is sightseeing by tourists traveling Interstate 15 (I-15). Much of the view of the WSA is blocked by foreground terrain features on State and private land. However, much of the WSA is visible from several points along I-15. Travelers along I-15 commonly stop during morning and evening hours to photograph the WSA and its Pine Valley Mountains backdrop. The Utah Department of Transportation (1982) indicates that traffic volumes along this section of I-15 were approximately 5,560 vehicles per day in 1979. A conservative estimate of the sightseeing use would be .5 to 1 million recreational experiences per year.

Even though the WSA provides sightseeing opportunities for large numbers of people, the WSA is not considered the primary destination for recreationists. Therefore, the WSA is not responsible for recreational income attributable to these sightseers.

In summary, the recreational use of the WSA is currently estimated at 3,150 visitor days annually. Approximately 78 percent of the use is attributed to primitive activities and approximately 6 percent is attributed to recreational activities (such as hunting and sightseeing) that currently utilize vehicular access along the boundaries of the unit. There is approximately 16 percent attributed to use solely for ORV play activities.

Wilderness Values

SIZE

The size of the WSA is 11,330 acres. It is approximately 7 miles long (east to west) by 3 miles wide (north to south).

NATURALNESS

This WSA is in a natural condition. There are no noticeable imprints of man in the WSA.

The high quality of naturalness (11,330 acres) has not changed since the *BLM Intensive Wilderness*

COTTONWOOD CANYON WSA

Inventory decision (USDI, BLM, 1980b). The BLM authorized a test water well in the Southwest ¼ Northwest ¼ Section 26, Township 41 South, Range 15 West, approximately 200 feet within the WSA boundary. The decision to authorize this well was made after a finding of no significant impact through Environmental Assessment Report No. UT-040-2-31. The development of this well is presently being analyzed under Environmental Assessment Report No. UT-040-3-38. The authorization was not considered impairing and does not change the naturalness values. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the *Interim Management Policy* (USDI, BLM, 1979a).

SOLITUDE

Topographic screening makes the opportunity for solitude outstanding in this WSA. About 5,200 acres meet the criteria for outstanding solitude and 6,130 acres do not meet the standard.

Neither the size nor the configuration enhances or detracts from the outstanding opportunities for solitude. Superior topographic screening is invariably associated with the exposures of Navajo Sandstone. In most instances, high relief and dissection are characteristic of the Navajo Sandstone occurring within the WSA. An exception is the sandstone exposure on the west side of Mill Creek below lower Washington Flat. The trees are scattered over very rugged terrain. Because vegetation is rather sparse, it is not considered an important individual screening factor.

The sights and sounds of human activities are not present from most places within the WSA. From the higher points of the WSA, traffic on I-15 can be observed. Views of this activity could lend to the feeling of isolation and remoteness or detract from the wilderness experience. The experience is dependent on the feelings of each visitor. Noise from aircraft is not considered significant or impairing to wilderness values since fewer than 10 small planes per day fly over the area.

In summary, it is estimated that approximately 5,200 acres or 46 percent of the WSA present opportunities that meet the outstanding criterion for lands under wilderness review. The topographic screening enables visitors to find a secluded spot in about half the WSA.

Most of the heads of drainages in Mill Creek and Washington Hollow provide solitude. The sandstone divide between Cottonwood Canyon and Washington Hollow is the major area in the WSA exhibiting this characteristic. Outstanding

opportunities are also found in upper Heath Wash, in the rim areas in the lower Cottonwood Canyon area, and in the cliff area south of Quail Creek.

PRIMITIVE AND UNCONFINED RECREATION

The opportunity for primitive recreation is outstanding because the canyon hiking activity is of outstanding quality. Diversity in the number of primitive and unconfined recreational activities is not a factor contributing to the opportunity. About 1,800 acres meet the outstanding standard for opportunities for recreation and 9,530 acres do not meet the standard.

The opportunity for primitive and unconfined recreation is found in three distinct areas within the WSA. The Cottonwood Canyon-Heath Canyon complex contains approximately 1,240 acres of superior hiking opportunities. This activity is more limited in the Washington Hollow-Mill Creek complex (500 acres). Quail Creek Canyon exhibits only 60 acres of outstanding opportunity for primitive recreation.

It is estimated that primitive recreation opportunities on 1,800 acres (16 percent of the WSA) meet the outstanding criterion for lands under wilderness review. The WSA lacks two or more recreational opportunities of outstanding quality and it has no rare, unusual, or otherwise notable recreation activities.

Approximately 6,400 acres of the WSA possess outstanding opportunities for either solitude or primitive recreation. Approximately 4,930 acres (44 percent) lack outstanding opportunities and do not meet the statutory standard. Of the 6,400 acres that meet the standard, only 1,200 acres have both outstanding opportunities for primitive recreation and solitude.

SPECIAL FEATURES

Because the *Wilderness Act* definition of wilderness does not require that scientific, educational, scenic, or historical values be present, these characteristics are considered optional wilderness values or special features. The Cottonwood Canyon WSA possesses only scenic values as a special feature.

Portions of the WSA exhibit a red Navajo Sandstone of rounded form with a tendency to alcove. Navajo Sandstone of this color and form has long been recognized as possessing aesthetic value. The Navajo Sandstone in the WSA is part of a larger 30,000-acre exposure west of Leeds and north of I-15. The aesthetic value occurs wher-

ever the sandstone is completely exposed and stripped of any overburden alluvium. Approximately 5,300 acres of the WSA exhibit this scenic value.

The WSA also possesses a scenic value to I-15 travelers. The red rock and alluvium provide contrast to the black coloration of the Pine Valley Mountains rising above the WSA.

The WSA's most notable features are associated with exposures of Navajo Sandstone. Other areas nearby, such as Zion National Park and Snow's Canyon State Park, offer better examples of this formation.

Land Use Plans and Controls

The WSA is being utilized for wildlife habitat, recreational activities such as hiking and sight-seeing, speculative mineral activities, and live-stock grazing.

There are no existing rights-of-way within the WSA, but the City of St. George has one pending right-of-way application for a water well. Other applications could be expected for municipal water purposes. No State or private or split estate lands are located within the WSA.

The *Washington County Master Plan* (Planning and Research Associates, 1971) has identified the WSA as either a "park and recreation" zone (Red Cliffs Recreation Area) or as an "open space" zone. The Red Cliffs Management Plan (USDI, BLM, 1977) encompasses the northeast portion of the WSA in Section 15 and is compatible with wilderness. The City of St. George plans to develop the aquifer for domestic uses. Several successful wells have already been developed in this aquifer. Because of the conflict with potential water development, Washington County policy presently indicates that the entire WSA should not be designated as a wilderness area.

The Forest Service Pine Mountain Wilderness Area is near the boundary of Cottonwood Canyon WSA.

Socioeconomics

The Cottonwood Canyon WSA lies in Washington County, Utah. Most of the socioeconomic impacts resulting from wilderness designation are expected to occur within this county.

DEMOGRAPHICS

The 1980 population of Washington County was estimated to be 26,065 (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

Approximately 96 percent of this population is concentrated in the Hurricane and St. George areas; both cities are within a 30-minute drive of the WSA.

EMPLOYMENT

Employment and personal income in Washington County are presented in Table 6. The three dominant sectors, in terms of employment, are retail trade (21 percent of total employment), government (19 percent); and services (11 percent). Personal income fell in similar proportions.

TABLE 6
1980 Employment and Personal Income
Washington County, Utah

Industrial Sector	Employment	Personal Income (\$1,000)
Total	7,866	83,449
Proprietors	1,469	14,010
Farm Proprietors	343	2,386
Nonfarm Proprietors	1,126	11,624
By Industry Source	-	-
Farm	98	3,031
Nonfarm	6,299	80,418
Private	4,805	63,399
Ag. Serv., For., Fish., and Other	29	724
Mining	70	1,347
Construction	537	9,425
Manufacturing	698	9,759
Nondurable Goods	441	5,986
Durable Goods	257	3,773
Transportation and Public Utilities	236	4,996
Wholesale Trade	263	3,963
Retail Trade	1,673	14,741
Finance, Insurance and Real Estate Services	424	5,201
Government and Government Enterprises	875	13,243
Government Enterprises	1,494	17,019
Federal, Civilian	193	2,725
Federal, Military	161	425
State and Local	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

Washington County is located near or along routes leading to many major recreation areas. Some of the larger tourist attractions include Zion National Park, Glen Canyon National Recreation Area (NRA), and Bryce Canyon National Park. Much of the county's economy is based on the tourism industry, as indicated by the high levels of employment and income in the trade and services sectors.

INCOME AND REVENUES

Economic-related activities in the WSA include

mineral exploration and production, livestock production, woodland production, and recreation. Table 7 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

TABLE 7
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$29,700
Mineral Production	0	0
Mining Claim Assessment	Less than \$4,800	0
Livestock Grazing	\$3,860	\$270
Woodland Products	0	0
Recreational Use	Less than \$12,915	0
Total	Less than \$21,575	Up to \$29,970

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

The WSA has 48 mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

No oil and gas or minerals have been produced in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Two livestock operators have a total grazing privilege of 193 AUMS within the WSA. If all this forage were utilized, it would account for \$3,860 of livestock sales and \$965 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use is moderate, and related local expenditures are low. These expenditures are insignificant to both the local economy and individual businesses. 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 from 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 Cottonwood Canyon WSA is estimated as about 3,150 visitor days per year. Only a portion of the expenditures

for recreational use of the WSA contributes to the local economy of Washington County.

The WSA generates Federal revenues from oil and gas leases and livestock sources (refer to Table 7).

Oil and gas leases in the WSA cover approximately 9,900 acres. At up to \$3 an acre, lease rental fees generate up to \$29,700 of Federal revenues annually. Half of these monies are allocated to the State which, in turn, 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 193 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$270 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development; however, the area's mineral potential is low. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but would probably be low, due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 150 acres; and uranium, 750 acres. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If oil and gas and uranium are developed, air quality could be reduced up to the PSD Class II limitations; however, the proximity of the WSA to Zion National Park may result in restriction of mineral development to meet PSD Class I limitations. Disturbance of approximately 900 acres would result in increases in fugitive dust emissions. The amount of emissions and their significance would depend upon location, the number of acres disturbed at one time, and reclamation.

GEOLOGY

Minor impacts to geology are expected because surface disturbances associated with locatable minerals (uranium strip mine) and oil and gas exploration and development activities could disturb 900 acres. This, however, would not significantly affect the area's geology as a whole.

SOILS

It is estimated that up to 900 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 900 acres would increase from 1,170 cubic yards/year to 2,430 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 1,260 cubic yards (25 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 900 acres disturbed would not significantly impact the WSA's sparse vegetation. However, one species of officially listed threatened or endangered plant is found within or near the WSA. Before authorizing surface disturbing activities (900 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the Fish and Wildlife Service (FWS) as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Since precipitation is low, it is not known where surface disturbance would occur, and all actions would have to comply with State and Federal water quality laws, no significant impacts are projected. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Virgin River Resource Area.

It is probable that portions of the WSA would be utilized as a future municipal water source. Approximately 14,000 to 84,000 acre-feet per year could be utilized.

Mineral exploration and development in the area would generally be confined to structures above the water-bearing aquifers so no impacts from mineral development are expected.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of in-place oil and up to 60 billion cubic feet of natural gas exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 and Category 3 stipulations. Approximately 150 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location and potential deposits of up to 4,700 tons of uranium oxide could be developed. Approximately 750 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood of development is thought to be minimal because of geologic and economic considerations.

WILDLIFE

No significant impacts to wildlife are expected to occur. The 900 acres projected to be disturbed under a worst-case analysis would probably not occur at the same time, and reclamation would be required as development proceeded. These activities, however, would disrupt wildlife. Mobile animals could be dispersed from the area for the lifetime of these activities. Less mobile wildlife would either perish or coexist with these disturbances. The endangered and sensitive wildlife species would be protected because of the BLM's policy to protect these species.

FOREST RESOURCES

Since there are few trees other than scattered pinyon and juniper, none of which are utilized (except by occasional campers or hikers), and since minimal surface-disturbing activities for the area as a whole are anticipated, no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Virgin River MFP. The 193 AUMs currently allocated in the WSA would continue to be utilized. Since very little use of motorized vehicles is currently being made to manage livestock, little effect is expected to the environment. The gap fences proposed could be developed and would result in improved livestock distribution.

VISUAL RESOURCES

Visual values in areas affected by the estimated 900 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class III management objectives would not be met. Even after rehabilitation, some permanent localized degradation would be expected. In the WSA as a whole, VRM values would not be significantly affected.

CULTURAL RESOURCES

The two cultural sites in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 900 acres by mineral exploration and development under this alternative could affect cultural sites. However, inventories for site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts.

Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 900 acres could be disturbed by mineral and energy activities. Primitive recreational opportunities could be diminished on the affected areas. The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 3,150 current visitor days per year to 4,694 at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 2,450 visitor days per year to about 3,651 per year over the next 20 years. Likewise recreational activities utilizing vehicular access (hunting, sightseeing, etc.) would increase from 200 visitor days per year to 298. ORV play activity would increase from 500 visitor days per year to 745 per year. Overflow from Quail Creek Reservoir could further increase use, particularly around the Red Cliffs area.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Virgin River MFP. Expected mineral and energy exploration and development could disturb an estimated 900 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. The significance of this impact would depend on the location of the disturbance. If disturbance were to occur around the edges of the WSA, impacts would be less.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Washington County Master Plan* which recommends "park or recreation" or "open spaces." It would also be consistent with the City of St. George's plan to develop the area's aquifer for domestic uses. The No Action Alternative is based on implementation of the current BLM Virgin River MFP and is, therefore, in conformance with it. It would be consistent with State of Utah plans and policies.

SOCIOECONOMICS

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. A portion of the \$100 per year assessment fee required for each mining claim would reach the local economy. If the uranium, oil, and gas in the WSA were developed, it would lead to increased employment and income for Washington County. However, the probability of economic development of minerals within the WSA is low.

There would be no livestock-related economic losses because the existing grazing use (193 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$3,860 annually in livestock sales and \$965 of ranchers' return to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase 1,544 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-

related expenditures attributable to the WSA would likely not be significant to the local economy.

The development of water wells by local communities could have a significant beneficial long-term impact on the area. The estimated value of the potential water production from the WSA is \$1.8 to \$11 million per year at \$130 per acre-foot.

Federal and State revenues would not be reduced by this alternative. There are 1,430 acres in the WSA open to oil and gas leasing that are currently not leased. If leased, they would bring up to \$4,290 additional 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. Collection of livestock grazing fees (\$270 per year) would continue. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (11,330 Acres)

As noted in the Description of the Alternatives section, the major changes that could occur in the 11,330-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be closed to vehicular use except for approvals by BLM as cited in the Description of the Alternatives section. The WSA would be managed under VRM Class I guidelines.

For the following analysis it is assumed that some of the existing mining claims (or new claims filed prior to designation) would eventually be explored and developed, causing an estimated 750 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities in the designated area. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. (Appendix 10 lists surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (750 vs. 900 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, wildlife, livestock, forest, and cultural resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection for these resources.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities. Since there would be a reduction of 150 acres disturbed, soil loss from the area would be reduced.

Assuming that all disturbance would occur in areas with moderate erosion class and that erosion condition would increase one class, soil loss on the 750 acres would decrease 1,050 cubic yards/year compared to the No Action Alternative. However, soil loss would also decrease as reclamation occurred.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur; however, none of these activities are planned.

Wilderness designation would preclude the exploration and development of a municipal water source for nearby communities. Sufficient areas within the WSA exist for several wells. Production from other municipal wells in the Navajo Formation ranges from 2,000 to 12,000 acre-feet per year. Thus, wilderness designation would remove from future development a potential municipal water source of between 14,000 and 84,000 acre-feet per year (valued at \$1.8 to \$11 million).

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 9,900 acres (2,400 acres pre-FLPMA and 7,500 acres post-FLPMA) are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration date, and expired leases will not be re-issued.

Exploration for and development of a potential resource of up to 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant impacts to the oil and gas resource.

Locatable Minerals

Approximately 1,000 acres are under mining claim within the WSA, principally for uranium and silver. Up to 4,700 tons of recoverable uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 750 acres could be disturbed due to exploration and development of locatable mineral resources. The worst case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case the potential for recovery of up to 4,700 tons of uranium oxide would be foregone. Because uranium is not being produced and because geologic and economic considerations (e.g., transportation, distance to processing plants, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant impact to uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, disturbance due to exploration of locatable mineral resources could disrupt wildlife populations and result in these species leaving the area.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Virgin River Resource Area MFP. The 193 AUMs currently allocated in the WSA are controlled by two livestock permittees. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for rangeland and/or wilderness protection and the effective management of these resources. In the case of the gap fences proposed, which, if any, of these would be allowed is unknown since each would be considered on a case-by-case basis.

VISUAL RESOURCES

A slight benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from Class III to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore,

would reduce the potential for surface-disturbing activities, except on the area where valid mining claims exist. Thus, there could be localized long-term degradation of values in some areas. However, no significant impact in the area as a whole would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Recreation use is currently low to moderate for most of the area, except near the Red Cliffs Recreation Area. If designated, the entire area's recreational opportunities would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a wilderness management plan would attempt to control destructive increases in future recreation use. However, increased recreation use around Red Cliffs could detract from the quality of the primitive recreational experience by increasing noise and reducing the opportunity for seclusion. The 1,032 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. 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 vicinity of the WSA. The ORV use in the Washington Hollow area would be eliminated. This could result in new areas being disturbed outside the WSA boundaries.

Considering this WSA's proximity to Quail Creek Reservoir, use could be expected to be higher than the above projection.

Mineral-related surface disturbance on up to 750 acres could cause localized impairment of values.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values.

WILDERNESS VALUES

Designation and management of all 11,330 acres as wilderness would contribute to the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude (including approximately 5,200 acres that exceed the standards and 6,130 acres that do not meet the standards) and primitive and unconfined recreation (including 1,800 acres that exceed and 9,530 acres that do not meet the standards). The scenic special features in the WSA would also be protected and preserved. Preservation would be provided as long as no valuable mineral discovery was made.

Increased recreation use, particularly around Red Cliffs, could impact the area's solitude by increasing the noise level and eliminating the opportunity for persons to find seclusion. Opportunities for primitive recreation and special features could also be degraded in the WSA where an estimated 750 acres of surface disturbance could result from allowable mineral exploration activities. These disturbances could have long-term effects on primitive recreation values and special features. The probability of this occurring is low since the area's mineral potential is low. The significance of the impact would depend on the location of the disturbance, noise level, emissions, etc.

LAND USE PLANS AND CONTROLS

Wilderness designation of the Cottonwood Canyon WSA would not be consistent with local county policies and the City of St. George's water development plans. The existing Virgin River MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Virgin River MFP.

SOCIOECONOMICS

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 7) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low. Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding explo-

ration 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$3,860 of livestock sales and \$965 of ranchers' return to labor and investment. Proposed improvements for livestock could be foregone along with any resulting increase in ranchers' income. No such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light to moderate (693 visitor days per year). The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 9,900 acres now leased would cause an eventual loss of up to \$29,700 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$4,290 annually in Federal revenues from the 1,430 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

Wilderness designation would conflict with the City of St. George's plans to drill wells for municipal water in a portion of the WSA. Designation could result in an increased but presently unquantifiable cost of water acquisition to the City of St. George. These costs could include the identification and development of alternative water sources or any administrative or legal costs incurred in securing the rights to drill on the WSA. The potential water resource in the WSA has been valued at \$130 per acre-foot, and designation could result in a loss of \$1.8 to \$11 million per year.

Partial Wilderness Alternative (9,853 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness

Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 9,853-acre area designated as wilderness and the 1,477-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some of the existing mining claims would eventually be explored and developed, causing an estimated 625 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production. They would not be reissued, and future leasing of oil and gas would not be allowed.

It is assumed that, within the nondesignated area, only 145 acres would be disturbed sometime in the future due to mineral and oil and gas exploration and development. Overall, 770 acres of surface disturbance would occur within the WSA, 130 acres less than under the No Action Alternative and 20 acres more than with the All Wilderness Alternative. (Appendix 10 lists the surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 900 acres of surface disturbance, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, vegetation, wildlife, livestock grazing, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative which is based on 770 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same impacts on development of mineral and energy resources, wildlife, livestock, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the All Wilderness, Partial Wilderness, and the No Action Alternatives.

WATER RESOURCES

Because the Navajo Sandstone aquifer is shallower in the southern portion of the WSA, the most feasible area for water development would be in the nondesignated area and could be developed. Essentially all of the potential annual water yield of 14,000 to 18,000 acre-feet could be utilized.

SOILS

Soils within the designated portion of the WSA

could benefit because of the reduced likelihood of surface-disturbing activities. Assuming that up to 770 acres of soil would be disturbed by mineral exploration in the entire area, there would be a slight reduction in soil loss compared to the No Action Alternative and a slight increase compared to the All Wilderness Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 9,850 acres of oil and gas leases in the area that would be designated wilderness. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas is within the area that would be designated as wilderness under this alternative. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potential resource of up to 2 million barrels of oil and 16 billion cubic feet of natural gas could be foregone. This would allow recovery of 1 million more barrels of oil and 2 billion more cubic feet of natural gas than with the All Wilderness Alternative.

It is concluded that, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, this alternative is not expected to result in any significant loss in recovery of the oil and gas resource.

Locatable Minerals

Approximately 840 acres of mining claims fall within the area that would be designated wilderness. Development work, extraction, and patenting could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981).

It cannot be determined how much of the potentially recoverable uranium falls within the area that would be designated as wilderness under this alternative. Because uranium is not being recovered at present within the WSA and geologic and economic considerations (e.g., dis-

tance to processing plants, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

VISUAL RESOURCES

Because total surface disturbance in the WSA would be 625 acres under this alternative as opposed to 900 acres under No Action and 750 acres under All Wilderness, the impact on visual resources would be less than under the No Action Alternative and slightly more than under the All Wilderness Alternative. In the portion recommended for designation, 625 acres of surface disturbance resulting from mineral exploration and development would cause localized long-term degradation of scenic values and exceed VRM Class I management objectives. An additional 145 acres in the nondesignated portion of the WSA would be disturbed and would not meet VRM Class II objectives. Disturbance of a total of 770 acres within the WSA would result in localized long-term impairment of visual values but would not significantly affect visual resources in the WSA as a whole.

RECREATION

Impacts on recreational values and opportunities for the 9,853-acre area designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to the lack of such activity in the area and because the ORV use in Washington Hollow is outside the designated area.

In the area that would not be designated (1,477 acres), little change in recreational use is expected due to the limited recreational values.

WILDERNESS VALUES

Impacts to wilderness values would be the same as under the All Wilderness Alternative on the 9,853 acres that would be designated wilderness. Size, naturalness, and outstanding opportunities for solitude (including 4,800 acres that exceed the standard and 5,053 acres that do not meet the standard) and primitive recreation (including 1,600 acres that meet and 8,253 acres that do not meet the standard), and most of the scenic special feature would be preserved. Recreational use could increase (refer to Recreation section under All Wilderness Alternative) due to designation. Most increases in use would result from construction of the Quail Creek Reservoir and solitude could be impacted, as described in the All Wilderness Alternative. There could be some loss of wilderness values due to allowable surface disturbance from mineral exploration and develop-

ment activities on up to 770 acres. Additionally, sights, sounds, and emissions of activities within and adjacent to the 1,477-acre area that would not be designated could result in loss of solitude and primitive recreation values within the designated portion.

In the 1,477-acre area that would not be designated, there would be 145 acres of disturbance from mineral and energy exploration and development activities. Those activities would degrade wilderness values (naturalness, special features, and opportunities for solitude and primitive recreation) from the commencement of activities through rehabilitation. Thus, slight long-term impairment of wilderness values in the portion that would not be designated could occur. Additionally, the sights, sounds, and emissions of those mineral and energy activities could impair solitude and primitive recreation values in the portion that would be designated.

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use

Plans and Controls section described for the All Wilderness Alternative with the exception of water development plans of the City of St. George. Most of the area they are interested in is deleted from wilderness designation under this alternative.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any changes in existing employment and local income distributions and projections as defined in the No Action Alternative. The 193 AUMs would remain available to cattle in the Red Cliffs and Washington Allotments. Water valued at \$1.8 to \$11 million annually could be developed. Approximately \$30,000 per year in Federal oil and gas leasing revenue, \$4,000 less than with the All Wilderness Alternative, would be lost as leases were phased out. This revenue would not be transferred to State programs. Overall, the local economic impact from this alternative would be considered insignificant.

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LaVerkin Creek
Canyon WSA



LAVERKIN CREEK CANYON WSA

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LAVERKIN CREEK CANYON WSA (UT-040-153)

INTRODUCTION

General Description of the Area

LaVerkin Creek Canyon lies along the boundary of Zion National Park in the northeast corner of Washington County. It is adjacent to a National Park Service (NPS) administratively endorsed wilderness proposal encompassing 120,620 acres. LaVerkin Creek Canyon Wilderness Study Area (WSA) contains 567 acres. It is administered by the BLM's Cedar City District, Dixie Resource Area.

The WSA's topography is dominated by LaVerkin Creek drainage. The canyon rims are 700 to 900 feet above the creek exposing various rock formations. The climate within the WSA is considered mild with average temperatures ranging from the low 40s during the winter months to the high 80s during mid-summer. Temperature extremes can vary from 0 to 105 degrees Fahrenheit (F). Average annual precipitation in Zion National Park is 14.5 inches with about half occurring in the form of winter snow and half during summer thunderstorms. Winds usually prevail from the southwest with the strongest winds occurring in March and April.

This WSA was dropped from wilderness study status by the U.S. 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 for analysis in this Environmental Impact Statement (EIS) in accordance with (1) general land use planning provisions of Section 202 of the Federal Land Policy and Management Act (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 located within the WSA.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the study phase were the small size of the WSA, viability of its management by BLM and NPS, and the management need for designating the area as wilderness. Issues and concerns specific to LaVerkin Creek Canyon WSA raised in the spring of 1984 public scoping meetings (USDl, BLM, 1984) are responded to below.

1. *Comment:* Flood control development may be needed in this WSA. Would these structures or improvements be preserved if the area were designated wilderness?

Response: New flood control developments could be allowed in the WSA on a case-by-case basis as discussed in the Description of the Alternatives section under the All Wilderness Alternative. Existing structures could remain and be maintained.

2. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede development in local communities.

Response: The WSA is underlain by Navajo Sandstone, a known water-producing formation. There are no known plans for developing this potential resource.

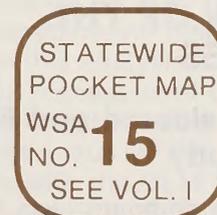
3. *Comment:* Based on size, this area does not qualify for further consideration as a wilderness area. All other normal considerations mandated as a part of the EIS must be adequately treated to the satisfaction of the Commission.

Response: This WSA is adjacent to a proposed wilderness area in Zion National Park. BLM has authority under Section 202 of FLPMA to study units of less than 5,000 acres.

4. *Comment:* Would BLM wilderness areas be consistent with other adjoining Federal land use plans?

Response: Consistency with land use plans is discussed in the Land Use Plans and Controls sections of this document. Wilderness designation of this unit would be consistent with the proposed wilderness area in Zion National Park.

5. *Comment:* Apparently there were irrational deletions of all or parts of the WSAs and Instant Study Areas (ISAs). After review of Site-Specific Analysis (SSA) summaries in the scoping document, it becomes apparent



that many areas have no resource conflicts and excellent wilderness qualities, yet no acres were recommended for wilderness.

Response: During scoping for this EIS, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the U.S. Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

6. *Comment:* The oil and gas potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the U.S. Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, one comment was received on the LaVerkin Creek Canyon WSA. The commentor

suggested a partial alternative be considered to eliminate from further study any areas that would conflict with wilderness designation. No specific resource conflicts were identified by the commentor. Studies of the LaVerkin Creek Canyon WSA have not identified any significant resource conflicts with wilderness designation; therefore, no partial wilderness alternatives were considered.

Transfer of several WSAs, including the LaVerkin Creek Canyon WSA, to NPS administration in adjacent NPS units has been proposed (H.R. 1214, 1984). Such a transfer could occur in the future regardless of wilderness status.

Because of the possibility of management transfer from the BLM to the NPS, the EIS could analyze both BLM and NPS management with and without wilderness designation of the WSA. However, alternatives for transfer of jurisdiction from BLM to NPS are not analyzed in this EIS because (1) BLM could continue to manage the WSA without wilderness designation or could manage the WSA as wilderness in conjunction with a contiguous NPS-administered wilderness; and (2) the outcome of the NPS wilderness proposals and H.R. 1214 are uncertain actions independent of the BLM wilderness review. The EIS addresses the basic question of wilderness designation of BLM-administered land and the resultant environmental impacts. 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.

It is noted, that in cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the BLM "Wilderness Study Policy" (USDI, BLM, 1982b) requires the BLM, in its Wilderness Study Report, to determine (1) whether 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 administering the contiguous wilderness area. BLM has determined that the LaVerkin Creek 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 (i.e., relative amounts of the total wilderness administered by each agency, principal public ingress and exit points, agency staffing and

workload in the region, and similar non-environmental 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; and (2) All Wilderness (567 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 ALTERNATIVE

Under this alternative, none of the 567-acre LaVerkin Creek Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Virgin River Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1979c). No State lands lie within or near the WSA (refer to Map 1).

The following are specific actions that would take place under this alternative:

- All 567 acres would remain open to mineral location, leasing, and sale. There are no mining claims in the WSA at the present time. Development work, extraction, and patenting would be allowed on future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Existing and future oil and gas leases could be developed under standard stipulations (Category 1) on the 567-acre area.
- The present domestic livestock grazing use of 20 Animal Unit Months (AUMs) would continue as authorized in the Virgin River MFP. There are no existing range developments in the WSA. New rangeland developments could be implemented without wilderness considerations. No developments are currently planned.
- Developments for wildlife, water resources, etc. would be allowed without concern for wilderness values if in conformance with

the current BLM land use plan. None of these developments are currently planned.

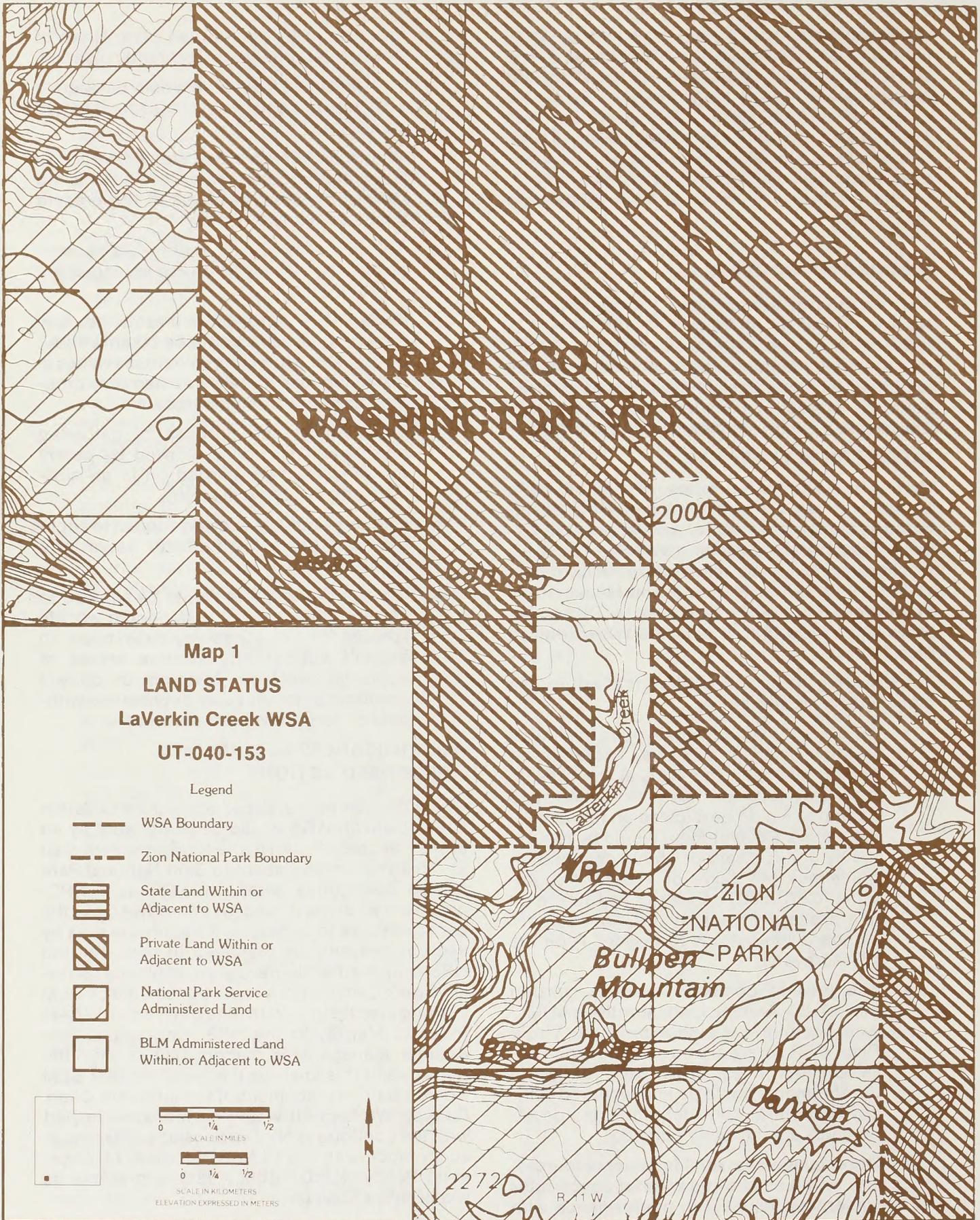
- The entire WSA acreage would be open to vehicular use and new access routes would be allowed.
- The entire 567-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 567 acres of the LaVerkin Creek Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). This WSA lies adjacent to Zion National Park and is contiguous with a 120,620-acre NPS-proposed wilderness. Because this WSA lacks the necessary size to constitute a wilderness area by itself, it can only be managed in part with the NPS-proposed wilderness. As a result, the LaVerkin Creek Canyon WSA could be retained by BLM or transferred (along with nine other small WSAs) (refer to Map 3) to the NPS, who would then assume management responsibilities. For the purposes of this analysis it is assumed that BLM would retain management of the LaVerkin Creek Canyon WSA and it would be managed in part with the contiguous NPS-proposed wilderness in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character.

No State lands are located in or adjacent to the

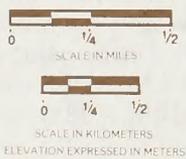
LAVERKIN CREEK CANYON WSA



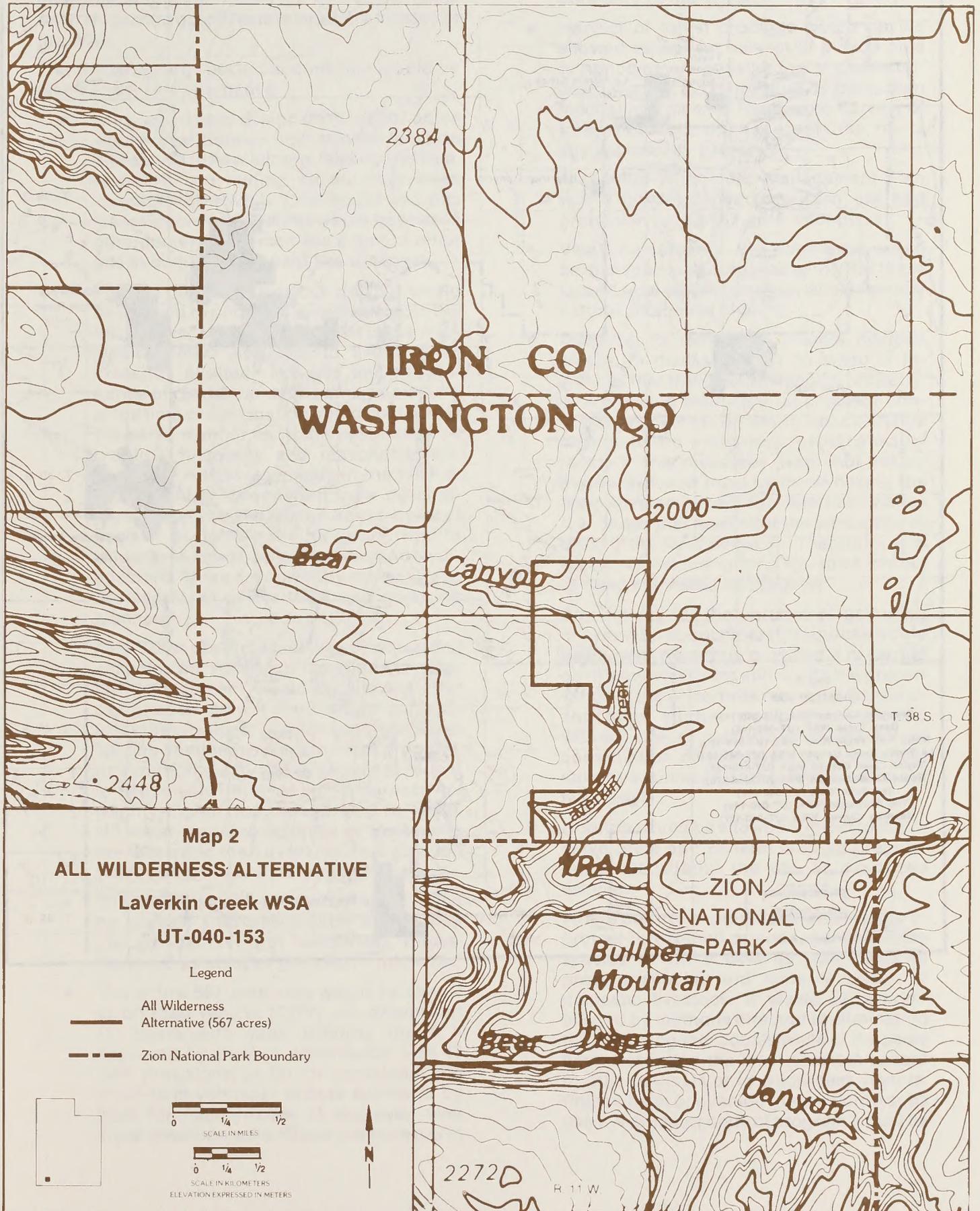
Map 1
LAND STATUS
LaVerkin Creek WSA
UT-040-153

Legend

-  WSA Boundary
-  Zion National Park Boundary
-  State Land Within or Adjacent to WSA
-  Private Land Within or Adjacent to WSA
-  National Park Service Administered Land
-  BLM Administered Land Within or Adjacent to WSA



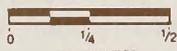
LAVERKIN CREEK CANYON WSA



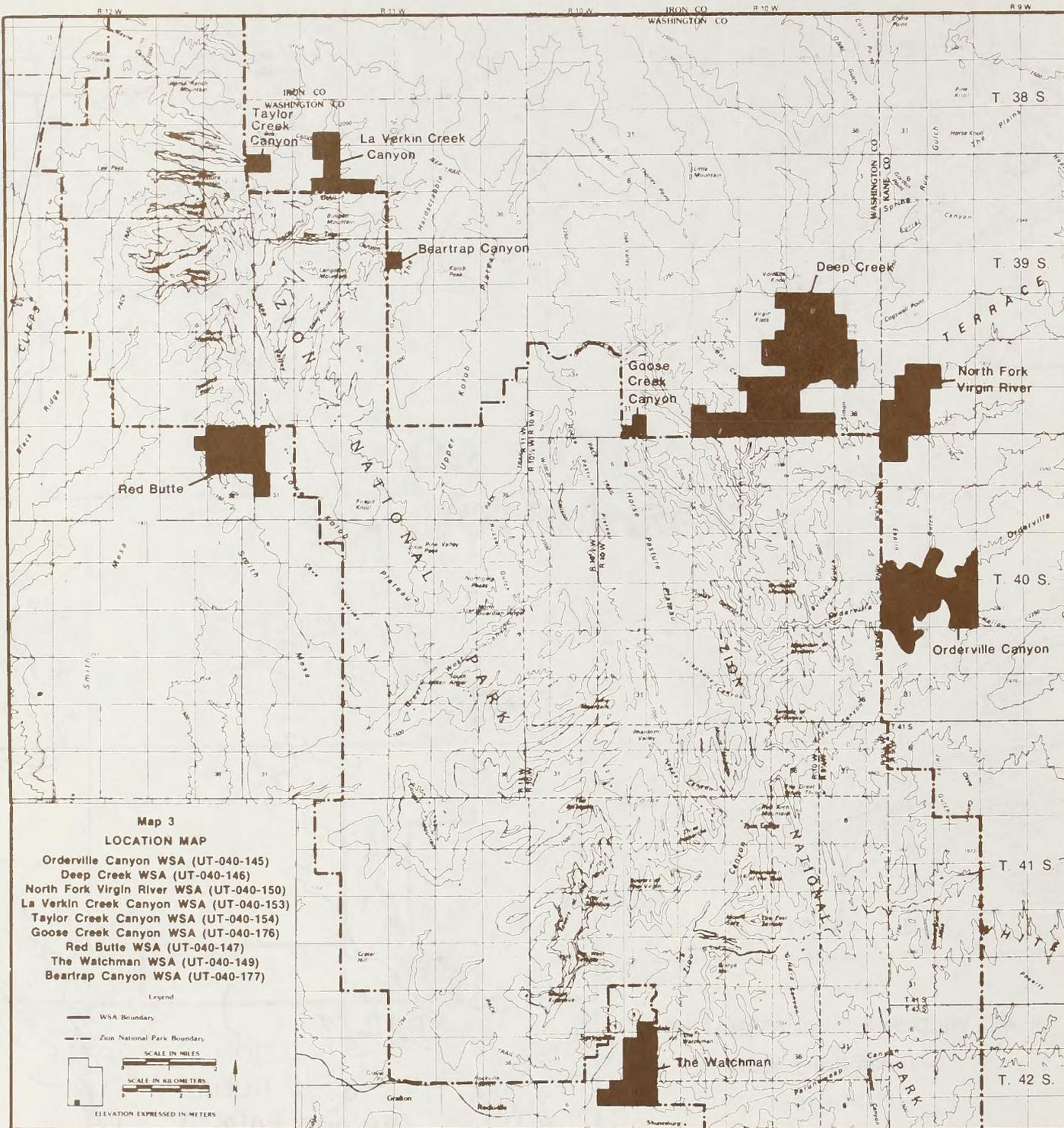
Map 2
ALL WILDERNESS ALTERNATIVE
LaVerkin Creek WSA
UT-040-153

Legend

- All Wilderness Alternative (567 acres)
- - - Zion National Park Boundary



LAVERKIN CREEK CANYON WSA



LAVERKIN CREEK CANYON WSA

WSA (refer to Map 1). The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 567 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Currently, no mining claims have been located in the WSA. Existing oil and gas leases involving 440 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would be allowed to continue as authorized in the Virgin River MFP. The 20 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 could continue in the same manner as in the past based on practical necessity and reasonableness. There are no developments in the WSA at present. After designation, new developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management. There are currently no rangeland developments in the WSA and none are planned.
- 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). No water resource facilities or treatments are located in the LaVerkin Creek Canyon WSA, and none are currently planned.
- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 567-acre area would be closed to off-road vehicle (ORV) use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. There are no ways in the WSA nor are there any roads along the boundary of the WSA.
- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 567-acre wilderness.
- Visual resources in the wilderness would be managed in accordance with 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 instances that threaten human life, property, or high-value resources on adjacent non-wilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must 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 on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be

approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Only those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

Air quality is excellent (Prevention of Significant Deterioration [PSD] Class II). Visual ranges in excess of 100 miles occur 75 percent of the time, and ranges in excess of 155 miles occur 10 percent of the time (USDI, BLM, 1980c). Zion National Park is designated as Class I under the PSD regulations.

Geology

This WSA lies within the Grand Staircase section of the Colorado Plateau Physiographic Province. LaVerkin Creek Canyon drops 1,000 feet from its east rim to LaVerkin Creek which flows south the length of the WSA. Bear Creek flows west to east and intersects LaVerkin Creek in the northern portion of the WSA.

Rocks of Jurassic Age approximately 1,000 feet thick outcrop in the WSA. Underlying Mesozoic and Paleozoic rock may be as much as 10,000 feet thick (Hintze, 1973). Approximately 500 feet of cross-bedded Navajo Sandstone are exposed in the canyon and 400 feet of the Carmel Formation crop out near the rim. A northeast-trending fault of undetermined displacement occurs a few hundred feet to the southeast of the unit and could extend beneath portions of this WSA. The canyon has steep, nearly 900-foot walls. It extends approximately 1.50 miles through the WSA.

Soils

There are some isolated pockets of productive soils within this WSA, but they are very small and undelineated. Most of the soils are mapped by the *Washington County Soil Survey* (U.S. Department of Agriculture, Soil Conservation Service,

1977) as Paunsaugunt-Kolob-Dalcan association or rock outcrop-rockland association. These are excessively drained, nearly level to very steep, shallow to deep gravelly silt loams, fine sandy loams, cobbly loams, and bare bedrock. The erosion potential is moderate to severe, and the erosion condition classification is moderate. Erosion condition as determined by using soil surface factors is summarized in Table 2 (terms are defined in the Glossary).

Soils are used for range, wildlife, and recreation and are unsuitable for agriculture.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	567	100	737
Slight	0.6	0	0	0
Stable	0.3	0	0	0
Total		567	100	737

Sources: USDI, BLM, 1979b; Leifeste, 1978.

Vegetation

Over 500 species of plants are known to occur in adjacent Zion National Park. Existing vegetation in the WSA is comprised of three major types. At the highest elevations in the WSA (from 5,500- to 7,500-foot elevation) is the coniferous forest zone which occupies about 167 acres. It is characterized by ponderosa pine, Douglas fir, white fir, aspen, and Rocky Mountain juniper.

Between the 4,000-foot and 5,500-foot elevation are approximately 150 acres of shrub woodland characterized by the pygmy forest of Utah juniper and pinyon pine. This zone includes yucca, Gambel's oak, Utah serviceberry, singleleaf ash, littleleaf mountain mahogany, and prince's plume. On the more exposed benches and gentle slopes at the edge of the pinyon and juniper forest are areas of sagebrush and rabbitbrush.

Associated grasses in this zone include Indian ricegrass, galleta grass, needle-and-thread grasses, and muttongrass. Oaks, bigtooth maple, and numerous wildflowers also occur there.

Associated with perennial drainages are small but interesting riparian plant communities occurring

LAVERKIN CREEK CANYON WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES LAVERKIN CREEK CANYON WSA

Resource	Alternatives	
	No Action	All Wilderness (567 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. As a worst case, the recovery of uranium may also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 32 percent of the WSA could be directly affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 20 AUMs would continue. New developments for livestock could be constructed; however, none are now proposed.	Grazing of 20 AUMs would continue. Little effect on current livestock management is expected. If proposed, new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 180 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	Recreational use could increase from the present 100 visitor days per year to 149 over the next 20 years. Up to 180 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA would be closed to ORV recreational use, but this would not be significant as little ORV use now occurs. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 180 acres, but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 20 acres which may be disturbed under valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with Washington County multiple-use concept, State plans and policies, and the current BLM Virgin River MFP. It would not complement the NPS proposal for adjacent wilderness or for transfer of the WSA to the adjacent NPS unit.	Designation would not be consistent with the Washington County multiple-use concept, but it would complement the NPS proposals for wilderness and transfer of the WSA to the NPS unit. Designation would constitute amendment of the BLM Virgin River MFP.
Socio-economics	Annual local sales of less than \$810 and Federal revenues of up to \$1,348 would continue. An additional 127 acres could be leased for oil and gas to increase Federal revenues by up to \$381 annually. Employment and income could increase from new mineral and energy development, but probability is low.	Annual local sales of \$810 and Federal revenues of \$28 would continue, but potential Federal revenues of up to \$1,701 annually from mineral leasing would be foregone. Opportunity for future mineral and energy development could be reduced in the WSA.

around springs and seepage areas. There are about 50 acres of riparian vegetation in the WSA. The seeps usually develop under protective overhanging lips of harder strata. These hanging gardens generally have luxuriant plant life, such as maidenhair fern, pink-flowered shooting star, and scarlet monkey flower. Approximately 200 acres of the WSA are barren.

Available data indicate no sensitive, threatened, or endangered plant species occur in this WSA.

This WSA is in the transition of the Colorado Plateau and Rocky Mountain Forest province ecoregions, as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). This transition has a diverse vegetation, with plants from each of these ecoregions being represented.

The potential natural vegetation (PNV) types of the WSA are Arizona pine forest (207 acres) and juniper-pinyon woodland (360 acres) (USDI, Geological Survey, 1978). PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

This WSA is located in the Virgin River subbasin of the Colorado River Basin hydrologic region. There are no existing water rights and the area is presently closed to further applications, although the Utah State Water Engineer has stated some applications could be considered, depending on water use and location. There are no withdrawals present in the WSA.

The only surface waters in the LaVerkin Creek Canyon WSA are intermittent streams in LaVerkin Creek and Bear Canyons which flow north to south for about 1.50 miles through the west side of the WSA. Wildlife and livestock are the major water users. There are recreation uses in Zion National Park south of the area. Potability is questionable due to livestock use in the headwaters. There is well development potential (but no current demand) due to the Navajo Sandstone Formation in the WSA. This formation is known to be a good water producer. Flash flooding, particularly during the summer rainy season (July through September), may create a hazard in the steep, narrow canyon bottoms.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 2+ was assigned to the LaVerkin Creek Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If this WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. This report will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider this report prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

The energy and mineral resource rating summary is given in Table 3.

LEASABLE MINERALS

Oil and Gas

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas.
Uranium	f2	c1	Less than 500 tons of uranium oxide.
Coal	f1	c4	None
Geothermal	f1	c2	None
Hydroelectric	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

All 567 acres in this WSA are open to oil and gas leasing (Category 1). There are 120 acres under a pre-FLPMA (valid existing rights) lease and 320 acres under a post-FLPMA lease with special protective stipulations. Based on similarities between the Virgin Oil Field (located approximately 17 miles south of the WSA) and this WSA and on the relatively unsuccessful history of exploration to date in the region, oil and gas favorability is considered low even though there is a potential for less than 10 million barrels of oil and 60 billion cubic feet of natural gas in-place.

Coal

The WSA is underlain by pre-Cretaceous rock not known to contain any coal.

Geothermal

No evidence is available to indicate that geothermal resources occur within the WSA.

LOCATABLE MINERALS

No prospects, deposits, or any other evidence of mineralization are known to exist within the WSA.

Uranium

No uranium deposits are known to occur within the WSA. The Moenave and Chinle Formations are the only rock units in this area considered favorable for uranium. SAI (1982) speculates that the Moenave and Chinle Formations within the WSA have a very low certainty for occurrence of uranium. It is estimated the WSA has less than 500 tons of uranium oxide.

Wildlife

Because this WSA occurs in the transition of two vegetative ecoregions, it supports a variety of animal species. The Virgin River Unit Resource Analysis (USDI, BLM, 1979b) indicates approximately 300 vertebrate animal species could inhabit the WSA. These include 60 species of mammals, 208 species of birds, 20 species of reptiles, six species of amphibians, and three species of fish. No critical wildlife habitat areas have been identified within the WSA.

Raptors may include golden eagle (BLM sensitive species), bald eagle, peregrine falcon, prairie falcon, American kestrel, red-tailed hawk, and Cooper's hawk. The red-tailed and Cooper's hawks are the most common. The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), are included on the Federal endangered species list. Bald eagles winter in the Virgin River drainage south of the WSA and also in Kanarraville and New Harmony valleys west of the WSA. Occasional sightings of these birds have been made, with most reports occurring in the Deep Creek-Goose Creek area. Nesting or roosting sites are not known to occur in the vicinity. No other threatened or endangered species are known to inhabit the WSA.

Mountain lion activity in the vicinity is heavy compared to other areas in Utah. In past years the Federal Government has controlled the cougars in the area to keep livestock predation under control. During the 1976 hunting season 11 cougars were taken from UDWR Herd Unit 58 (which encompasses the WSA), the largest number for any herd unit in the State.

No acres are planned for vegetation treatment nor are any wildlife facilities proposed.

Forest Resources

Although there are some individual trees with commercial value in the Rocky Mountain forest zone, as a whole there are no commercial values to the forest resources on the WSA. There is presently no forest product use and none is planned.

Livestock and Wild Horses/Burros

The LaVerkin Creek Canyon WSA lies within the Cedar Mountain Allotment which is grazed by 800 sheep from June 16 to October 15. Only 3 percent of this allotment is Federal range (20 AUMs). One permittee uses the allotment. About 45 percent of the WSA is unsuitable for livestock use due to steep terrain. The remaining area provides about 80 percent of the Federal grazing use. There are no other agricultural uses. There are no existing range improvements and none proposed. There is no potential for land treatment. Table 4 gives livestock grazing use data for the WSA.

Wild horses and burros do not use the area.

Visual Resources

This WSA was judged to be Scenic Class A, exceptional, during preparation of the Virgin River Unit Resource Analysis (USDI, BLM, 1979b). The WSA shares the same features as Zion National Park, one of the nation's most important tourist attractions with a worldwide reputation for scenic splendor. The VRM Class is II. Refer to Appendix 7 for a description of BLM's VRM system.

Cultural Resources

Petroglyphs, stone granaries, and rock shelters are known to exist in Zion National Park and the general vicinity. However, no archaeological inventory exists on this specific WSA and no cultural values have been identified.

Recreation

Recreational use of the WSA is primitive in nature and includes hiking, rock climbing, backpacking, fishing, and photography. The size of this WSA is not sufficient to attract recreationists except as an addition to the Zion National Park experience.

Visitor use data are sketchy but Zion National Park files unofficially indicate approximately 75 hikers through LaVerkin Creek Canyon during 1981. Assuming 6 hours to hike through the WSA, this use represents 38 visitor days. Since these data are incomplete (not everyone registers) it is assumed that recreation visitor days to the area would be about 100. Motorized recreational use does not occur on this WSA.

Wilderness Values

SIZE

The LaVerkin Creek Canyon WSA is in the shape of an "L," approximately 1.50 miles wide and long, encompassing 567 acres. The WSA is not a viable independent candidate for wilderness designation if Congress does not designate the contiguous NPS-proposed wilderness area in Zion National Park. If managed in part with the contiguous NPS unit, the WSA would be a viable wilderness area.

**TABLE 4
Livestock Grazing Use Data**

Allotment	Total Acres	Acres in WSA	Suitable ¹ Acres in WSA	Unsuitable ¹ Acres in WSA	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Cedar Mountain	13,000	567	312	255	20	1

Source: USDI, BLM, 1979b.

¹The suitability of an area for grazing is determined by a number of factors including steepness of the terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing and any available feed is not allocated for domestic livestock grazing.

NATURALNESS

The imprint of man's work is substantially unnoticeable. There are no known imprints within the WSA.

SOLITUDE

The narrow sheer-walled canyons of LaVerkin Creek and Bear Canyon that continue into Zion National Park offer opportunities for solitude. The unit by itself is not considered to have outstanding opportunities for solitude, but if managed in conjunction with Zion National Park, it would.

PRIMITIVE AND UNCONFINED RECREATION

The canyon bottoms of LaVerkin Creek and Bear Canyon offer primitive and unconfined recreation opportunities such as hiking, backpacking, and photography. The WSA by itself is not considered to have outstanding opportunities for primitive and unconfined recreation but if managed in conjunction with the proposed wilderness area in Zion National Park it would.

SPECIAL FEATURES

The steep canyons of the WSA provide habitat for raptors, including falcons. The WSA has exceptional scenic values as natural extensions of Zion National Park.

Land Use Plans and Controls

There are no State or private in-holdings, sub-surface rights, or rights-of-way in the WSA. The land is presently used for unconfined and primitive forms of outdoor recreation, wildlife habitat, and livestock grazing. The NPS land adjacent to the WSA has been administratively endorsed for wilderness.

The Statement of Management for Zion National Park is "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the Park's ecological communities." (USDI, NPS, 1976). In this light, the NPS has shown interest in nondevelopment of adjacent lands in order that the Park's watershed remain unimpaired.

The House Subcommittee on Public Lands and National Parks conducted a hearing on H.R. 1214 (1984), a bill designed to transfer jurisdiction of certain lands, including the LaVerkin Creek Canyon WSA, from the BLM to the NPS. In response to the hearing, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit (USDI, NPS, 1984). The NPS found the WSA suitable for addition to the NPS unit.

In a February 6, 1985 letter from the U.S. Secretary of the Interior to the Honorable John F. Seiberling, Chairman, Subcommittee on Public Lands and National Parks, Committee on Interior and Insular Affairs, the LaVerkin Creek Canyon WSA was recommended as suitable for inclusion into the adjacent unit of the National Park System. No Congressional action has been taken on that recommendation.

The *Washington County Master Plan* (Planning and Research Associates, 1971) identifies the WSA as an open space zone, and the County Commission has indicated they do not support wilderness designation for this WSA.

The WSA is managed under the BLM Virgin River Planning Unit MFP (USDI, BLM, 1979c) which allows multiple uses as noted in the Description of the No Action Alternative.

Socioeconomics

DEMOGRAPHICS

Kane and Washington Counties are the local, social, and economic influence zones of the WSA.

Kane County is rural with a total of 4,024 residents and an average population density of approximately one person per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Washington County is also basically a rural county except for the population centers near the City of St. George. The total population of Washington County is 26,065 for an average population density of 10.8 persons per square mile.

EMPLOYMENT

The economies of both Kane and Washington Counties are dominated by three employment sectors: retail trade, services, and government. In Kane County both retail trade and government account for 17 percent of the total employment, and the services sector provides 14 percent. In Washington County the retail trade sector provides 21 percent, government 19 percent, and services 11 percent of the total employment. Personal income is in proportion to employment. Employment and income figures for the two counties are presented in Table 5.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production and recreation. Table 6 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

LAVERKIN CREEK CANYON WSA

TABLE 5
1980 County Employment and Personal Income
Washington and Kane Counties, Utah

Industrial Sector	Washington County		Kane County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	7,866	84,499	1,452	12,595
Proprietors	1,469	14,010	382	2,623
Farm				
Proprietors	343	2,386	122	136
Nonfarm				
Proprietors	1,126	11,624	260	2,487
By Industry				
Source				
Farm	98	3,031	27	382
Nonfarm	6,299	80,418	1,043	12,213
Private	4,805	63,399	798	9,614
Ag. Serv., For.,				
Fish and				
Other	29	724	(L)	0
Mining	70	1,347	17	196
Construction	537	9,425	51	1,544
Manufacturing	698	9,759	70	566
Nondurable				
Goods	441	5,986	(D)	(D)
Durable				
Goods	257	3,773	(D)	(D)
Transportation				
and Public				
Utilities	236	4,996	150	1,875
Wholesale				
Trade	263	3,963	12	230
Retail Trade	1,673	14,741	252	2,364
Finance,				
Insurance and				
Real Estate	424	5,201	39	392
Services	875	13,243	202	2,427
Government				
and Government				
Enterprises	1,494	17,019	245	2,599
Federal,				
Civilian	193	2,725	18	252
Federal,				
Military	161	425	30	78
State and				
Local	1,140	13,869	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

No oil and gas or minerals have been produced from the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

One livestock operator has total grazing privileges of 20 AUMs within the WSA. If all this forage were utilized, it would account for \$400 of livestock sales and \$100 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures 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 from 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 LaVerkin Creek Canyon WSA is estimated as about 100 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Kane and Washington Counties.

The WSA generates Federal revenues from mineral lease sources (refer to Table 6). Oil and gas leases in the WSA cover approximately 440 acres. At up to \$3 per acre, lease rental fees generate up to \$1,320 of Federal revenues annually. Half of these monies are allocated to the State which, in turn, 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 20 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$28 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

TABLE 6
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$1,320
Mineral Production	0	0
Livestock Grazing	\$400	\$28
Woodland Products	0	0
Recreational Use	Less than \$410	0
Total	Less than \$810	Up to \$1,348

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as

cited in the Description of the Alternatives section.

2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but is estimated to be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; and uranium, 20 acres. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If uranium and oil and gas were developed, air quality could be reduced up to the PSD Class II limitations; however, the proximity of the WSA to Zion National Park may result in restriction of the development to meet PSD Class I limitations. Disturbance of 180 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium and oil and gas exploration and development activities would probably not exceed 180 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 180 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 180 acres would increase from 234 cubic yards/year to 486 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 252 cubic yards (34 percent) over current annual soil loss. This apparently large increase is attributable to the small size of the WSA. The increase would be significant within the WSA but would not be significant in the context of the surrounding areas.

VEGETATION

The anticipated maximum of 180 acres disturbed would significantly affect the WSA's vegetation because approximately 32 percent of the unit would be disturbed. The disturbance to the vegetation resource would not be significant when considering the surrounding area's large acreages of similar vegetation.

WATER RESOURCES

Since precipitation is low and only a small portion of the LaVerkin Creek drainage would be impacted, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 252 cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Virgin River Planning Unit.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells, and would not significantly reduce the quality or quantity of ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of oil in-place and up to 60 billion cubic feet of natural gas exists within the WSA and surrounding area. These oil and gas resources could be explored and developed, subject to Category 1 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposits of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the disturbance of an estimated 180 acres (about 32 percent of the WSA) through mineral and energy development and exploration. Deer, mountain lion, and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Less mobile wildlife would either perish or coexist with these disturbances at smaller population levels.

No effects on golden eagle, bald eagle, or peregrine falcon are expected because there are no critical habitats or use areas in the WSA. Prior to surface disturbance the BLM would consult with the Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act (refer to Appendix 4) and would implement mitigation measures to protect threatened, endangered, or sensitive species.

FOREST RESOURCES

Since there are few trees other than scattered pinyon and juniper, none of which are utilized (except by occasional campers or hikers), no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Virgin River MFP. The 20 AUMs currently allocated in the WSA are controlled by one livestock permittee. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since no use of motorized vehicles is currently being made to manage livestock, few, if any, changes in livestock management techniques are expected.

VISUAL RESOURCES

Visual values in areas affected by the estimated 180 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class II management objectives would not be met. If up to 32 percent of the WSA were disturbed, visual values in the unit, as a whole, would be degraded. Even after rehabilitation, some permanent localized degradation would be expected; however, in the context of the surrounding areas, 180 acres of disturbance would not appreciably reduce the visual quality of the surrounding vicinity. However, the potential for mineral development is low.

CULTURAL RESOURCES

Disturbance of 180 acres by mineral exploration and development under this alternative could affect cultural resources. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts.

Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown; however, based on the experience of BLM district archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

If 180 acres were disturbed by mineral and energy activities, primitive recreational opportunities (less than outstanding) could be diminished on the WSA as a whole. The potential for mineral development is low. The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 100 current visitor days per year to 149 visitor days at

the end of 20 years. Overflow from Zion National Park could further increase use.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Virgin River MFP. Potential mineral and energy exploration and development could disturb an estimated 180 acres. Wilderness values in this WSA (i.e., naturalness on all 567 acres, the less than outstanding opportunities for solitude and primitive recreation, and special features) would be lost or diminished in affected areas. However, the impacts to these values probably would not be significant due to the low probability of surface disturbance and reclamation practices.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Washington County Master Plan* which recommends "open spaces," and with Washington County policy.

In Zion National Park, the area adjoining this WSA has been proposed as wilderness. This alternative would not complement the NPS proposal. The Statement of Management for Zion National Park is "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the Park's ecological communities" (USDI, NPS, 1976). In this light, the NPS has shown interest in nondevelopment of adjacent lands in order to not impair the Park's watershed. The No Action Alternative, with the potential for disturbance of 180 acres related to mineral and energy exploration and development (32 percent of the WSA) and related increases in soil loss, would be inconsistent with these goals.

The surface-disturbing activities potentially associated with this alternative would not be consistent with the "scenic, scientific, and cultural, and recreational values that importantly supplement or complement those within the current park boundary" (USDI, NPS, 1984); therefore, this alternative would not be consistent with the NPS finding that the WSA is suitable for inclusion into Zion National Park. This alternative is based on implementation of the current BLM Virgin River MFP and is therefore in conformance with it.

SOCIOECONOMICS

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 uranium, oil, and gas in the WSA were developed it would lead to an increase in employment and income for

Kane and Washington Counties. However, the probability of economic development of minerals within the WSA is low.

There would be no livestock-related economic losses because the existing grazing use (20 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$400 annually in livestock sales and \$100 of ranchers' return to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 49 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 127 acres in the WSA open to lease that are currently not leased. If leased they would bring up to \$381 additional Federal lease fee revenues per year in addition to royalties from production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$28 per year) would continue.

All Wilderness Alternative (567 Acres) (Proposed Action)

As cited in the Description of the Alternatives section, the major changes that could occur in the 567-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be closed to vehicular use except for approvals by BLM as noted in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that mining claims would be located before designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

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Because potentially disturbed areas would be smaller than under the No Action Alternative (20 vs. 180 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, water, and forest resources would be insignificant for this alternative, in comparison to the No Action Alternative. Wilderness protection would provide additional protection to these resources.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 20 acres (3.5 percent of the WSA) would increase from 26 cubic yards/year to 54 cubic yards/year from the present situation. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 28 cubic yards, which is 224 cubic yards less than with the No Action Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 440 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA, and none is expected. Therefore, existing leases would expire and would not be renewed.

Exploration for and development of a potential resource of up to 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant impacts to the oil and gas resource.

Locatable Minerals

There are presently no mining claims in the WSA. Up to 500 tons of uranium oxide that are recoverable could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20

acres could be disturbed due to exploration and development of locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 500 tons of uranium oxide would be foregone (USDI, BLM, 1981).

If it is assumed that valid claims would be staked before designation (worst-case analysis), up to 20 acres could be disturbed due to exploration of locatable mineral resources, primarily uranium, should this alternative be adopted. Because production of this metal is not currently occurring and economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of potentially recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude and the possibility that fewer acres would be disturbed. The disturbance of 20 acres (3.5 percent of the WSA) due to exploration and development of locatable mineral resources would disrupt wildlife populations on the affected areas but would not result in these species leaving the WSA.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Virgin River MFP. The 20 AUMs currently allocated in the WSA are controlled by one livestock permittee. Since no use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to preserve wilderness values.

VISUAL RESOURCES

A slight benefit would occur to visual resources of the WSA because the VRM class would change from Class II to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities from 180 acres under the No Action Alternative to about 20 acres

LAVERKIN CREEK CANYON WSA

for development of valid mining claims. Although mitigative measures would be applied to minimize visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. However, if only 3.5 percent of the area were disturbed, no significant loss of visual quality in the area as a whole would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although use is currently low (about 100 visitor days a year) the WSA has outstanding scenic values. If designated, those high quality values would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management would be provided through a Wilderness Management Plan that would attempt to control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values.

Little, if any, impact on ORV recreational use would be expected due to the lack of such activity in the area.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values. Recreation opportunities in Zion National Park would also be protected and enhanced by complementary management in this WSA.

WILDERNESS VALUES

Designation and management of all 567 acres as wilderness would assure the preservation of the

wilderness value of naturalness. The WSA by itself is not considered to have outstanding opportunities for either solitude or primitive and unconfined recreation. Designation, however, would complement these values within Zion National Park. The scenic special feature in this WSA would also be protected and preserved.

Opportunities for primitive recreation, solitude, and special features could be degraded in localized areas where an estimated 20 acres of surface disturbance could result from allowable mineral exploration and development activities. This small disturbance probably would not have long-term effects on primitive recreation values and special features.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous NPS wilderness proposal. LaVerkin Creek and Bear Canyon provide extensions of the hiking opportunities in Zion National Park.

Thus, it is concluded that wilderness designation and management would protect and preserve the wilderness values of naturalness and the scenic special feature, except in localized areas affected by the surface disturbance related to mineral exploration.

LAND USE PLANS AND CONTROLS

The area adjoining this WSA in Zion National Park has been proposed as wilderness. This alternative would complement the NPS proposal. The Statement of Management for Zion National Park is "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the Park's ecological communities" (USDI, NPS, 1976). In this light the NPS has shown interest in nondevelopment of adjacent lands in order to not impair the Park's watershed. Wilderness designation of this area would be consistent with these goals. Wilderness designation would not conflict with the U.S. Secretary of the Interior's recommendation to transfer the WSA to the NPS.

The existing BLM Virgin River MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Virgin River MFP.

The *Washington County Master Plan* and county policy recommend multiple use of public lands in the county. This alternative would not totally conflict with the multiple-use concept since many resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-

LAVERKIN CREEK CANYON WSA

use concept because restrictive conditions would be placed on mineral development and oil and gas leases would not be reissued.

SOCIOECONOMICS

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 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low. Valid existing oil and gas 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 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 Alter-

native. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$400 of livestock sales and \$100 of ranchers' return to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would not be significant to the local economy.

The loss of 400 acres now leased would cause an eventual loss of up to \$1,320 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$381 annually in Federal revenues from the 127 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

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Deep Creek WSA



DEEP CREEK WSA

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DEEP CREEK WSA

(UT-040-146)

INTRODUCTION

General Description of the Area

Deep Creek Wilderness Study Area (WSA) lies in Washington County along the boundary of Zion National Park with its administratively endorsed wilderness proposal encompassing 120,620 acres. The unit contains only 3,320 acres but adjoins the Park for approximately 3 miles. It is being considered for wilderness designation under Section 202 of the Federal Land Policy and Management Act (FLPMA).

The WSA consists of a section of Deep Creek Canyon and lies within the Canyonlands and High Plateau sections of the Colorado Plateau Physiographic Province. Near Zion National Park, canyon walls are nearly sheer, dropping 2,000 feet from the rims to the canyon bottom. The climate is considered mild with temperatures averaging 40 degrees Fahrenheit (F) during the winter months and 8 degrees F during the summer months. Temperature extremes can vary from 0 to 105 degrees F. Average annual precipitation in Zion National Park is 14.5 inches with about half in the form of winter snow and half during summer thunderstorms. Winds usually prevail from the southwest with the strongest winds occurring in March and April.

There are no private, State, or split estate lands located within the WSA.

This 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 for analysis in this Environmental Impact Statement (EIS) in accordance with (1) general land use planning provisions of Section 202 of FLPMA; and (2) policies that allow 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.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the study phase are the small size of the WSA, viability of its management by BLM, and the National Park Service's (NPS) management need for designating the area wilderness. Issues and concerns specific to the Deep Creek WSA raised during the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* Flood control development may be needed in the Deep Creek WSA. Would these structures or improvements be preserved if the area were designated wilderness?

Response: New flood control developments could be allowed in the WSA, as noted in the Description of the Alternatives section. Existing structures could remain and be maintained.

2. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede developments in local communities.

Response: No water developments have been proposed in the Deep Creek WSA. There is potential for ground water in the Navajo Sandstone, but no demand for the water has been identified.

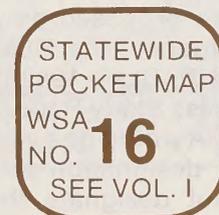
3. *Comment:* Based on size, this area does not qualify for further consideration as a wilderness area. All other normal considerations mandated as a part of the EIS must be adequately treated to the satisfaction of the Commission.

Response: This WSA is adjacent to a proposed wilderness area in Zion National Park. BLM has authority under Section 202 of FLPMA to study units of less than 5,000 acres.

4. *Comment:* Sonic booms occur in the Deep Creek WSA.

Response: Outside sounds were evaluated in determining the quality of the unit's solitude. Excessive numbers and volumes of sonic booms were not identified as a problem.

5. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.



Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA other than those analyzed.

Transfer of several WSAs, including the Deep Creek WSA, to NPS administration in adjacent NPS units has been proposed (H.R. 1214, 1984). Such a transfer could occur in the future regardless of wilderness status.

Because of the possibility of transfer of management from the BLM to the NPS, the EIS could include analysis of both BLM and NPS management with and without wilderness designation of the WSA. However, because BLM could continue to manage the WSA without wilderness designation or could manage the WSA a wilderness in conjunction with the contiguous NPS-administered wilderness and because the outcome of the NPS wilderness proposals and H.R. 1214 are uncertain actions independent of the BLM wilderness review, alternatives for transfer of jurisdiction from BLM to NPS are not analyzed in this EIS. The EIS addresses the basic question of wilderness designation of BLM-administered lands and the resultant environmental impacts. 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.

It is noted that, in cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the BLM "Wilderness Study Policy" (USDI, BLM, 1982b) requires the BLM in its Wilderness Study Report to determine (1) whether 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 wil-

derness, whether the BLM portion could be more effectively managed by the agency administering the contiguous wilderness area.

BLM has determined that the Deep Creek 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 primarily on factors affecting both BLM and NPS jurisdiction (i.e. 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 non-environmental 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; and (2) All Wilderness (3,320 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.

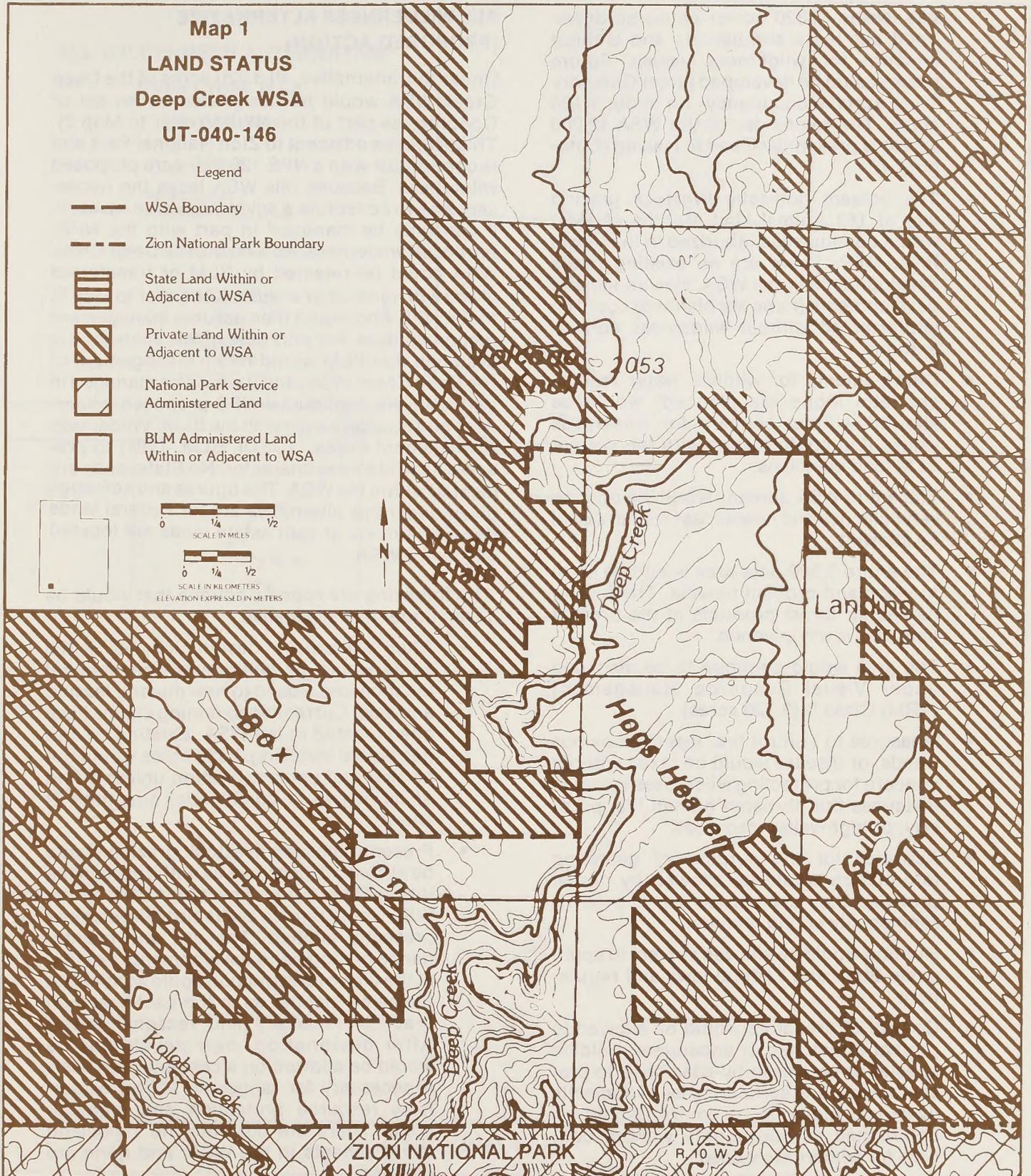
NO ACTION ALTERNATIVE

Under this alternative, none of the 3,320-acre Deep Creek WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Virgin River Management Framework Plan (MFP) (USDI, BLM, 1979c). No State lands lie within or near the WSA (refer to Map 1); therefore no need exists for acquisition through exchange or purchase.

The following are specific actions that would take place under this alternative:

- All 3,320 acres would remain open to mineral location, leasing, and sale. There are no mining claims in the WSA at the present time. Development work, extraction, and patenting would be allowed on future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Existing oil and

DEEP CREEK WSA



DEEP CREEK WSA

gas leases (3,320 acres) could be developed per lease stipulations and without concern for wilderness values. Future leases could be developed under Category 3 (no surface occupancy) on about 1,120 acres. The remainder of the WSA (2,200 acres) is presently closed to leasing (Category 4).

- The present domestic livestock grazing use of 183 Animal Unit Months (AUMs) would continue as authorized in the Virgin River MFP. There are no existing range developments in the WSA. New rangeland developments (none are planned) could be implemented without wilderness considerations.
- Developments for wildlife, water resources, etc. (none are planned) would be allowed without concern for wilderness values if in conformance with the current BLM land use plans.
- The entire WSA acreage would be open to vehicular use and new access routes would be allowed.
- The entire 3,320-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (3,320 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

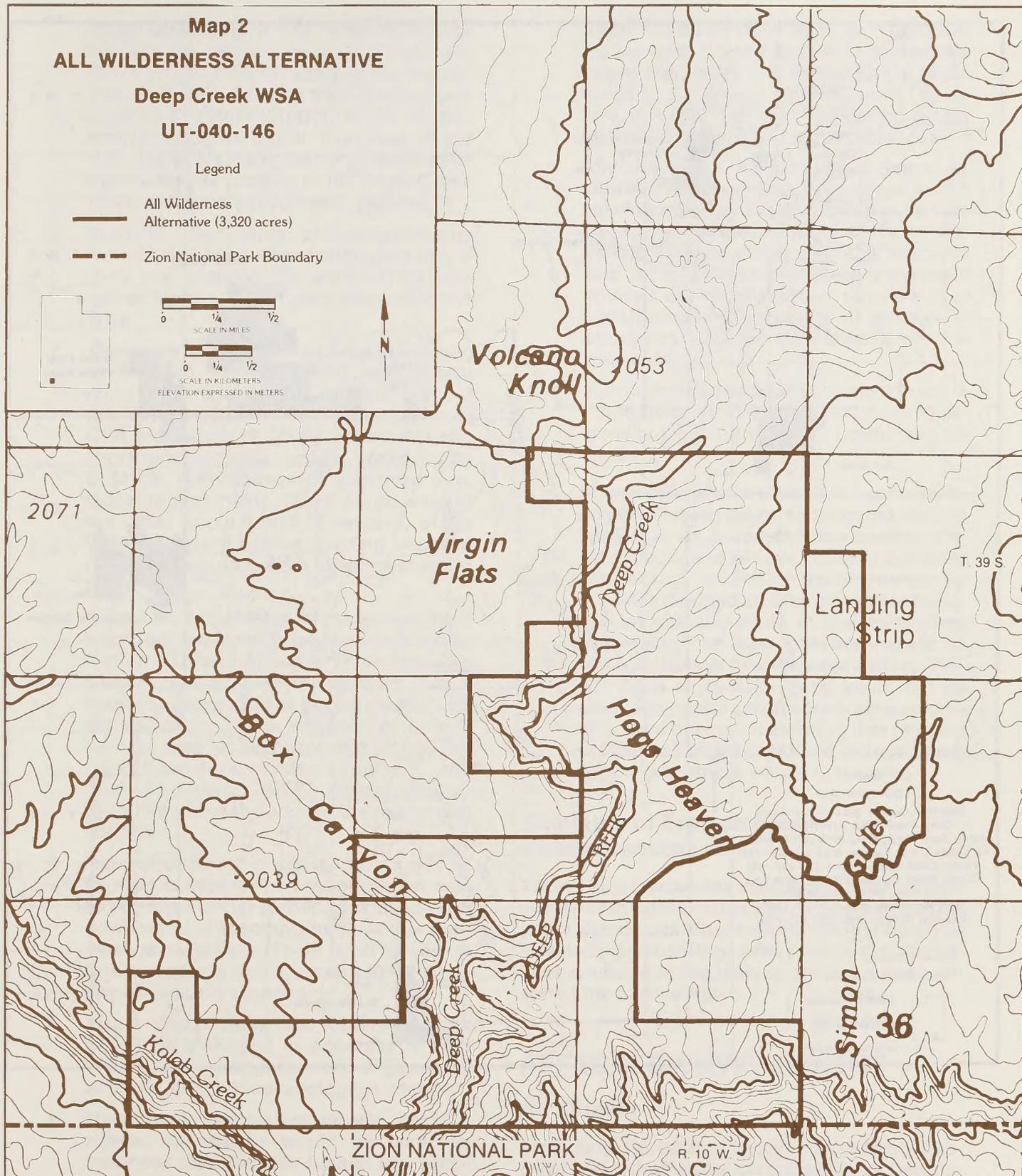
ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 3,320 acres of the Deep Creek WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). This WSA lies adjacent to Zion National Park and is contiguous with a NPS 120,620-acre proposed wilderness. Because this WSA lacks the necessary size to constitute a wilderness area by itself, it can only be managed in part with the NPS-proposed wilderness. As a result, the Deep Creek WSA could be retained by BLM or transferred along with nine other small WSAs (refer to Map 3) to the NPS who would then assume management responsibilities. For purposes of this analysis, it is assumed that BLM would retain management of the Deep Creek WSA, and it would be managed in part with the contiguous NPS-proposed wilderness and in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. No State lands are located within the WSA. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located within the WSA.

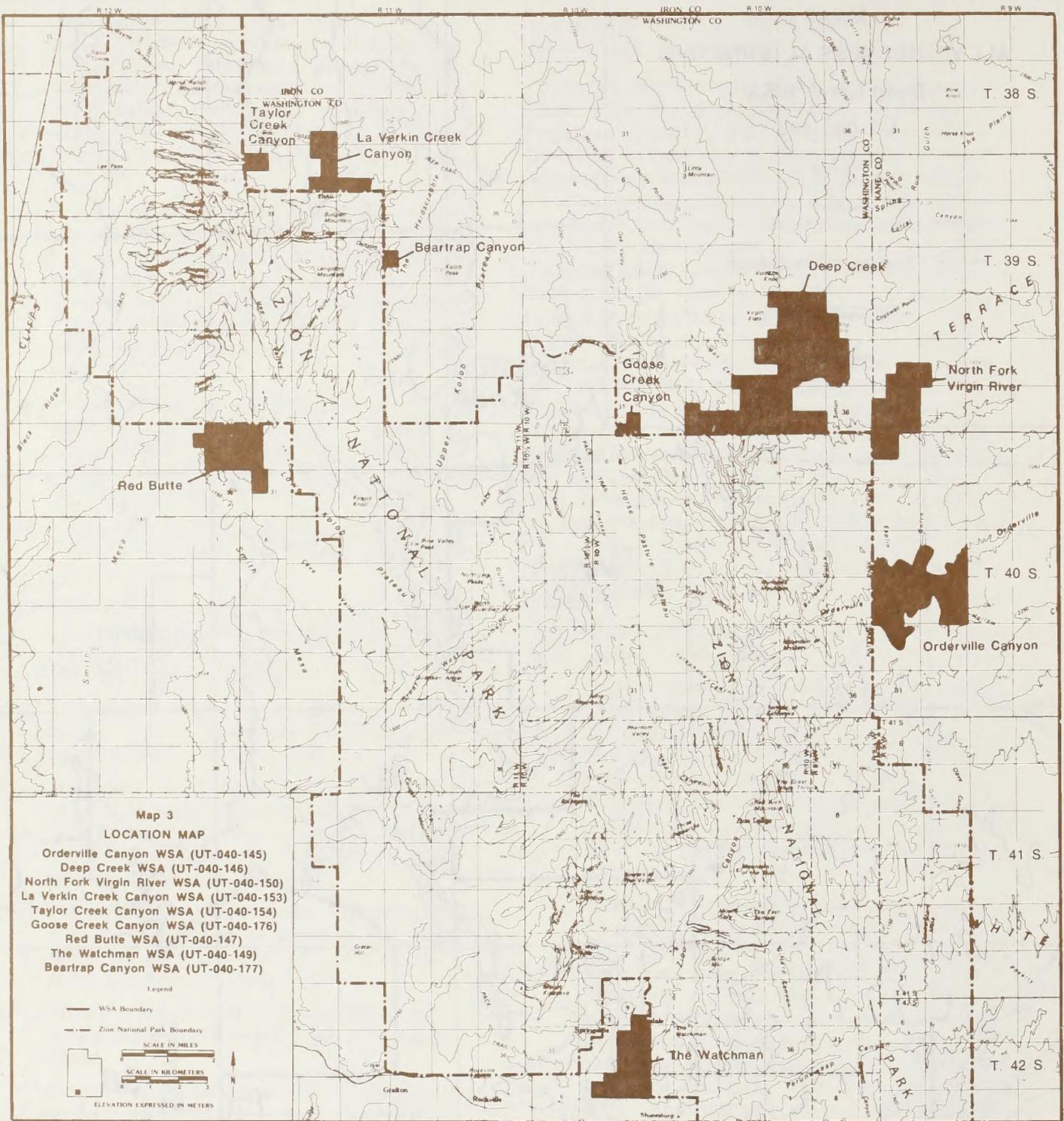
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 3,320 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Currently, no mining claims have been located in the WSA. Existing oil and gas leases involving 3,320 acres would not be reissued upon expiration unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would be allowed to continue as authorized in the Virgin River MFP. The 183 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 could continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management. There are currently no rangeland developments in the WSA, and none are planned.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after

DEEP CREEK WSA



DEEP CREEK WSA



DEEP CREEK WSA

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). No water resource facilities or treatments are located in the Deep Creek WSA, and none are currently planned.

- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 3,320-acre area would be closed to off-road vehicle (ORV) use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. There are no ways in the WSA. About 1 mile (8 percent) of the WSA boundary follows existing unpaved roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 3,320-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources in the wilderness area would be managed in accordance with 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 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 must 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 on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be approved only upon showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

Air quality is excellent. The area is presently classified under the Prevention of Significant Deterioration (PSD) regulations as Class II. Visual ranges in excess of 100 miles occur 75 percent of the time, and ranges in excess of 155 miles occur 10

DEEP CREEK WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
DEEP CREEK WSA**

Resource	Alternatives	
	No Action	All Wilderness (3,320 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 150 tons of uranium oxide. Oil and gas could only be recovered through slant drilling and recovery is not expected.	Oil, gas and uranium oxide potential likely would not be recovered. Due to the low likelihood of recovery of these minerals, however, the loss of development opportunity would not be significant.
Wildlife	Less than 0.6 percent of the WSA would be directly affected by mineral and energy development, which could adversely affect wildlife on the disturbed areas.	Wildlife would benefit from solitude. However, the potential for disturbance of wildlife from mineral development is approximately the same as with No Action.
Livestock	Grazing of 183 AUMs and maintenance of existing developments would continue. New developments for livestock could be constructed; however, none are proposed.	Grazing of 183 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected.
Visual Resources	The quality of visual resources could be impaired on up to 20 acres.	Visual quality could be impaired on 20 acres.
Recreation	Overall primitive recreational use is expected to increase from 300 current visitor days per year to 447 at the end of 20 years. Overflow from Zion National Park could further increase use.	Publicity associated with wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Little impact on ORV use would be expected due to the lack of such activity presently in the area.
Wilderness Values	Wilderness values could be lost on up to 20 acres, but the values in the WSA as a whole would not be affected.	Wilderness values would be protected, except on up to 20 acres that may be disturbed under valid mineral rights.
Land Use Plans and Controls	This alternative would be totally consistent with the Washington County multiple-use concept because 66 percent of the WSA would be closed to future oil and gas leasing. It would also not complement the NPS proposals for wilderness designation for their adjacent area and transfer of the WSA to the NPS unit. No Action is based on the BLM Virgin River MFP and is therefore in conformance with it.	This alternative would complement the NPS proposal of wilderness designation for their adjacent area and would not conflict with transfer of the WSA to the NPS unit. It would conflict with the Washington County Master Plan's multiple-use concept. Congressional designation of the WSA as wilderness would be an amendment to the BLM Virgin River MFP.
Socio-economics	Annual local sales of less than \$4,890 and Federal revenues of up to \$3,360 would continue. Federal revenues would be decreased by \$6,600 from oil and gas leases currently leased which will not be reissued once they expire. The opportunity for future energy development would be reduced on 66 percent of the WSA.	Annual local sales of less than \$4,890 and Federal revenues of \$256 would continue. Federal revenues of up to \$9,960 from mineral leasing would be foregone. Opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

DEEP CREEK WSA

percent of the time (USDI, BLM, 1980c). Under the PSD regulations Zion National Park has been designated as Class I.

Geology

The WSA lies within the Grand Staircase portion of the Colorado Plateau Physiographic Province. Elevations range from 5,200 feet in the canyon bottoms to just over 7,000 feet on the rims.

The Deep Creek WSA consists of a section of Deep Creek Canyon. Small portions of North Fork Canyon and Kolob Canyon cut diagonally through the southeast and southwest corners. Near the Zion boundary, canyon walls are nearly sheer, dropping 2,000 feet from the east rim to the canyon bottom. Deep Creek flows from north to south through the WSA and is intersected by the North Fork of the Virgin River and Kolob Creek at their respective junctures in Zion National Park. Most exposed rock is Navajo Sandstone and Carmel Formation.

Soils

There are some isolated pockets of productive soils within this WSA, but they are very small and undelineated. Most of the soils are mapped by the Washington County Soil Survey (U.S. Department of Agriculture, Soil Conservation Service, 1977) as Paunsaugunt-Kolob-Dalcan association or rock outcrop-rockland association. These are excessively drained, nearly level to very steep, shallow to deep gravelly silt loams, fine sandy loams, cobbly loams, and bare bedrock. The erosion potential is slight to moderate. Erosion condition was determined by using soil surface factors, as summarized in Table 2 (terms are defined in the Glossary). These soils are used for range, wildlife, and recreation and are unsuitable for agriculture.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss		Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
	Per Acre (cubic yard/acre)	Acres		
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	1,320	40	1,720
Slight	0.6	2,000	60	1,200
Stable	0.3	0	0	0
Total		3,320	100	2,920

Sources: USDI, BLM, 1979b; Leifeste, 1978.

Vegetation

This WSA occurs in the transition of the Colorado Plateau and the Rocky Mountain Forest Province Ecoregion. This transition has a diverse vegetation, with plants from each of these ecoregions being represented. Over 500 species of plants are known to occur in adjacent Zion National Park. Distribution of the plant communities is not exclusively based on either latitude or corresponding elevations.

At the highest elevations in the WSA, from 5,500 to 7,000 feet, is the Rocky Mountain Forest zone. It is characterized by ponderosa pine, Douglas fir, white fir, aspen, and Rocky Mountain juniper, with understory shrubs such as mountain mahogany, snowberry, chokecherry, manzanita, currant, and elderberry. Associated grasses include bluebunch wheatgrass, slender wheatgrass, needle-and-thread, and mountain brome.

This zone is found at the higher elevations and northern exposures of Deep Creek.

The Colorado Plateau zone, approximately 4,000- to 5,500-foot elevation, is characterized by the pygmy forest of Utah juniper and pinyon pine. This zone includes yucca, Gambel's oak, Utah serviceberry, singleleaf ash, littleleaf mountain mahogany, ponderosa pine, and princess plume. On the more exposed benches and gentle slopes at the edge of the pinyon and juniper forest are areas of sagebrush and rabbitbrush.

Associated grasses in this zone include Indian ricegrass, galleta grass, needle-and-thread, and muttongrass. Oaks, bigtooth maple, and numerous wildflowers also occur there.

Associated with the perennial drainages are small but interesting plant communities, hanging gardens, occurring around springs and seepage areas. The communities usually develop under protective overhanging lips of harder strata. Hanging gardens generally have luxuriant plant life, such as maidenhair fern, pink-flowered shooting star, and scarlet monkey flower. Also within this unit are perennial drainages with areas of riparian vegetation flourishing in contrast to the drier slopes. Here one finds sedges, rushes, willows, cottonwood, velvet ash, maple, blackberry, chokecherry, birch, and a variety of grasses and forbs.

As indicated above, the Deep Creek WSA lies in the transition zone between the Colorado Plateau and the Rocky Mountain Forest Province Ecoregions as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the

WSA are Arizona pine forest and mountain mahogany-oak scrub. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Available data indicate no threatened, endangered, or sensitive plant species occur in the WSA.

Water Resources

This entire WSA is located in the Virgin River subbasin of the Colorado River Basin hydrologic region. There are no existing water rights and the area is presently closed to further applications, although the Utah State Water Engineer has stated some applications could be considered depending on water use and location. There are no withdrawals present in the unit.

Three perennial streams flow through the Deep Creek WSA. Kolob Creek runs for 0.50 mile through the southwest corner of the unit; the North Fork of the Virgin River flows through the southeast corner for 0.50 mile, and Deep Creek bisects the area for about 4 miles from north to south. Both Kolob Creek and Deep Creek empty into the North Fork south of the unit in Zion National Park. The major water users are wildlife, livestock, and recreation. Records of water quality and quantity are not available in the unit, but are considered sufficient for livestock and wildlife uses. Potability is questionable for humans due to livestock use. There is a well developed water potential in the Navajo Sandstone but no current demand.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 1 was assigned to the Deep Creek WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource

importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

The energy and mineral resource rating summary is given in Table 3.

**TABLE 3
Mineral and Energy Resource Rating Summary**

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Uranium	f2	c2	Less than 150 tons of uranium oxide ³
Coal	f1	c4	None
Geothermal	f1	c3	None
Hydroelectric	f2	c4	None
Gold	f2	c2	Less than 25 tons

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

This unit has 1,120 acres open to leasing under Category 3 (no surface occupancy) and 2,200 acres presently closed (Category 4) to leasing.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

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). Wilderness designation would not affect the termination of existing leases.

Presently all 3,320 acres of the WSA are under post-FLPMA leases. Closed areas were leased for blocking purposes. Based on similarities between the Virgin oil field (which is located approximately 17 miles southwest of the WSA) and this WSA and on the relatively unsuccessful history of exploration to date in the region, the unit has a low certainty (cl) for the occurrence of small (less than 10 million barrels of oil) oil and gas fields (f2). There are no known structures within or near the WSA that might represent potential exploration targets; accordingly, the probability for exploration and development occurring in the WSA is low. If a field of this size did exist it would have an estimated areal extent of about 2,500 acres. In Utah fields of this size typically require about 160 acres for developmental facilities such as roads, pads, and disposal ponds.

Coal

The unit is underlain by pre-Cretaceous rock not known to contain any coal.

Geothermal

No evidence is available to indicate that geothermal resources occur within the WSA.

LOCATABLE MINERALS

Uranium

No uranium deposits are known to occur within the WSA. The Moenave and Chinle Formations are the only rock units in the area considered favorable for uranium. SAI (1982) speculates that the Moenave Formation within the WSA may contain about 150 tons of uranium oxide. There are no mining claims within the WSA.

Wildlife

Because this WSA occurs in the transition of two vegetation ecoregions, it supports a variety of animal species. The Virgin River Unit Resource Analysis (USDI, BLM, 1979b) indicates approximately 300 vertebrate animal species could inhabit this WSA. These include 60 species of mammals, 208 species of birds, 20 species of reptiles, six species of amphibians, and three species of fish.

Raptors may include golden eagle (BLM sensitive species), bald eagle, peregrine falcon, prairie falcon, American kestrel, red-tailed hawk, and Cooper's hawk. The red-tailed and Cooper's hawks are the most common. The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), are included on the Federal endangered species list. Bald eagles winter in the Virgin River drainage south of the WSA and also in Kanarrville and New Harmony Valleys west of the WSA. Occasional sightings of these birds have been made with most reports occurring in the Deep Creek-Goose Creek area. Nesting or roosting sites are not known to occur. An active peregrine falcon nest is located in Zion National Park south of the WSA.

All of the WSA has an adequate prey base and excellent nesting habitat for the peregrine falcon. No other threatened or endangered species are known to occur within the WSA.

Big game animals include mule deer, elk, and mountain lion. The WSA is within the boundaries of Deer Herd Unit 58 and provides summer range. Hunting pressure is light because access is blocked by private and NPS land. The WSA is included in Elk Herd Unit 19 and is used by elk year-round with Deep Creek WSA being a winter concentration area. This elk herd is relatively small (less than 100) with the bulk of their habitat on private lands. No critical habitat for big game is found on the WSA.

Mountain lion activity in the vicinity is heavy compared to other areas in Utah. In past years the Federal Government has controlled the cougars

in the area to keep livestock predation under control. During the 1976 hunting season 11 cougars were taken from Deer Herd Unit 58 (which comprises the WSA), the largest number for any unit in the State.

Rainbow and brown trout occur in the unit's perennial streams. There are no existing or proposed wildlife improvements in this WSA.

Forest Resources

Although there are some individual trees with commercial value, as a whole there are no commercial value forest resources in the WSA.

Livestock and Wild Horses/Burros

The Deep Creek WSA falls within the boundaries of three grazing allotments (East Deep Creek, West Deep Creek, and Hog's Heaven). There is a single permittee per allotment (refer to Table 4). East Deep Creek is licensed annually to graze 37 cattle from May 1 to October 15 (204 AUMs); Hog's Heaven has 18 cattle on the allotment from May 16 to October 15, with 50 percent Federal range (45 AUMs) and an additional 495 AUMs carried in nonuse. West Deep Creek runs between 135 and 175 cattle from June 10 to September 30. It is licensed with 9 percent Federal range and 180 Federal AUMs available, although only 45 to 58 AUMs have been used. It is estimated that about 60 percent of the Federal grazing use on these allotments comes from the WSA. Approximately two-thirds of the WSA are suitable for grazing. The remainder of the area is unsuitable due to steep slopes and rough terrain. There are no existing or proposed range improvements or land treatment potential. There are no wild horses and burros in the WSA.

TABLE 4
Livestock Grazing Use Data

Allotment	Percent of Allotment Forage in WSA	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
East Deep Creek	59	120	1
West Deep Creek	20	36	1
Hog's Heaven	60	27	1
Total	43	183	3

Source: USDI, BLM, 1979b.

Note: The suitability of an area for grazing is determined by a number of factors including steepness of the terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

Visual Resources

This WSA was judged to be scenic Category A, exceptional, during the Virgin River Planning Unit Resource Analysis (USDI, BLM, 1979b). The unit contains the same features as Zion National Park, one of the nation's most important tourist attractions with a worldwide reputation for scenic splendor. VRM Class is II. Refer to Appendix 7 for more detail on BLM's VRM rating system.

Cultural Resources

Petroglyphs, stone granaries, and rock shelters are known to exist in Zion National Park and the general vicinity. However, no archaeological inventory exists on this specific WSA and no cultural values have been identified. The trail from Virgin Flats into Deep Creek Canyon is assumed to have been made and used by Indians for hunting and water access.

Recreation

Recreation use of the WSA includes primitive uses such as hiking, rock climbing, backpacking, fishing, and photography. Although that area is open to ORV use, most of the area is too rough to utilize. Therefore, it is assumed that the area is not used by ORVs.

Visitor use data are sketchy but Zion National Park files unofficially indicate 162 hikers through the Deep Creek unit during 1981. Several hikers went into the unit specifically for fishing. The unit probably receives over 300 primitive visitor days/year.

Wilderness Values

SIZE

The Deep Creek WSA is approximately 3 miles long (north to south) and 2 miles wide (east to west) and encompasses 3,320 acres. The unit is not a viable independent candidate for wilderness designation if Congress does not designate the contiguous NPS-proposed wilderness. If managed in part with the contiguous NPS unit, the WSA would be a viable wilderness area.

NATURALNESS

The unit has primarily been affected by the forces of nature. There are no known intrusions.

SOLITUDE

The opportunity to experience solitude is inherently available in the deeply entrenched Deep

Creek, North Fork, and Kolob Canyons. The thickly vegetated, serpentine canyon offers topographic and vegetation screening. The flowing water in the narrow canyon of Deep Creek adds to the feeling of solitude. When combined with the opportunities in the adjacent National Park, the opportunity to seek out and experience solitude is considered outstanding. However the unit by itself is not considered to have outstanding opportunities for solitude.

PRIMITIVE AND UNCONFINED RECREATION

The canyon bottoms of North Fork, Deep Creek, and Kolob Creek offer primitive and unconfined recreation opportunities such as backpacking, bird watching, photography, and sightseeing. Deep Creek often flows from wall to wall in the canyon bottom and excludes any motorized activity. Deep Creek and the North Fork provide access to the Zion Narrows canyon system. The hiking experience in this unit represents 5.2 miles of a possible 18-mile hike to the Zion Narrows trail head. An additional 0.63 mile on the North Fork of the Virgin River is also contained in this unit. When combined with the primitive unconfined recreation experience of the adjacent canyon system, the experience within the Deep Creek unit is considered outstanding. However the unit by itself is not considered to have outstanding opportunities for solitude.

SPECIAL FEATURES

This unit contains canyons and scenic landscapes that are natural extensions of Zion National Park. The deep canyons and the abundance of water provide a wide variety of ecological zones, with unique flora and fauna.

Land Use Plans and Controls

The land is presently used for unconfined and primitive forms of outdoor recreation, wildlife habitat, and livestock grazing. The Virgin River Planning Unit MFP decision was to develop a program of land acquisition for blocking purposes and multiple use management in the vicinity of the Deep Creek WSA. To date there has been one substantial land exchange completed and another in progress to meet this goal.

Zion National Park is contiguous to the WSA on its northern boundary. The NPS has proposed this area for wilderness designation. In the past the NPS has expressed concern and interest over management of drainages that originate outside the Park boundaries. Although the headwaters of Deep Creek, Kolob Creek, and North Fork are located outside the WSA boundary, the NPS

believes that portions of the drainages within the WSA are important to the well being of the Park.

The *Zion Park Master Plan* (USDI, NPS, 1976) recommends: "Other outstanding areas that should be studied for possible inclusion within the park are the Kolob Creek, Deep Creek, and Orderville Canyon areas adjacent to the north and east boundaries." However, present policy prohibits further expansion of Zion National Park (USDI, NPS, 1984a).

The House Subcommittee on Public Lands and National Parks conducted a hearing on H.R. 1214 (1984), a bill designed to transfer jurisdiction of certain lands, including the Deep Creek WSA, from the BLM to the NPS. In response to the hearing, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit (USDI, NPS, 1984b). The NPS found the WSA suitable for addition to the NPS unit. In a February 6, 1985 letter from the Secretary of the Interior to the Honorable John F. Seiberling, Chairman, Subcommittee on Public Lands and National Parks, Committee on Interior and Insular Affairs, the Deep Creek WSA was identified as suitable for inclusion into the adjacent unit of the National Park System. However, the letter also indicated the WSA had multiple use values and would prefer the WSA not be transferred to NPS until Section 202 studies are completed. No Congressional action has been taken on that recommendation.

The *Washington County Master Plan* (Planning and Research Associates, 1971) does not specifically address wilderness. However, the County Commission indicated in a policy statement that they were opposed to the unit being designated wilderness.

There are no rights-of-way or other facilities within the WSA and none are proposed.

Socioeconomics

Kane and Washington Counties are expected to receive most of the social and economic impacts resulting from wilderness designation.

DEMOGRAPHICS

Kane County is a rural county with a total of 4,024 residents and an average population density of approximately one person per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Washington County is also basically a rural county except for the population centers near the City of St. George. The total population of Washington County is 26,065 for an average population density of 10.8 persons per square mile.

EMPLOYMENT

The economies of both Kane and Washington Counties are dominated, in terms of employment, by three sectors: retail trade, services, and government. In Kane County both retail trade and government account for 17 percent of the total employment, and the services sector provides 14 percent. In Washington County the retail trade sector provides 21 percent, government 19 percent, and services 11 percent of the total employment. Personal income fell in proportions similar to employment. Employment and income figures for the two counties are presented in Table 5.

TABLE 5
1980 Employment and Personal Income
Washington and Kane Counties, Utah

Industrial Sector	Kane County		Washington County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	1,452	12,595	7,866	83,449
Proprietors	302	2,623	1,469	14,010
Farm Proprietors	122	136	343	2,386
Nonfarm Proprietors	260	2,487	1,126	11,624
By Industry Source				
Farm	27	382	98	3,031
Nonfarm	1,043	12,213	6,299	80,418
Private	798	9,614	4,805	63,399
Ag. Serv., For., Fish., and Other	(L)	0	29	724
Mining	17	196	70	1,347
Construction	51	1,544	537	9,425
Manufacturing	70	566	698	9,759
Nondurable Goods	(D)	(D)	441	5,986
Durable Goods	(D)	(D)	257	3,773
Transportation and Public Utilities	150	1875	236	4,996
Wholesale Trade	12	230	263	3,963
Retail Trade	252	2,364	1,673	14,741
Finance, Insurance, and Real Estate	39	392	424	5,201
Services	202	2,427	875	13,243

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production and recreation. Table 6 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

No oil and gas or mineral has been produced from the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Three livestock operators have a total grazing privilege of 183 AUMs within the WSA. If all this forage were utilized, it would account for \$3,660 of livestock sales and \$915 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures 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 deducted from 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 Deep Creek WSA is estimated as about 300 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane and Washington Counties.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 6).

Oil and gas leases in the WSA cover approximately 3,320 acres. At up to \$3 per acre, lease rental fees generate up to \$9,960 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 183 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$256 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

TABLE 6
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$ 9,960
Livestock Grazing	\$3,660	\$256
Woodland Products	None	None
Recreational Use	Less than \$ 1,230	No commercial permits
Total	Less than \$ 4,890	Up to \$10,216

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as discussed in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough terrain and low

resource potential. The following is a worst-case analysis based on the assumption that uranium would be developed sometime in the future and would disturb 20 acres. The existing oil and gas leasing categories would eliminate surface-disturbing activities in the area. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If uranium were developed, air quality could be reduced up to the PSD Class II limitations; however, the proximity of the WSA to Zion National Park may result in restriction of uranium development to meet PSD Class I limitations. Disturbance of 20 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium exploration and development activities would probably not exceed 20 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 20 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 20 acres would increase from 28 cubic yards/year to 54 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 28 cubic yards (1 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 20 acres disturbed would not significantly impact the unit's vegetation.

WATER RESOURCES

Since precipitation is low and only 20 acres would be disturbed, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur. All disturbed areas would be reclaimed and developments would meet State water quality laws. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Zion Planning Unit.

DEEP CREEK WSA

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and gas would continue to be managed according to leasing Categories 3 and 4 (no surface occupancy or no leasing). No surface disturbance would result from oil and gas activities. The potential for up to 10 million barrels of oil in-place and up to 60 billion cubic feet of natural gas exists within the WSA. These oil and gas resources could only be developed by slant drilling. However, due to the small size of these deposits, no development is expected.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 150 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of these locatable mineral resources. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be adversely affected by disturbance of an estimated 20 acres (0.6 percent of the WSA) through mineral development and exploration. Deer, elk, mountain lion, and mobile nongame animals would be dispersed from the disturbed areas for the lifetime of these activities. Less mobile wildlife would either perish or coexist with these disturbances at smaller and less viable population levels.

No effects on golden eagle, bald eagle, or peregrine falcon are expected because there are no critical habitats or use areas in the WSA. Prior to surface disturbance, BLM would consult with the Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act (refer to Appendix 4) and would implement mitigation measures to protect threatened, endangered, or sensitive species.

FOREST RESOURCES

Since the majority of the area is covered by mountain shrub and pinyon juniper, none of which is utilized (except by occasional campers or hikers), and since minimal surface-disturbing activities are anticipated, no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Virgin River Planning Unit MFP. The 183 AUMs currently allocated in the WSA are controlled by three livestock permittees. Since very little use of motorized vehicles is currently being made to manage livestock, little effect is expected to the environment. There are no planned livestock improvements in the WSA.

VISUAL RESOURCES

Visual values in areas affected by the estimated 20 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class II management objectives would not be met. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

Disturbance of 20 acres by mineral exploration and development under this alternative could affect cultural sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 20 acres could be disturbed by mineral and energy activities. Primitive recreation opportunities could be diminished on the affected areas. The future trend in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall primitive recreational use is expected to increase from 300 current visitor days per year to 447 visitor days at the end of 20 years. Overflow from Zion National Park could further increase use.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Virgin River Planning Area MFP. Expected mineral and energy exploration and development could disturb an estimated 20 acres. Wilderness

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values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. However, the impacts to these values probably would not be significant due to the low probability of surface disturbance and required reclamation.

LAND USE PLANS AND CONTROLS

This alternative would not be totally consistent with the Washington County multiple-use concept because 2,200 acres would be closed to oil and gas leasing.

It would not complement the NPS proposal of wilderness designation for their adjacent area. The surface-disturbing activities potentially associated with this alternative would not be consistent with the "... scenic, scientific, cultural, and recreational values that importantly supplement or complement those within the current park boundary" (USDI, NPS, 1984a). Therefore, this alternative would not be consistent with the NPS finding that the WSA is suitable for inclusion into Zion National Park.

The No Action Alternative is based on implementation of the current BLM Virgin River MFP and is, therefore, in conformance with it.

SOCIOECONOMICS

There would not be a loss of current local employment or income as a result of this alternative. The ability to explore and develop oil and gas resources would decrease as leases would expire and not be renewed on 2,200 acres. If mining claims were located in the WSA, a portion of the \$100 per year assessment fee required for each mining claim would reach the local economy. If the uranium in the WSA were developed it would lead to an increase in employment and income for Kane and Washington Counties. However, 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).

There would be no livestock-related economic losses because the existing grazing use (183 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$3,660 annually in livestock sales and \$915 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent

increase over 20 years). Because recreational use in the area is estimated to increase only 147 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would be reduced by this alternative. There are 2,200 acres in the WSA closed to oil and gas leasing that are currently leased. These leases were issued prior to the establishment of BLM leasing category system and will not be reissued once they expire. Thus, Federal revenues will be lost. However, the 1,100 acres that are open to leasing under Category 3 stipulations would continue to provide \$3,360 to the Federal Government. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$256 per year) would continue. About 50 percent of these revenues are returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (3,320 Acres) (Proposed Action)

As cited in the Description of the Alternatives section, the major changes that could occur in the 3,320-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that mining claims would be staked before designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. This would represent a worst-case analysis. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas would be the same as the No Action Alternative (20 acres), the impacts from development and surface disturbance on air quality, geology, soils, vegetation, water, wildlife, and forest resources would be insignificant for the All Wilderness Alternative, as described for the No Action Alternative. Wilder-

ness designation would provide additional protection to these resources.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 3,320 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA and no surface occupancy is allowed in the leases.

Existing pre- and post-FLPMA leases could be developed by slant drilling subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration date, and expired leases will not be reissued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas could be foregone under this alternative. However, due to the small size of the potential deposits, the lease category stipulations, the low certainty that these deposits exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant impacts to the oil and gas resource.

Locatable Minerals

There are presently no mining claims in the WSA. Up to 150 recoverable tons of uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case the potential for up to 150 tons of uranium would be foregone.

Because production of these metals is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant impact to uranium resources.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Virgin River Planning

Unit MFP. The 183 AUMs currently allocated in the WSA are controlled by three livestock permittees. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources.

VISUAL RESOURCES

A slight benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from II to the more restrictive I. This class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities to about 20 acres. Thus, there could be localized long-term degradation of values in some areas. However, no significant impact in the area as a whole would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although use is currently low (about 300 visitor days a year), the WSA has outstanding scenic values. If designated, those high quality recreational values would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. 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 the increased use.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values. Little impact on ORV recreational use would be

expected due to the lack of such activity presently in the area.

It is concluded that this alternative could benefit recreation by increasing management attention and recognition of recreational values. Recreation opportunities in Zion National Park would also be protected and enhanced by complementary management in this WSA.

WILDERNESS VALUES

Designation and management of all 3,320 acres as wilderness would ensure the preservation of the wilderness value of naturalness. The unit by itself is not considered to have outstanding opportunities for either solitude or primitive and unconfined recreation. Designation, however, would complement these values within Zion National Park. The scenic special features in this WSA would also be protected and preserved.

Opportunities for primitive recreation, solitude, and special features could be degraded in localized areas where an estimated 20 acres of surface disturbance could result from potential mineral exploration activities. These disturbances could have long-term effects on primitive recreation values and special features.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous NPS wilderness proposal and BLM WSA. The unit provides access to the Zion Narrows and designation could help preserve the management objectives of the NPS.

Thus, it is concluded that designation and management as wilderness of the Deep Creek WSA would protect and preserve the wilderness values of naturalness and special features, except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant impact to wilderness values would be expected.

LAND USE PLANS AND CONTROLS

In Zion National Park the area adjoining the WSA has been proposed as wilderness. This alternative would complement the NPS proposal. The Statement of Management for Zion National Park is ". . . to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the park's ecological communities." (USDI, NPS, 1976). The NPS has shown interest in nondevelopment of adjacent lands so as not to impair the Park's watershed. Wilderness designation of this area would be consistent with these goals. Wilderness designation would not conflict with the Secretary of the

Interior's recommendation to transfer the WSA to the NPS.

The existing BLM Virgin River MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Virgin River MFP.

The *Washington County Master Plan* stresses multiple use of public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resources would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would not be reissued.

SOCIOECONOMICS

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 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low. Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$3,660 of livestock sales and \$945 of ranchers' return to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

The loss of 1,120 acres now leased for oil and gas under Category 3 (closed to surface occupancy)

stipulations would cause an eventual loss of up to \$3,360 per year of lease fees to the Federal treasury. In addition to these rental fees, any potential

royalties from lease production through slant drilling could also be foregone.

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1. The first section of the report discusses the general background of the project and the objectives of the study. It mentions the location of the project area and the importance of the study area.

2. The second section describes the methodology used in the study, including the data collection methods and the analysis techniques.

3. The third section presents the results of the study, showing the findings of the data analysis and the conclusions drawn from the study.

4. The fourth section discusses the implications of the study and provides recommendations for future research and management practices.

5. The fifth section is a conclusion that summarizes the main findings of the study and reiterates the importance of the research.

The study was conducted in the following manner: first, a detailed map of the study area was prepared, showing the boundaries of the project area and the locations of the various features of interest. This map was used to guide the field work and to ensure that all areas of interest were covered.

The data collection process involved a series of field visits to the study area, during which various types of data were collected. This included information on the physical characteristics of the area, such as the topography, vegetation, and soil types. It also included information on the biological characteristics of the area, such as the distribution and abundance of various plant and animal species.

The data collected during the field visits were then analyzed using a variety of statistical and spatial analysis techniques. This allowed the researchers to identify patterns and trends in the data, and to test hypotheses about the relationships between different variables. The results of the analysis are presented in the following sections of the report.

The findings of the study indicate that there are significant differences in the physical and biological characteristics of the study area. These differences are related to the location of the area and the various features of interest. The study also found that there are strong relationships between the physical and biological characteristics of the area, and that these relationships can be used to predict the distribution and abundance of various species.

Based on the findings of the study, the following recommendations are made for future research and management practices. First, it is recommended that further research be conducted to better understand the relationships between the physical and biological characteristics of the study area. This could be done by conducting more detailed field studies and by using more advanced analysis techniques.

Second, it is recommended that management practices be developed that take into account the findings of the study. This could include measures to protect the physical and biological characteristics of the study area, and to ensure that the area is managed in a way that is consistent with the findings of the study.

In conclusion, the study has provided valuable information about the physical and biological characteristics of the study area, and has identified important relationships between these characteristics. The findings of the study have important implications for future research and management practices, and it is hoped that this report will be helpful to those interested in the study area.

North Fork
Virgin River WSA



NORTH FORK VIRGIN RIVER WSA

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488	Appendix RL
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491	Appendix RO
492	Appendix RP
493	Appendix RQ

NORTH FORK VIRGIN RIVER WSA (UT-040-150)

INTRODUCTION

General Description of the Area

The North Fork Virgin River Wilderness Study Area (WSA) is located in Kane County, and lies along the boundary of Zion National Park and its administratively endorsed wilderness proposal encompassing 120,620 acres. It is approximately 45 road miles from Kanab and is administered by the BLM, Cedar City District, Kanab Resource Area Office. The unit contains 1,040 acres and adjoins the Park for approximately 0.50 mile along the east side of the Park. It is being considered for wilderness designation under Section 202 of the Federal Land Policy and Management Act (FLPMA).

The area's topography is dominated by the North Fork of the Virgin River that traverses the area from east to west. Elevations vary from 5,400 feet to 6,900 feet above sea level.

Average annual precipitation ranges from 16 to 20 inches. Approximately half of the precipitation falls from December through March, much in the form of snow (approximately 70 inches of snow yearly). Intense thunderstorms from the southwest are common during the summer months.

Temperatures vary greatly with aspect and altitude, but are generally indicative of cold winters and cool summers. July and January are the warmest and coldest months, respectively. July temperatures range from extremes of 35 degrees Fahrenheit (F) to 100 degrees F, with an average range of 50 to 70 degrees F, while the January extremes are -15 to 60 degrees F, with an average range being 15 to 40 degrees F. (The weather data used are from Alton, Utah which lies approximately 20 miles east of the WSA, but at approximately the same elevation.)

This WSA formerly 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 now included for Environmental Impact Statement (EIS) analysis in line with general land use planning provisions of Section 202 of the Federal Land Policy and Management Act (FLPMA) and in accordance with policies that allow for wilderness consideration of areas 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 located within the unit.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the study phase are the small size of the unit, viability of its management by BLM, and the National Park Service (NPS) management need for designating the area wilderness and the possibility of changing the air quality classification with wilderness designation. Issues and concerns specific to the North Fork Virgin River WSA raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

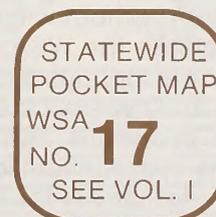
1. *Comment:* Wilderness designation would protect North Fork Virgin River, which is a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic Rivers System.

Response: This information has been added to the Affected Environment, Recreation section. Development of a potential reservoir site in the WSA would be prevented by wilderness designation.

2. *Comment:* Apparently there were irrational deletions of all or parts of the WSAs and ISAs. After review of Site-Specific Analysis (SSA) summaries in the scoping document, it becomes apparent that many areas have no resource conflicts and excellent wilderness qualities, yet no acres were recommended for wilderness.

Response: During scoping for the EIS, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives.

Additional input is expected as a result of the public review and comment on the Draft EIS.



At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy," (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

3. *Comment:* How would BLM wilderness areas be consistent with other adjoining Federal lands?

Response: Consistency of wilderness designation is discussed in the Environmental Consequences, Land Use Plans and Controls sections.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, one comment received on the North Fork Virgin River WSA suggested a partial alternative be considered eliminating from further study any areas that would conflict with wilderness designation. No specific resource conflicts were identified by the commentor. Studies of the North Fork Virgin River WSA have not identified any significant resource conflicts with wilderness designation; therefore, no partial wilderness alternatives were considered.

Transfer of several WSAs, including North Fork Virgin River WSA, to NPS administration in adjacent NPS units has been proposed (H.R. 1214, 1984). Such a transfer could occur in the future regardless of wilderness status.

Because of the possibility of transfer of management from the BLM to the NPS, the EIS could include analysis of both BLM and NPS management with and without wilderness designation of the WSA. However, because BLM could continue to manage the WSA without wilderness designation or could manage the WSA a wilderness in conjunction with the contiguous NPS-administered wilderness and because the outcome of the NPS wilderness proposals and H.R. 1214 are uncertain actions independent of the BLM wilderness review, alternatives for transfer of juris-

diction from BLM to NPS are not analyzed in this EIS. The EIS addresses the basic question of wilderness designation of BLM-administered lands and the resultant environmental impacts. 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.

It is noted that, in cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the BLM "Wilderness Study Policy" (USDI, BLM, 1982b) requires the BLM in its Wilderness Study Report to determine (1) whether 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 administering the contiguous wilderness area.

BLM has determined that the North Fork Virgin River WSA would not be a viable independent wilderness if adjacent NPS land is not also designated as wilderness. The question of which agency should management the WSA to achieve overall management effectiveness will be addressed in the Wilderness Study Report. The decision will be based primarily on factors affecting both BLM and NPS jurisdictions (i.e. 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 non-environmental 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; and (2) All Wilderness (1,040 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 ALTERNATIVE

Under this alternative, none of the 1,040-acre North Fork Virgin River WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would

NORTH FORK VIRGIN RIVER WSA

continue to be managed in accordance with the Zion Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1979b). No State lands lie within the WSA (refer to Map 1); however, a single State section is adjacent to the WSA.

The following are specific actions that would take place under this alternative:

- All 1,040 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on existing mining claims (140 acres) and future mining claims. Development would be regulated by undue or unnecessary degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Existing and future oil and gas leases could be developed under standard stipulations (Category 1) on 320 acres and under no surface occupancy stipulations (Category 3) on the remaining 720 acres. There is presently one lease (800 acres) in the WSA. The remainder of the area is not leased.
- The present domestic livestock grazing use of 17 Animal Unit Months (AUMs) would continue as authorized in the Zion Planning Unit MFP and *Kanab-Escalante Grazing Management Environmental Impact Statement* (EIS) (USDI, BLM, 1980a). There are no existing range developments in the WSA. New rangeland developments (none are planned) could be implemented without wilderness considerations.
- Developments for wildlife, water resources, etc. (none are planned) would be allowed without concern for wilderness values if in conformance with the current BLM land use plan.
- The WSA would be open to vehicular use and new access routes would be allowed with the exception of the canyon area which would continue to be closed to off-road vehicle (ORV) use as directed by the MFP.
- The entire 1,040-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (1,040 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without

concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.

- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

ALL WILDERNESS ALTERNATIVE

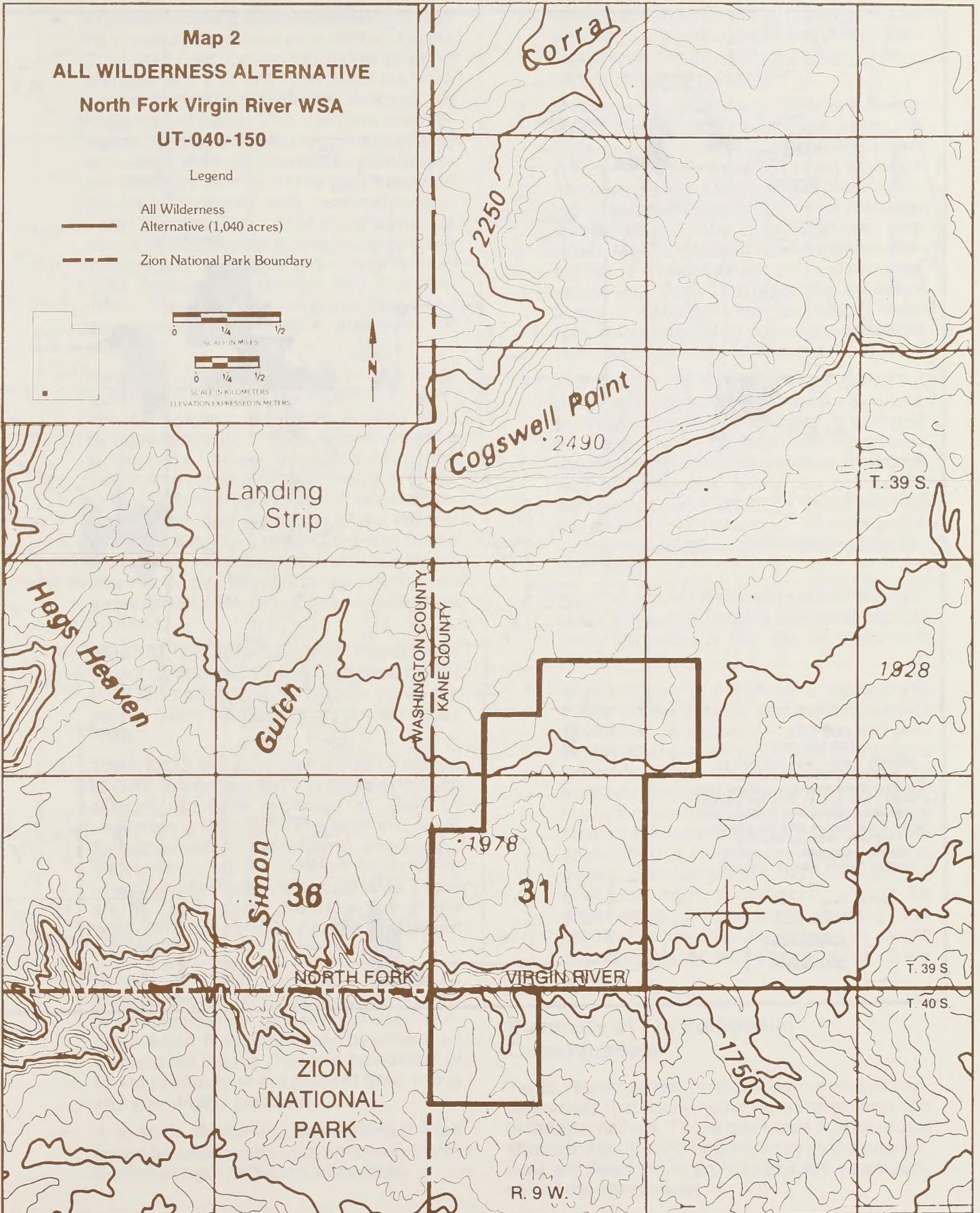
(PROPOSED ACTION)

Under this alternative, all 1,040 acres of the North Fork Virgin River WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). This WSA lies adjacent to Zion National Park and is contiguous with a 120,620-acre NPS-proposed wilderness. Because this WSA lacks the necessary size to constitute a wilderness area by itself, it can only be managed in part with the NPS-proposed wilderness. As a result, the North Fork Virgin River WSA along with nine other small WSAs could be retained by BLM or transferred to the NPS (refer to Map 3) who would then assume management responsibilities. For the purposes of this analysis, it is assumed that BLM would retain management of the North Fork Virgin River WSA, and it would be managed in part with the contiguous NPS-proposed wilderness and in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. No State lands are located in the WSA. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

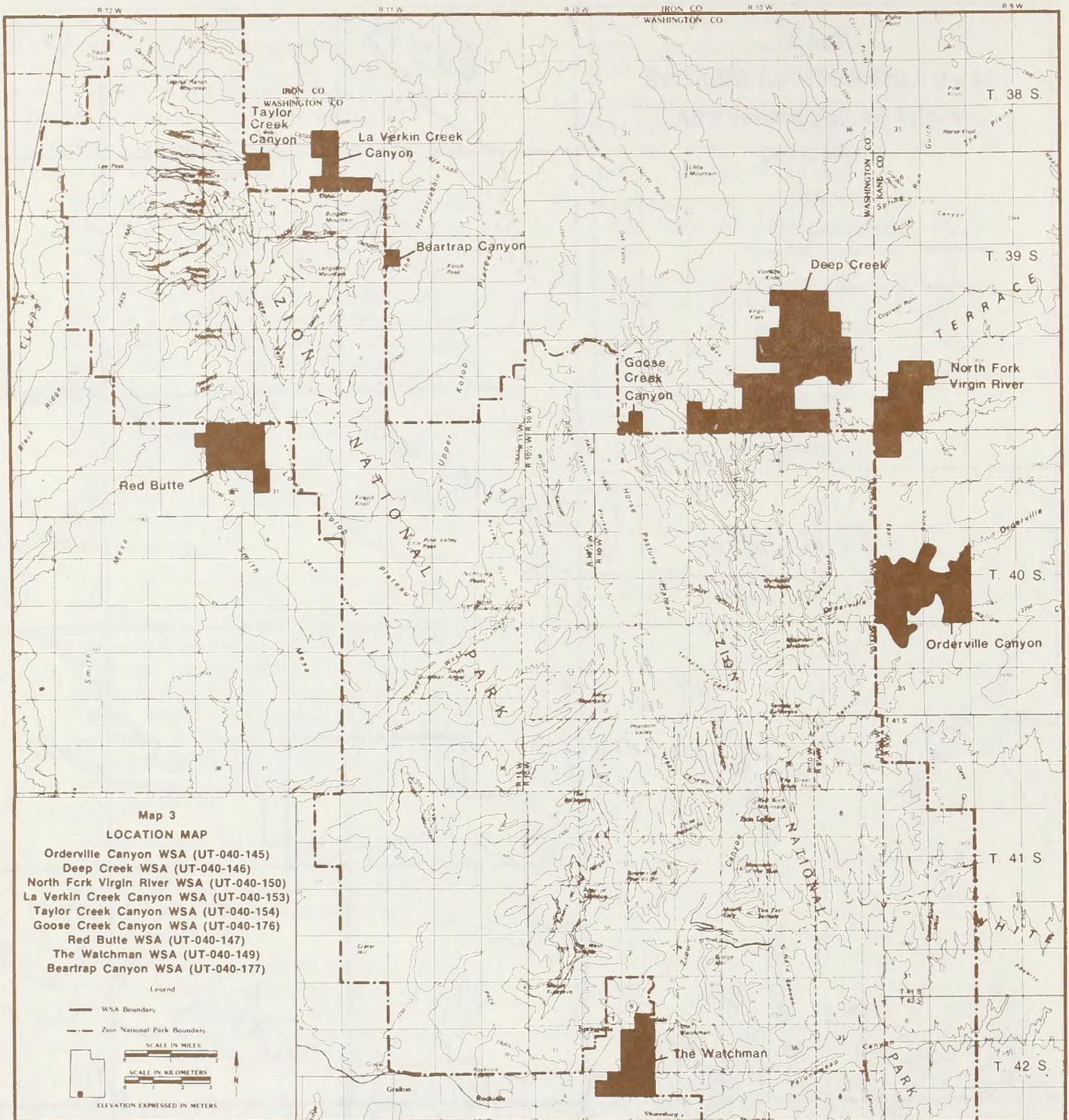
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 1,040 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Currently, seven mining claims (140 acres) have been located in the WSA. An existing oil and gas lease involving approximately 800 acres would not be re-issued upon expiration unless a find of oil or gas in commercial quantities is shown.

NORTH FORK VIRGIN RIVER WSA



NORTH FORK VIRGIN RIVER WSA



NORTH FORK VIRGIN RIVER WSA

- Present domestic livestock grazing would be allowed to continue as authorized in the Zion MFP and *Kanab-Escalante Grazing Management EIS*. The 17 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 could continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management. There are currently no rangeland developments in the WSA, and none are planned.
- 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). No water resource facilities or treatments are located in the North Fork Virgin River WSA, and none are currently planned.
- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 1,040-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 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. There are no roads along the boundary of the WSA. One way extends into the WSA about 0.25 mile.
- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 1,040-acre wilderness.
- Visual resources in the wilderness would be managed in accordance with 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 instances which 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 must 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 on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

NORTH FORK VIRGIN RIVER WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES NORTH FORK VIRGIN RIVER WSA

Resource	Alternatives	
	No Action	All Wilderness (1,040 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 0.7 million tons of coal, and 100 tons of uranium oxide.	Oil, gas, and coal likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 18 percent of the WSA could be directly affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 17 AUMs would continue. There are no existing developments. New developments could be constructed; however, none are now proposed.	Grazing of 17 AUMs would continue. Little effect on grazing management is expected. Proposed new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 190 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	ORV use could continue on 0.25 miles of way. Overall recreational use could increase from the present 4,000 visitor days per year to 5,960 over the next 20 years. Up to 190 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 0.25 miles of way, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 190 acres (18 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 20 acres (2 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, and the current BLM Zion MFP. It would not complement the NPS proposal for adjacent wilderness or for transfer of the WSA to the adjacent NPS unit.	This alternative would not be consistent with Kane County's concept of multiple use, but would complement the NPS proposals for wilderness and transfer of the WSA to the NPS unit. Designation would constitute an amendment of the BLM Zion MFP.
Socio-economics	Annual local sales of less than \$17,440 and Federal revenues of up to \$2,424 would continue. An additional \$720 in Federal revenues per year could be derived from leasing of presently unleased areas.	Annual local sales of less than \$17,440 and Federal revenues would continue, but Federal revenues of up to \$3,120 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

AFFECTED ENVIRONMENT

Air Quality

Air quality data for the WSA were obtained from the automated visibility measuring station at Lava Point in Zion National Park. This station scans across the area of the WSA, focusing on the Kaibab Plateau in Arizona. The preliminary figures from this relatively new system give an average visibility of 155 miles. This indicates extremely clean air in the area. The area is presently classified as Class II air under the Prevention of Significant Deterioration (PSD) regulations. This means that air quality deterioration that accompanies moderate well-controlled growth would not be considered significant. Zion National Park has a PSD Class I designation under existing regulations.

Geology

The North Fork of the Virgin River WSA lies within the southern portion of the Grand Staircase section of the Colorado Plateau Physiographic Province.

Elevations vary from a little more than 6,900 feet above sea level on the north side of the canyon at the northern boundary of the WSA, to about 5,400 feet above sea level in the canyon bottom at the west boundary of the WSA.

The main drainage in the WSA is the North Fork Virgin River which drains from east to west.

Rocks of Jurassic and Cretaceous Age totaling about 1,500 feet crop out in the WSA. Marine sediments of the Jurassic Carmel Formation form the most extensive outcrops in the southern portion of the WSA. Cretaceous Dakota and Tropic Formations crop out in the extreme northern portion of the WSA. Underlying Mesozoic and Paleozoic rocks may be as much as 11,000 feet thick in the vicinity of the WSA (Hintze, 1973).

Soils

All of the soils within this small WSA are of one soil association, Typic Argiborolls/Lithic Argiborolls/Typic Haploborolls. These are gravelly, gravelly sandy, cobbly, and silty clay loam soils, which are shallow to deep on steep to very steep slopes.

Approximately 85 percent of the WSA is considered to have a severe susceptibility to erosion, primarily due to the steepness of the terrain. The remaining 15 percent is fairly level and, therefore, is only moderately susceptible to erosion. Ero-

sion condition was determined by using soil surface factors, as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	880	85	4,752
Critical	2.7	0	0	0
Moderate	1.3	160	15	208
Slight	0.6	0	0	0
Stable	0.3	0	0	0
Total		1,040	100	4,960

Sources: USDI, BLM, 1979a; Leifeste, 1978.

Vegetation

The Colorado Plateau zone, approximately 4,000 feet to 5,500 feet in elevation, is characterized by the pygmy forest of Utah juniper and pinyon pine. This zone includes yucca, Gambel's oak, Utah serviceberry, singleleaf ash, littleleaf mountain mahogany, and princess plume. On the more exposed benches and gentle slopes at the edge of the pinyon and juniper forest are areas of sagebrush and rabbitbrush.

Associated grasses in this zone include Indian ricegrass, galleta grass, needle-and-thread, and muttongrass. Oaks, bigtooth maple, and numerous wildflowers also occur there.

Associated with perennial drainages are small but interesting plant communities occurring around springs and seepage areas. These springy places usually develop under protective overhanging lips of harder strata and contain hanging gardens that generally have luxuriant plant life, such as maidenhair fern, pink-flowered shooting star, and scarlet monkey flower.

The major portion of the WSA is composed of the mountain shrub vegetative association covering approximately 79 percent of the area. The dominant species in this type are oak, big sagebrush, serviceberry, pinyon, juniper, and manzanita. The understory consists of bitterbrush, rabbitbrush, and bunch grasses.

The remaining 21 percent of the WSA is covered by the pinyon-juniper woodland vegetative association with pinyon, juniper, and some ponderosa

pine in suitable habitat composing the overstory. The sparse understory includes mountain mahogany, serviceberry, Gambel's oak, cliffrose, and silver buffaloberry.

Available data indicate no threatened, endangered, or sensitive plant species occur in this WSA.

The North Fork Virgin River WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

This WSA is located in the Virgin River subbasin of the Colorado River Basin hydrologic region. There are no existing water rights and the area is presently closed to further applications, although the Utah State Water Engineer has stated some applications could be considered depending on water use and location. There are no withdrawals present in the unit.

The WSA is a part of the East Virgin watershed, containing approximately 1.5 miles of the North Fork of the Virgin River. A stream flow gauge on the North Fork within the boundaries of Zion National Park has recorded a mean annual discharge of 71,360 acre-feet over a 50-year period. No other water resources or developments are known to exist in the WSA.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 1+ was assigned to the North Fork Virgin River WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource

importance of the WSA.

The low OIR is based on the area's low potential for having economic deposits of minerals.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider the reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

Table 3 provides an energy and mineral resource rating summary for the WSA.

**TABLE 3
Mineral and Energy Resource Rating Summary**

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Uranium	f2	c2	Less than 100 tons of uranium oxide
Coal	f2	c4	Less than 1.4 million tons
Geothermal	f1	c4	Low temperature
Hydroelectric	f2	c4	Small unit (1 megawatt)

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

The oil and gas capabilities of the region have

been reviewed by SAI (1982). There is no evidence indicating the existence of commercially recoverable oil and gas resources within the WSA. The only tests for oil and gas in the region have been three holes drilled in western Kane County, near the east edge of the downthrown block of the Sevier fault and about 15 miles southeast of the WSA. Oil shows were reported in these wells from Moenkopi, Kaibab, and Queantoweap rock units (Kunkel, 1965). According to SAI (1982) these wells were located on what appears to be an obscure dome in the Carmel Limestone. No such structure is known to underlie the WSA.

This unit has a low certainty (c1) for the occurrence of small (less than 10 million barrels of oil and 60 billion cubic feet of natural gas of which 3 million barrels and 18 million cubic feet, respectively, would be recoverable) oil and gas fields (f2). There are no known structures within or near the WSA that might represent potential exploration targets, and accordingly the probability for exploration and development occurring in the WSA is low. If a field of this size did exist it would have an estimated areal extent of about 2,500 acres. In Utah fields of this size typically require about 160 acres for developmental facilities such as roads, pads, and disposal ponds.

Under the current land use plan 720 acres within the WSA (North Fork Virgin River Canyon) are open to oil and gas leasing with a no surface occupancy stipulation. The remaining 320 acres are open to leasing subject to the standard use and wilderness *Interim Management Policy* stipulations (USDI, BLM, 1979c). Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

There is presently one post-FLPMA oil and gas lease in the WSA covering 800 acres.

Coal

Approximately 220 acres of the northern part of the WSA lie within the Kolob Coal Field. According to Doelling and Graham (1972), coal beds occur in the WSA in a zone 3 to 5 feet thick within the basal part of the Dakota Sandstone at depths less than 2,000 feet. Based on these figures it is estimated that such coal beds contain between .85 and 1.4 million tons of coal, of which one-third to one-half is recoverable by underground mining methods. Coal in the Kolob Field varies in quality from one area to another, but in general the coal is of poor quality and of moderate to high sulfur content.

The northern boundary of the WSA is less than 1 mile outside the southern boundary of the Kolob Known Recoverable Coal Resource Area (KRCRA). Since the coal unsuitability criteria was applied only to the KRCRA, it is not known whether the portion of the WSA underlain by coal is suitable or unsuitable for coal mining. However, the Kolob KRCRA in the vicinity of the WSA was identified as acceptable for further consideration for coal leasing. At the present time no coal leases exist within the WSA.

Geothermal

No geothermal resources are known to occur within or near the WSA. According to SAI (1982) the geothermal favorability of the WSA is low with a potential only for low-temperature geothermal resources.

The WSA lies within the Colorado Plateau which, in terms of geothermal resources, is characterized by a low heat flow, a long history of relative tectonic stability, and a general lack of thermal springs. The scarcity of hot springs may be due in part to a lowered regional water table caused by deep stream incision. If thermal waters do exist, they occur only at considerable depth (Muffler, 1978).

Most investigations consider recent crustal instability, high heat flow, and young igneous rocks (less than 1 or 2 million years old) as important criteria for a geothermal resource of commercial proportion. No hot springs or young igneous rocks are known to occur within or near the vicin-

ity of the WSA. The nearest thermal springs to the WSA are approximately 40 miles to the southwest, and they discharge at temperatures between 20 degrees Centigrade (C) and 42 degrees C (National Oceanic Atmospheric Administration, 1979).

LOCATABLE MINERALS

No prospects, deposits, or any other evidence of mineralization are known to exist within the WSA. Seven claims have been located within the WSA, and it is assumed they are located principally for uranium.

Uranium

No uranium deposits are known to occur within the WSA. The Triassic Chinle and the Jurassic Moenave Formations are the only rock units within the WSA considered favorable for uranium in south-central Utah (U.S. DOE, 1979). According to the U.S. DOE (1983) only the Moenave Formation in the region is considered favorable for the occurrence of economic deposits of uranium. The U.S. DOE (1983) speculates that the Moenave Formation within the WSA may contain about 100 tons of uranium oxide.

The Silver Reef district, approximately 30 miles to the southwest, is the closest uranium-producing area to the WSA. This district is known primarily for its past silver production although minor amounts of uranium were obtained from the Springdale Sandstone Member of the Moenave Formation. The Springdale Sandstone Member is estimated to lie at a depth of at least 3,000 feet below the surface of the WSA (Hintze, 1973). Other favorable rock units in the vicinity are included in the Chinle Formation (Shinarump Conglomerate Member), but these rocks lie at a depth of about 4,000 feet below the WSA (Hintze, 1973) and it is doubtful if such deposits could be extracted economically (SAI, 1982).

Seven mining claims are presently located within the WSA. None of these claims have any indication of past working and it is not known for which mineral(s) they are located. However, it is probable that they are located for uranium.

HYDROELECTRIC

The North Fork of the Virgin River drains the WSA. Because the North Fork is perennial in this area, SAI (1982) considers the WSA favorable for small scale hydroelectric resources (1 megawatt).

The Federal Energy Regulatory Commission (FERC) has identified potential small scale hydroelectric sites in the vicinity of the WSA as well as existing dams that could be retrofitted to

produce electricity. However, according to FERC (SAI, 1982) no potential hydroelectric sites occur within the WSA.

SALABLE MINERALS

Minor deposits of stream gravel and other loose rock material that could be used for construction occur within the WSA. These deposits are not unique or economically significant due to the presence of ample similar materials nearby outside the WSA.

Wildlife

Because this WSA occurs in the transition of three vegetative ecoregions, it supports a variety of animal species. There are approximately 300 vertebrate animal species that could inhabit the WSA. These include 60 species of mammals, 208 species of birds, 20 species of reptiles, 6 species of amphibians, and 3 species of fish (USDI, BLM, 1979b).

Raptors may include golden eagle (BLM sensitive species), bald eagle, peregrine falcon, prairie falcon, American kestrel, red-tailed hawk, and Cooper's hawk. The red-tailed and Cooper's hawks are the most common. The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), are included on the Federal endangered species list. Bald eagles winter in the Virgin River drainage south of the WSA and also in Kanarraville and New Harmony Valleys west of the WSA. Occasional sightings of these birds have been made with most reports occurring in the Deep Creek-Goose Creek area. Nesting or roosting sites are not known to occur. No other threatened or endangered species are known to occur within the WSA.

An active peregrine falcon nest occurs in Zion National Park south of the WSA. Peregrine falcons have been reported in the Deep Creek-Goose Creek area and in Taylor Creek Canyon, but nesting is not confirmed. All of the WSA has an adequate prey base and excellent nesting habitat for the peregrine falcon.

Big game animals include mule deer, elk, and mountain lion. The WSA is within the boundaries of Deer Herd Unit 58 providing summer range. No critical range is found within the WSA. Hunting pressure is light because access is blocked by private and NPS lands. There are no existing or proposed improvements for wildlife for this area.

Mountain lion activity in the vicinity is heavy compared to other areas in Utah. In past years the Federal government has controlled the cougars in

the area to keep livestock predation under control. During the 1976 hunting season 11 cougars were taken UDWR Deer Herd Unit 58 (which encompasses the WSA), the largest number for any herd unit in the State.

Trout have been stocked in the North Fork but their present status is not known.

Forest Resources

The major forest resources found in the WSA consist of the pinyon-juniper ecotype. The WSA has forest resources suitable for firewood, posts, pine nuts, and Christmas tree cutting. However, because of the area's lack of access and the same resources being available elsewhere, there is little use or demand for these purposes.

Livestock and Wild Horses/Burros

The North Fork Virgin River WSA covers parts of two allotments (Hogs Heaven and Lower North Fork).

The Hogs Heaven Allotment has 765 acres within the WSA and includes 17 AUMs. The Lower North Fork Allotment has 225 acres in the WSA with no suitable public grazing land included. Two permittees are allowed to graze cattle on these allotments. Approximately 50 acres of public land are unallotted in the WSA. Refer to Table 4 for livestock grazing use data.

There are no existing and proposed range improvements in the WSA, and there are no wild horses or burros in the WSA.

TABLE 4
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	Suitable Acres in WSA ¹	Unsuitable Acres in WSA ¹	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Hogs Heaven	1,771	765	300	465	17	1
Lower North Fork	840	225	0	225	0	2
Unallotted	50	50	0	50	0	0

Source: USDI, BLM, 1979a.

¹ The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

Visual Resources

Under the VRM system, the entire WSA is rated

Class II. This means that changes in any of the four basic visual elements (form, line, color, texture) should not be evident. (Refer to Appendix 7 for an explanation of BLM's VRM system.)

The scenery quality rating for the North Fork Canyon is Class A. This designation means that it contains outstanding or dominating features. This drainage is cut with numerous small side canyons that are covered with ponderosa pine, pinyon pine, and cottonwood. The color contrast is excellent, with few intrusions found within the rating area.

Cultural Resources

No sampling inventory for archaeological and other cultural resources has been conducted in the WSA. There are no known sites.

Recreation

Recreation use of the North Fork is limited primarily by the necessity to obtain access across private land. There are no developed recreation facilities in the WSA.

The majority of the WSA is open to ORV uses. Only one trail, approximately 0.25 mile long, occurs in the area. The canyon (130 acres) is closed to ORV use except for existing roads and trails. Since there are no roads or trails in the canyon, the canyon is essentially closed to ORV use.

Hunting is generally poor throughout the unit.

The primary sightseeing opportunity in the WSA is geologic in nature. The canyons of the North Fork of the Virgin River and the Zion Narrows headwaters' erosional features vary from 300 to 800 feet deep.

Presently the WSA is the primary access route for people hiking down the Zion Narrows in Zion National Park. The NPS at Zion issued permits for 3,278 people to enter the park through the North Fork in 1981. It is believed that many more entered via the North Fork without obtaining permits. The unit probably receives over 4,000 visitor days/year, all of which are attributed to primitive activities.

The North Fork of the Virgin River has been identified by the NPS in the National Rivers Inventory. This signifies that the North Fork of the Virgin River, from the road head in Zion National Park to its source, possesses values that may be of national significance and, therefore, have the potential to be included in the National Wild and Scenic Rivers System. Approximately 1.5 miles of

the 25-mile-long river flow within the WSA.

Wilderness Values

SIZE

The North Fork of the Virgin River WSA is approximately 2 miles long (north to south) and 1 mile wide (east to west) and encompasses 1,040 acres. The unit is not a viable independent candidate for wilderness designation if Congress does not designate the contiguous NPS-proposed wilderness area in Zion National Park. If managed in part with the contiguous NPS unit the WSA would be a viable wilderness area.

NATURALNESS

The unit has primarily been affected by the forces of nature. One unmaintained way traverses the extreme northwest portion of the unit. The way appears to provide access to an old timber harvest area outside the unit and is no longer in use and is substantially unnoticeable. There are no other impacts of man's work within the unit.

SOLITUDE

Opportunities for solitude are limited to the canyon bottom of the North Fork of the Virgin River. The remainder of the unit is gently sloping and vegetated with oak brush, pinyon-juniper, and sagebrush. There is little topographic or vegetative screening on the benchlands above the river.

The river bottom does provide outstanding opportunities for solitude when combined with the adjacent canyon system in Zion National Park and on other BLM-administered lands. The North Fork within the unit represents a small portion of a larger canyon system and provides outstanding opportunities for solitude.

The canyon bottom of the North Fork of the Virgin River is serpentine, deeply entrenched, and thickly vegetated with Douglas fir. Opportunities for vegetative and topographic screening are excellent. However, the unit by itself is not considered to have outstanding opportunities for solitude.

PRIMITIVE AND UNCONFINED RECREATION

The canyon bottoms of the North Fork offer primitive and unconfined recreation opportunities such as backpacking, birdwatching, photography, and sightseeing. The terrain in the canyon is strewn with dead fall timber and boulders and includes a perennial stream.

The North Fork provides the major access to the Zion Narrows canyon system. The administration of the canyon system is divided between NPS, BLM, and private individuals. The hiking experience on the WSA represents 1.6 miles of a possible 13-mile hike to the Zion Narrows trail head. When combined with the primitive unconfined recreation experiences of the adjacent canyon system, the experience within the North Fork of the Virgin River is considered outstanding. However, the unit by itself is not considered to have outstanding opportunities for primitive recreation.

SPECIAL FEATURES

The most important supplemental values are scenery. The scenery received the highest values using the BLM's VRM system. Other zoological and botanical features found in Zion National Park are also found in this unit.

Land Use Plans and Controls

The U.S. Government has surface and subsurface ownership of all 1,040 acres of public land within the WSA boundary. There are no private or State in-holdings or valid existing rights, except for post-FLPMA oil and gas leases and seven claims associated with this WSA. The BLM is managing the lands through general guidance of the Zion Planning Unit MFP.

Zion National Park is contiguous to the WSA on the western border. The NPS has prepared this area for wilderness designation. In the past the NPS has expressed interest in some of the drainages that flow through the park but which originate outside the park boundaries. Although the headwaters of the North Fork of the Virgin River are located outside the WSA boundary, the NPS believes that the portion of the drainage within the WSA is important to the well-being of the park as a whole (USDI, NPS, 1976). This area also provides major visitor access to the Zion Narrows.

The House Subcommittee on Public Lands and National Parks conducted a hearing of H.R. 1214 (1984), a bill designed to transfer jurisdiction of certain lands, including the North Fork Virgin River WSA, from the BLM to the NPS.

In response to the hearing, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit (USDI, NPS, 1984). The NPS found the WSA suitable for addition to the NPS unit. In a February 6, 1985 letter from the Secretary of the Interior to the Honorable John F. Seiberling, Chairman, Subcommittee on Public

Lands and National Parks, Committee on Interior and Insular Affairs, the North Fork Virgin River WSA was identified as suitable for inclusion into the adjacent unit of the National Park System. However, the letter also indicated the WSA has multiple-use values and that it was preferred that the WSA not be transferred to NPS until Section 202 studies are completed. No Congressional action has been taken on that recommendation.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

The Utah Division of Water Resources has completed reconnaissance surveys for nine reservoir sites on the North Fork of the Virgin River. One of these sites is within the WSA. This survey was originally initiated for Cedar City; however, they are no longer interested in the proposed project since they participated in the Quail Creek Project. Washington County has indicated interest in possible development of the North Fork of the Virgin River. At the present time, no applications have been filed for any development projects.

Socioeconomics

Kane and Washington Counties are expected to receive most of the social and economic impacts resulting from wilderness designation.

DEMOGRAPHICS

Kane County is a rural county with a total of 4,024 residents and an average population density of approximately one person per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Washington County is also basically a rural county except for the population centers near the City of St. George. The total population of Washington County is 26,065, for an average population density of 10.8 persons per square mile.

EMPLOYMENT

The economies of both Kane and Washington Counties are dominated, in terms of employment, by three sectors: retail trade, services, and government. In Kane County both retail trade and government account for 17 percent of the total employment, and the services sector provides 14 percent. In Washington County the retail trade

TABLE 5
1980 Employment and Personal Income
Kane and Washington Counties, Utah

Industrial Sectors	Kane County		Washington County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	1,452	12,595	7,866	83,449
Proprietors	382	2,623	1,469	14,010
Farm Proprietors	122	136	343	2,386
Nonfarm Proprietors	260	2,487	1,126	11,624
By Industry Source				
Farm	27	382	98	3,031
Nonfarm	1,043	12,213	6,299	80,418
Private	798	9,614	4,805	63,399
Ag. Serv., For., Fish., and Other	(L)	0	29	724
Mining	17	196	70	1,347
Construction	51	1,544	537	9,425
Manufacturing	70	566	698	9,759
Nondurable Goods	(D)	(D)	441	5,986
Durable Goods	(D)	(D)	257	3,773
Transportation and Public Utilities	150	1,875	236	4,996
Wholesale Trade	12	230	263	3,963
Retail Trade	252	2,364	1,673	14,741
Finance, Insurance, and Real Estate	39	392	424	5,201
Services	202	2,427	875	13,243
Government and Government Enterprises	245	2,599	1,494	17,019
Federal, Civilian	18	252	193	2,725
Federal, Military	30	78	161	425
State and Local	197	2,269	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

sector provides 21 percent, government 19 percent, and services 11 percent of the total employment. Employment and income figures for the two counties are presented in Table 5.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production and recreation. Table 6 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has seven mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

No oil and gas or minerals have been produced from the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Two livestock operators have a total grazing privilege of 17 AUMs within the WSA. If all this forage were utilized, it would account for \$340 of livestock sales and \$85 of ranchers' returns to labor and investment.

Nonmotorized recreational use is moderate.

TABLE 6
Income (Sales) and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$2,400
Mineral Production	0	0
Mining Claim Assessment	Less than \$700	0
Livestock Grazing	\$340	\$24
Woodland Products	0	0
Recreational Use	Less than \$16,400	0
Total	Less than \$17,440	Up to \$2,4240

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

Related local expenditures are well distributed. These expenditures are insignificant to both the local economy and individual businesses. The WSA's motorized recreational use is very low and 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 from 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 North Fork Virgin River WSA is estimated as about 4,000 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane and Washington Counties.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 6). Mineral leases in the WSA cover approximately 800 acres. At up to \$3 per acre, lease rental fees generate up to \$2,400 of Federal revenues annually. Half of these monies are allocated to the State, which in turn 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.

The livestock permittees in the WSA can use up to 17 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$24 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but

NORTH FORK VIRGIN RIVER WSA

would probably be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; coal, 10 acres, and uranium, 20 acres. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If uranium, oil and gas, and coal were developed, air quality could be reduced up to the PSD Class II limitations. However, the proximity of the WSA to Zion National Park could result in restriction of the development to meet PSD Class I limitations. Disturbance of 190 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium, oil and gas, and coal exploration and development activities would probably not exceed 190 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 190 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 190 acres would increase from 247 cubic yards/year to 513 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 266 cubic yards (0.5 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 190 acres disturbed would significantly affect the unit's vegetation because approximately 20 percent of the WSA would be disturbed. Impacts to the surrounding area's vegetative resource, however, would be insignificant because of the large acres of similar vegetation.

WATER RESOURCES

Since most of the WSA is already in a severe

erosion class, no significant change in sedimentation or change in total dissolved solids (TDS) is expected to occur from the 266 cubic yards of additional annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Zion Planning Unit.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells, and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of oil in-place and up to 60 billion cubic feet of natural gas (3 million barrels of oil and 18 billion cubic feet of natural gas recoverable) exists within the WSA and surrounding area. These oil and gas resources could be explored and developed, subject to Category 1 and 3 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected. Approximately .4 to .7 million tons of coal could be recoverable from the WSA. Because of poor quality of the coal and economic considerations, coal production is not expected.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposits of up to 100 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this mineral resource. However, the likelihood for development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by disturbance of an estimated 190 acres (18 percent of the WSA) through mineral and energy development and exploration. Deer, elk, mountain lion, and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Less mobile wildlife would either perish or coexist with these disturbances at smaller population levels. There are no planned wildlife improvements in the WSA.

No effects on golden eagle, bald eagle, or peregrine falcon are expected because there are no critical habitats or use areas in the WSA. Prior to surface disturbance, BLM would consult with the Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act (refer to Appendix 4) and would implement mitigating measures to protect threatened, endangered, or sensitive species.

FOREST RESOURCES

Since the majority of the area is covered by mountain shrub and pinyon juniper, none of which is presently utilized (except by occasional campers or hikers), no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Zion Planning Unit MFP. The 17 AUMs currently allocated in the WSA are controlled by two livestock permittees. Since very little use of motorized vehicles is currently being made to manage livestock, little effect is expected to the environment. There are no planned livestock improvements in the WSA.

VISUAL RESOURCES

Visual values in areas affected by the estimated 190 acres of surface disturbance from mineral and energy exploration and development would be degraded and, if within VRM Class II areas, management objectives would not be met. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

Disturbance of 190 acres by mineral exploration and development under this alternative could affect cultural resources. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts.

Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 190 acres could be disturbed by mineral and energy activities. Primitive recreational opportunities could be diminished on the affected areas.

The future trend in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall primitive recreational use is expected to increase from 4,000 current visitor days per year to 5,960 at the end of 20 years. Overflow from Zion National Park could further increase use.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Zion Planning Unit MFP. Potential mineral and energy exploration and development could disturb an estimated 190 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. However, the impacts to these values probably would not be significant due to the low probability of surface disturbance and reclamation practices.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use, but it would not complement the NPS proposal of wilderness designation for their adjacent area.

The surface-disturbing activities potentially associated with this alternative would not be consistent with the "scenic, scientific, cultural, and recreational values that importantly supplement or complement those within the current park boundary" (USDI, NPS, 1984); therefore, this alternative would not be consistent with the NPS finding that the WSA is suitable for inclusion into Zion National Park. The No Action Alternative is based on implementation of the current BLM Zion Planning Unit MFP and is, therefore, in conformance with it.

Potential water development projects could be allowed.

SOCIOECONOMICS

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 coal, uranium, and oil and gas in the WSA were developed it could lead to increased employment and income for Kanab and Washington Counties. However, the probability of economic development of minerals within the WSA is low.

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There would be no livestock-related economic losses because the existing grazing use (17 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$340 annually in livestock sales and \$85 of ranchers' return to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because estimated recreational use in the area is estimated to increase 1,960 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy) recreation-related expenditures attributable to the WSA would likely not be very significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 240 acres in the WSA open to leases that are currently not leased. If leased they would bring up to \$720 additional Federal lease fee revenues per year in addition to any royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$24 per year) would continue.

All Wilderness Alternative (1,040 Acres) (Proposed Action)

As noted in the Description of the Alternatives section the major changes that could occur in the 1,040-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 0.25 mile of an existing vehicular way in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that existing mining claims would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities and that coal leasing would not occur. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas would be smaller than under the No Action Alternative (20 vs. 190 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, water, and forest resources would be insignificant for the All Wilderness Alternative, as described for the No Action Alternative. Wilderness designation would provide additional protection for these resources.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 20 acres would increase from 26 cubic yards/year to 54 cubic yards/year from the present situation. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 28 cubic yards, which is 238 cubic yards less than for the No Action Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 800 acres are under oil and gas lease. However, no exploration or development of oil and gas is presently occurring within the WSA, and none is expected to occur before designation. Therefore, the potential resource of up to 10 million barrels of oil and less than 60 billion cubic feet of natural gas (3 million barrels of oil and 18 billion cubic feet of natural gas recoverable) would be foregone under this alternative.

Due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant impacts to the oil and gas resource.

Recovery of .4 to .7 million tons of coal would be foregone. Because of the poor quality of the coal and economic considerations, production of coal is unlikely even without wilderness designation.

LOCATABLE MINERALS

Approximately 140 acres are under mining claim within the WSA principally for uranium. Up to 100 tons of uranium oxide that are recoverable could occur within the WSA. Development work, extraction, and patenting would be allowed to continue

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on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of the locatable mineral resources.

The worst-case impact to minerals would be if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 100 tons of uranium oxide would be foregone. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant impact to uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude and the possibility that less acres would be disturbed. However, the disturbance of 20 acres due to exploration of locatable mineral resources could disrupt wildlife populations but would not result in these species leaving the WSA.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Zion Planning Unit MFP. The 17 AUMs currently allocated in the WSA are controlled by two livestock permittees. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources.

VISUAL RESOURCES

A slight benefit would occur to the visual resources of the WSA because the VRM class would change from Class II to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities to about 20 acres. Thus, there could be localized long-term degradation of values in some areas. However, no significant impact in the area as a whole would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Since most of the estimated recreational use (4,000 visitor days) is associated with visitor days in the Virgin River Narrows of Zion National Park, no significant impact is anticipated due to designation.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation and the WSA's proximity to Zion National Park could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use. The quality of the primitive recreation experience probably would not be negatively affected by the increased use. The few visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. 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 vicinity of the WSA.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values. Approximately 0.25 mile of a way within the WSA would be closed to ORV use.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values. Recreation opportunities in Zion National Park would also be protected and enhanced by complementary management in this WSA.

WILDERNESS VALUES

Designation and management of all 1,040 acres as wilderness would assure the preservation of the wilderness value of naturalness. The unit by itself is not considered to have outstanding opportunities for either solitude or primitive and

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unconfined recreation. Designation, however, would complement these values within Zion National Park. The scenic special feature in this WSA would also be protected and preserved.

Opportunities for primitive recreation, solitude, and special features could be degraded in localized areas where an estimated 20 acres of surface disturbance could result from allowable mineral exploration activities. These disturbances could have long-term effects on primitive recreation values and special features.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous NPS wilderness proposal. The unit is a major access point to the Zion Narrows, and designation could help preserve the management objectives of the NPS.

Thus, it is concluded that designation and management as wilderness of all 1,040 acres of the North Fork Virgin River WSA would protect and preserve the wilderness values of naturalness and scenic special features except in localized areas affected by surface disturbance related to mineral exploration.

LAND USE PLANS AND CONTROLS

In Zion National Park the area adjoining this unit has been proposed as wilderness. This alternative would complement the NPS proposal. The "Statement of Management" for Zion National Park is "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the park's ecological communities." (USDI, NPS, 1976). The NPS has shown interest in nondevelopment of adjacent lands in order to not impair the park's watershed. Wilderness designation of this area would be consistent with these goals. Wilderness designation would not conflict with the unit's suitability for addition to the NPS unit if wilderness values are determined to outweigh potential conflicts.

The existing BLM Zion MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Zion MFP.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would not be renewed.

At least one potential dam site on the North Fork of the Virgin River would be eliminated from consideration under this alternative.

SOCIOECONOMICS

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 some losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low. Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$340 of livestock sales and \$85 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increased rancher income. No such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would only cause slight increases to the local community.

Motorized recreational use of the WSA is very light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 800 acres now leased for oil and gas would cause an eventual loss of up to \$2,400 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$720 annually in Federal revenues from the 240 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

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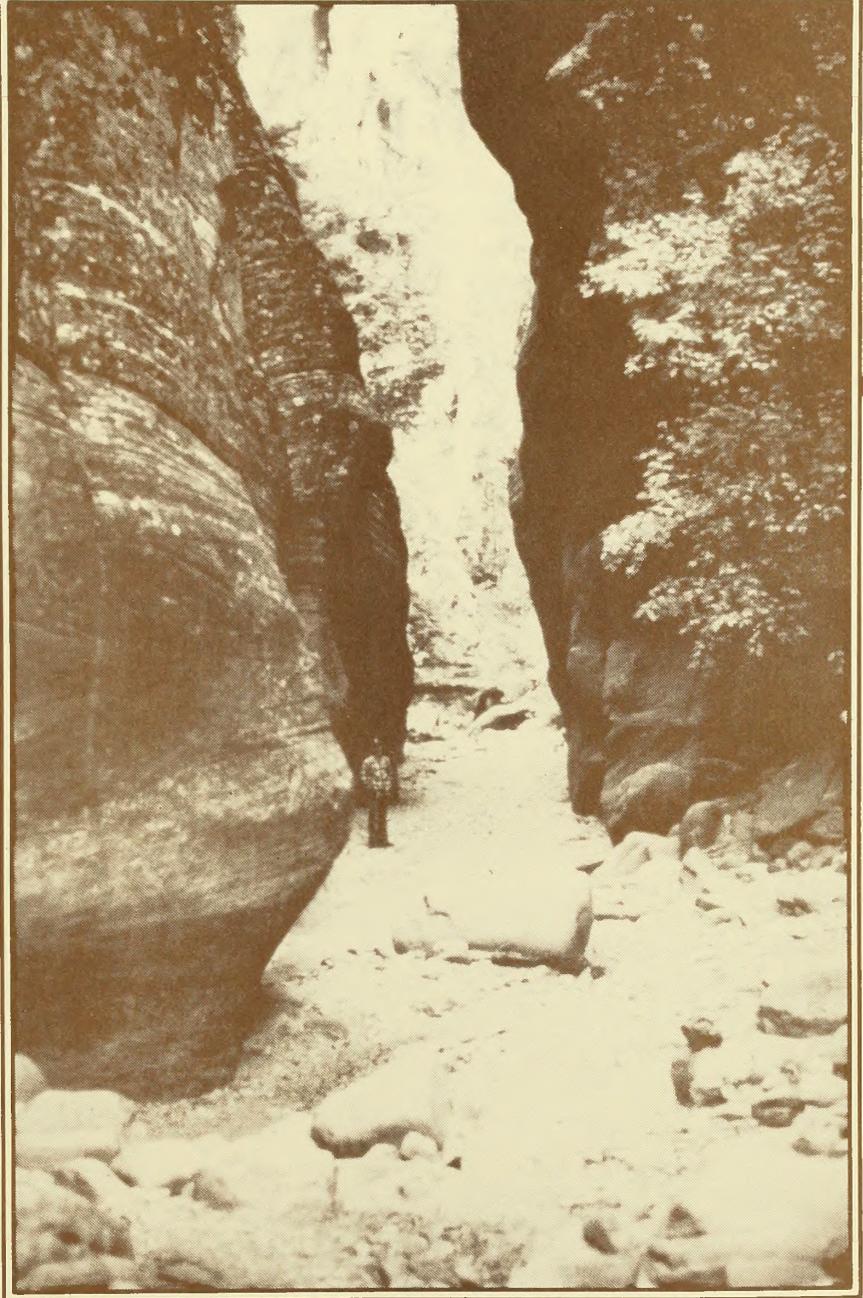
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Orderville Canyon WSA



ORDERVILLE CANYON WSA

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ORDERVILLE CANYON WSA

(UT-040-145)

INTRODUCTION

General Description of the Area

Orderville Canyon Wilderness Study Area (WSA) lies along the boundary of Zion National Park and a National Park Service (NPS) administratively endorsed wilderness proposal encompassing 120,620 acres. The WSA contains 1,750 acres and adjoins the Park for approximately 1.5 miles. It is approximately 40 road miles from Kanab, Utah. It is being considered for wilderness designation under Section 202 of the Federal Land Policy and Management Act (FLPMA).

The WSA is characterized by a deep canyon and side drainages. Elevations range from 5,100 feet above sea level to 6,600 feet. The temperature range is dependent on the aspect and altitude, but is generally indicative of warm summers and cold winters. July and January are the warmest and coldest months, respectively. July temperatures range from extremes of 50 degrees Fahrenheit (F) to 115 degrees F, with an average range of 68 to 84 degrees F. January extremes are -20 to 70 degrees F, with the average range being 15 to 30 degrees F. (The weather data used are from Orderville, Utah, which is approximately the same elevation as the WSA.)

Average annual precipitation ranges from 12 to 16 inches. Approximately 50 percent of this precipitation falls from December through March, much in the form of snow in the higher elevations (approximately 40 inches of snow per year). Intense thunderstorms from the southwest are common during the summer months.

There are no private or State lands located within the WSA.

This 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 for analysis in line with general land use planning provisions of Section 202 of the Federal Land Policy and Management Act (FLPMA) and in accordance with 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.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the

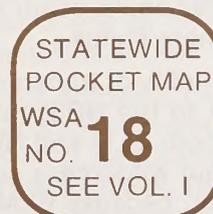
study and scoping phases relate to the small size of the WSA and Zion National Park's management need for designating the area as wilderness. The following are specific comments and responses to concerns raised in the spring of 1984 (USDI, BLM, 1984) public scoping meetings.

1. *Comment:* How would BLM wilderness areas be consistent with other adjoining Federal lands?

Response: Designation of Orderville Canyon as wilderness would be consistent with the Zion National Park proposed wilderness area. Refer to Land Use Plans and Controls, All Wilderness Alternative, Environmental Consequences section.

2. *Comment:* Apparently there were irrational deletions of all or parts of the WSAs and ISAs. After review of Site-Specific Analysis (SSA) summaries in the scoping document, it becomes apparent that many areas have no resource conflicts and excellent wilderness qualities, yet no acres were recommended for wilderness.

Response: During scoping for this Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the



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Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

3. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, it was suggested that a partial alternative be considered for Orderville Canyon WSA eliminating from further study any areas that would conflict with wilderness designation. No specific resource conflicts were identified by the commentor. Studies of the Orderville Canyon WSA have not identified any significant resource conflicts with wilderness designation; therefore, no partial wilderness alternatives were considered.

Transfer of several WSAs, including the Orderville Canyon WSA, to NPS administration in adjacent NPS units has been proposed (H.R. 1214, 1984). Such a transfer could occur in the future regardless of wilderness status.

Because of the possibility of transfer of management from the BLM to the NPS, the EIS could include analysis of both BLM and NPS management with and without wilderness consideration of the WSA. However, because BLM could continue to manage the WSA without wilderness des-

ignation or could manage the WSA as wilderness in conjunction with a contiguous NPS-administered wilderness and because the outcome of the NPS wilderness proposals and H.R. 1214 are uncertain actions independent of the BLM wilderness review, alternatives for transfer of jurisdiction from BLM to NPS are not analyzed in this EIS. The EIS addresses the basic question of wilderness designation of BLM-administered lands and the resultant environmental impacts. 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.

It is noted that, in cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the BLM "Wilderness Study Policy" requires the BLM in its Wilderness Study Report to (1) determine whether 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 that administers the contiguous wilderness area.

BLM has determined that the Orderville 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, but this matter will be based primarily on factors affecting both BLM and NPS jurisdictions (i.e., relative amounts of the total wilderness area administered by each agency, principal public ingress and exit points, agency staffing and workland in the region, and similar non-environmental 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 the impacts from wilderness designation.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (1,750 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.

ORDERVILLE CANYON WSA

NO ACTION ALTERNATIVE

Under this alternative, none of the 1,750-acre Orderville Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Zion Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1979c). No State lands lie within or adjacent to the WSA (refer to Map 1).

The following are specific actions that would take place under this alternative:

- All 1,750 acres would remain open to mineral location, leasing, and sale. There is only one mining claim in the WSA at the present time (20 acres). Development work, extraction, and patenting would be allowed on future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). The existing oil and gas lease on 300 acres could be developed under Category 1 (standard stipulations) and Category 3 (closed to surface occupancy).
- The present domestic livestock grazing use of 30 Animal Unit Months (AUMs) would continue as authorized in the BLM Zion MFP and *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a). There are no existing range developments in the WSA. New rangeland developments could be implemented without wilderness considerations, although none are currently planned.
- Developments for wildlife, water resources, etc. would be allowed without concern for wilderness values if in conformance with the current BLM land use plan. No developments are currently planned.
- Approximately 50 percent of the WSA, located primarily above the canyon rim, would continue to remain open to off-road vehicle (ORV) use. The remaining area, within the canyon itself, would remain closed to ORV use.
- The entire 1,750-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (1,750 acres).

- Measures to control fire, insects, noxious weeds or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

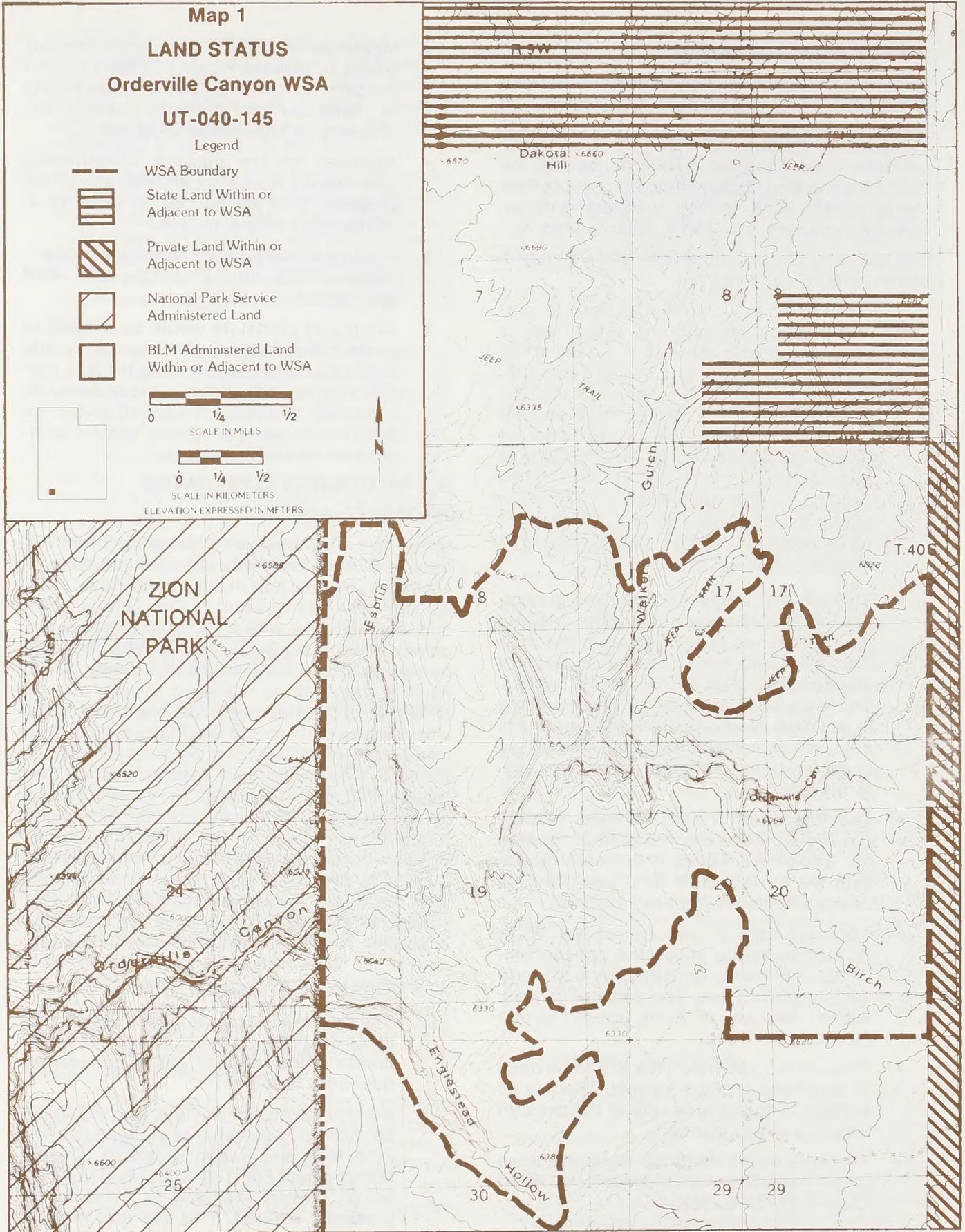
ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 1,750 acres of the Orderville Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). This WSA lies adjacent to Zion National Park and is contiguous with a NPS 120,620-acre proposed wilderness. Because this WSA lacks the necessary size to constitute a wilderness area by itself, it can only be managed in part with the NPS-proposed wilderness. As a result, the Orderville Canyon WSA could be retained by BLM or transferred, along with nine other small WSAs, to the NPS who would then assume management responsibilities (refer to Map 3). For the purposes of this analysis, it is assumed that BLM would retain management of the Orderville Canyon WSA and would manage it in part with the contiguous NPS-proposed wilderness, in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. No State lands are located in or adjacent to the WSA (refer to Map 1). No private or split estate lands are located in the WSA.

The existing oil and gas lease involving 300 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown.

- Present domestic livestock grazing would be allowed to continue as authorized in the Zion MFP and *Kanab-Escalante Grazing Management EIS*. The 30 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 could continue in

ORDERVILLE CANYON WSA

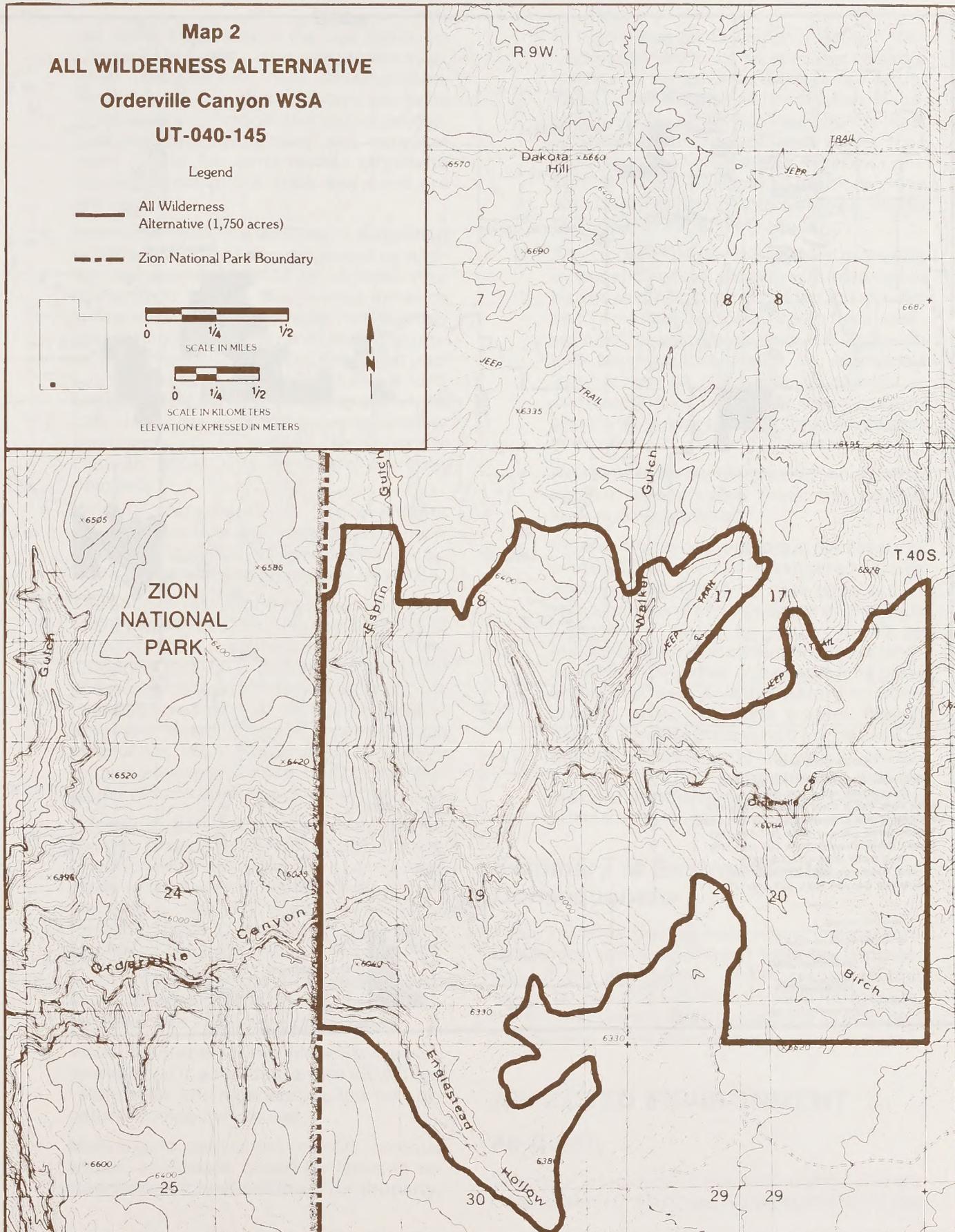


ORDERVILLE CANYON WSA

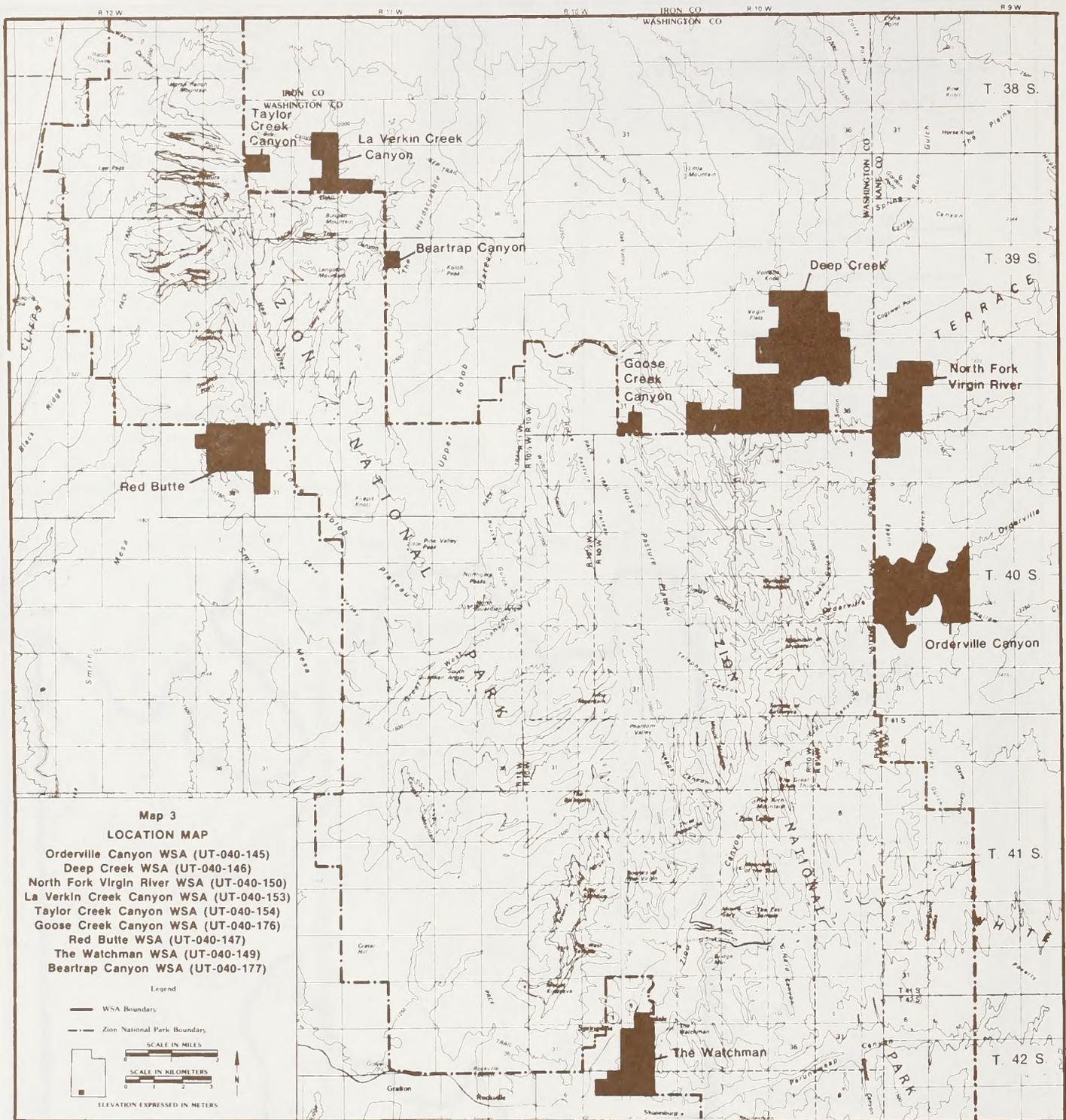
Map 2 ALL WILDERNESS ALTERNATIVE Orderville Canyon WSA UT-040-145

Legend

- All Wilderness Alternative (1,750 acres)
- - - Zion National Park Boundary



ORDERVILLE CANYON WSA



ORDERVILLE CANYON WSA

the same manner as in the past based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management. There are currently no rangeland developments in the WSA and none are planned.

- 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 eminent 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). No water resource facilities or treatments are located in the Orderville Canyon WSA, and none are currently planned.
- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 1,750-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. About 1 mile of the WSA boundary intermittently follows an unpaved road or jeep trail that 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 1,750-acre wilderness.
- Visual resources in the wilderness would be managed in accordance with 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 instances that threaten human life, property,

or high-value resources on adjacent non-wilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must 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 on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

This WSA is located in a Prevention of Significant Deterioration (PSD) Class II area as defined in the

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
ORDERVILLE CANYON WSA

Resource	Alternatives	
	No Action	All Wilderness (1,750 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 500 tons of uranium oxide.	Oil and gas would not likely be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 10 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 30 AUMs and maintenance of existing developments (currently there are none) would continue. New developments could be constructed; however, none are now proposed.	Grazing of 30 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 180 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	ORV use would continue at current low levels (there are no existing ways). Overall recreational use could increase from the present 1,000 visitor days per year to 1,490 over the next 20 years. Up to 180 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 180 acres (10 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 20 acres (1 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, and the current BLM Zion MFP. It would not complement the NPS proposals for nearby wilderness and transfer of the WSA to the adjacent NPS unit.	This alternative would not be consistent with Kane County's concept of multiple use. It would be consistent with State policy if lands were exchanged. It would complement the NPS proposals for wilderness and transfer of the WSA to the adjacent NPS unit. Designation would constitute amendment of the BLM Zion MFP.
Socio-economics	Annual local sales of less than \$4,800 and Federal revenues of up to \$942 would continue. An additional \$4,350 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$4,800 and Federal revenues of up to \$42 would continue, but potential Federal revenues of up to \$5,250 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

ORDERVILLE CANYON WSA

Clean Air Act, as amended. Air quality is excellent. The adjacent Zion National Park is designated as PSD Class I. Visual ranges in excess of 100 miles occur 75 percent of the time, and ranges in excess of 155 miles occur 10 percent of the time.

Geology

The Orderville Canyon WSA lies within the southern portion of the Grand Staircase section of the Colorado Plateau Physiographic Province.

Elevations range from approximately 5,100 feet above sea level in the canyon bottom at the west boundary to a little less than 6,600 feet above sea level on the canyon rims. Drainage is east to west through Orderville Canyon.

Rocks of Jurassic Age, with a total depth of 1,500 feet, are exposed in the WSA. Cross-bedded eolian sandstone of the Navajo Formation forms the canyon walls, and marine sediments of the Carmel Formation cap the canyon rims.

Minor outcrops of undivided Jurassic sediments are exposed in the southeast corner of the WSA. Underlying Mesozoic and Paleozoic rocks may be as much as 11,000 feet thick in the vicinity (Hintze, 1973).

Soils

Erosion classes are slight, 200 acres (11 percent); and moderate, 1,550 acres (89 percent). Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

The bulk of the soils in this WSA (approximately 90 percent) are of the Typic Argiborolls/Lithic Argiborolls/Typic Haploborolls soil association. These are shallow to deep, gravelly, gravelly sand, cobbly, and silty clay loam soils on steep to very steep slopes.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	1,550	89	2,015
Slight	0.6	200	11	120
Stable	0.3	0	0	0
Total		1,750	100	2,135

Sources: USDI, BLM, 1979b; Leifeste, 1978.

Another 9 percent of the WSA is rockland, with sandstone bedrock exposed from 50 to 70 percent of the area, the existing soil being very shallow to shallow on nearly level to steep slopes.

The remaining 1 percent of the WSA is in the Aridic Argiustolls/Typic Argiustolls soil association. These are moderately deep to deep, fine sandy loam soils on nearly level to steep slopes.

Vegetation

The existing vegetation consists primarily of the pinyon-juniper woodland vegetative association. This type covers about 78 percent (1,365 acres) of the WSA. This vegetative association has an overstory of pinyon, juniper, and some ponderosa pine in suitable habitat. The sparse understory consists of shrubs, including mountain mahogany, serviceberry, Gambel's oak, cliffrose, and silver buffaloberry.

The remaining 22 percent (385 acres) of the WSA is covered by a mountain shrub association, with dominant species being oak, big sagebrush, serviceberry, pinyon, juniper, and manzanita, along with some bitterbrush, rabbitbrush, and bunchgrasses.

Riparian vegetation does not occupy a significant portion of this WSA.

No threatened, endangered, or other sensitive plant species are found in the WSA.

The Orderville Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

This WSA is located in the Virgin River subbasin of the Colorado River Basin hydrologic region. There are no existing water rights, and the area is presently closed to further applications, although the Utah State Water Engineer has stated some applications could be considered depending on water use and location. There are no withdrawals present in the WSA.

The Orderville Canyon WSA comprises a portion of the East Virgin River watershed. It drains, via Orderville Canyon, into the North Fork of the Vir-

ORDERVILLE CANYON WSA

gin River in Zion National Park. The WSA is drained by an intermittent stream. No springs or water developments are known to exist within the WSA boundaries.

Water quality is poor; it is present on an intermittent basis (during storms) along the 2 miles of drainage within the WSA.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 1 was assigned to the Orderville Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance of the WSA will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of silver that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983). However, the potential for this resource is low.

The energy and mineral resource rating summary is given in Table 3.

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic ft. of gas
Uranium	f2	c2	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f1	c4	None
Hydroelectric	f2	c4	.05 to 15 megawatts
Gold	f2	c1	Little to none
Silver	f2	c1	Little to none

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

There are no known deposits of leasable or locatable minerals in the WSA. There are no current exploration, drilling, or mining activities for minerals occurring in the WSA.

LEASABLE MINERALS

Oil and Gas

According to SAI (1982) this WSA has a low certainty (c1) for the occurrence of small (less than 10 million barrels of oil) oil and gas fields (f2). There are no known structures within or near the WSA that might represent potential exploration targets and, accordingly the probability for exploration and development occurring in the WSA is low. If a field of this size did exist it would have an estimated area extent of about 2,500 acres. In Utah fields of this size typically require about 160 acres for development facilities such as roads, pads, and disposal ponds. There is no evidence indicating the existence of commercially recoverable oil and gas resources within the WSA.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wil-

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derness values. Post-FLPMA leases generally require restrictive access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Presently one post-FLPMA lease covering 300 acres is found within the WSA. Under the current land use plan all of the 1,750 acres within the WSA are open to oil and gas leasing although all but 200 acres are closed to surface occupancy.

Coal

No coal resources are known to occur within the WSA (Doelling and Graham, 1972). The WSA lies 2 miles west of the Kolob coal field. Coal-bearing rocks in the Kolob Field, as well as all other fields in southern Utah, are of Cretaceous Age and no other coal-bearing rocks with commercial potential are known from this region (Doelling and Graham, 1972). All bedrock of sedimentary origin within the WSA is pre-Cretaceous. Because these rocks are not known to be coal-bearing anywhere in the region, SAI (1982) considers the WSA to have no potential for the occurrence of economic deposits of coal.

Geothermal

No geothermal resources are known to occur within or near the WSA. According to SAI (1982) the geothermal favorability of the WSA is low with a potential only for low-temperature geothermal resources. No hot springs are known to occur within or near the vicinity of the WSA. The nearest thermal springs to the WSA are approximately 40 miles to the southwest, and they discharge at temperatures between 20 degrees Centigrade (C) and 42 degrees C (National Oceanic Atmospheric Administration, 1979).

LOCATABLE MINERALS

Uranium

No uranium deposits are known to occur within the WSA. The Triassic Chinle Formation and the Jurassic Moenave Formation are the only rock units within the WSA considered favorable for uranium in south-central Utah (U.S. DOE, 1979).

According to SAI (1982) only the Moenave Formation in the region is considered favorable for the occurrence of economic deposits of uranium. SAI (1982) speculates that the Moenave Formation within the WSA may contain less than 500 tons of uranium oxide. This amount is not considered to be of economic significance.

The Silver Reef district, approximately 30 miles to the southwest, is the closest uranium-producing area to the WSA. This district is known primarily for its past silver production although minor amounts of uranium were obtained from the Springdale Sandstone Member of the Moenave Formation. The Springdale Sandstone Member is estimated to lie at a depth of at least 3,000 feet below the surface of the WSA (Hintze, 1973). Other favorable rock units in the vicinity are included in the Chinle Formation (Shinarump Conglomerate Member), but these rocks lie at a depth of about 4,000 feet below the WSA (Hintze, 1973) and it is doubtful if such deposits could be extracted economically (SAI, 1982).

SAI (1982) reports that two inactive uranium mines are located just outside the WSA. The rock units from which the uranium was mined are not known. Only one mining claim is presently located within the WSA and it is assumed to be located for uranium.

SALABLE MINERALS

Minor deposits of stream gravel and other loose rock material that could be used for construction occur within the WSA. These deposits are not unique or economically significant due to the presence of ample similar materials nearby outside the WSA.

Wildlife

No crucial or critical habitat is located in the WSA. Because this WSA occurs in the transition of three vegetative ecoregions, it supports a variety of animal species. The Zion Unit Resource Analysis indicates approximately 300 vertebrate animal species could inhabit this WSA. These include 60 species of mammals, 208 species of birds, 20 species of reptiles, six species of amphibians, and three species of fish.

Raptors may include golden eagle (BLM sensitive species), bald eagle, peregrine falcon, prairie falcon, American kestrel, red-tailed hawk, and Cooper's hawk. The red-tailed and Cooper's hawks are the most common. The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), are included on the Federal endangered species list. Bald eagles winter in the

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Virgin River drainage south of the WSA and also in Kanarraville and New Harmony Valleys west of the WSA. Occasional sightings of these birds have been made with most reports occurring in the Deep Creek-Goose Creek area. Nesting or roosting sites are not known to occur.

An active peregrine falcon nest occurs in Zion National Park south of the WSA. Peregrine falcons have been reported in the Deep Creek-Goose Creek area and in Taylor Creek Canyon, but nesting is not confirmed. All of the WSA has an adequate prey base and excellent nesting habitat for the peregrine falcon. No other threatened or endangered species are found in the WSA.

Big game animals include mule deer and mountain lion. The WSA is within the boundaries of Deer Herd Unit 58 and provides summer range. Deer hunting pressure is light because access is blocked by private and NPS-administered land.

No management facilities or treatments for wildlife have been proposed for the WSA.

Mountain lion activity in the vicinity is heavy compared to other areas in Utah. In past years the Federal government has controlled cougars in the area to keep livestock predation under control. During the 1976 hunting season 11 cougars were taken from this herd unit, the largest number for any herd unit in the State.

Game species present in the WSA include: (1) mule deer, low population; (2) mountain lion, same habitat as principal prey species, mule deer; (3) cottontail rabbit, moderate population level; and (4) mourning dove, moderate population nesting along riparian areas.

The Zion snail (*Physa zionis*) is endemic to the hanging gardens of Zion and Orderville Canyons.

Forest Resources

About 78 percent (1,365 acres) of the WSA is composed of the pinyon-juniper woodland vegetation association. It is characterized by a dominant tree overstory of pinyon pine, Utah juniper, scattered Gambel's oak, and some ponderosa pine in suitable habitats. The remainder of the WSA is of a mountain shrub association, with scattered pinyon and juniper.

No commercial forest resources exist in the WSA. Difficulty of access, rugged terrain, and the availability of equal and superior areas nearby have precluded use of the existing resources.

Livestock and Wild Horses/Burros

The Orderville Canyon WSA covers parts of two allotments (Zion Park and Orderville Gulch). Neither allotment has any proposed or existing improvements. The Zion Park Allotment has 450 acres within the WSA but this acreage is not suitable for livestock grazing. The Orderville Gulch Allotment has 1,300 acres included in the WSA with 30 AUMs available for grazing. Two permittees run cattle on these allotments. Table 4 shows the status of livestock grazing in the WSA.

There are no wild horses or burros within the WSA.

Visual Resources

The WSA has 1,400 acres (80 percent) of Class A and 350 acres (20 percent) of Class B scenery.

Under the BLM's VRM system, the entire Orderville Canyon WSA is rated Class II. This means that changes in any of the four basic elements (form, line, color, and texture) should not be evi-

TABLE 4
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	Suitable ¹ Acres in WSA	Unsuitable ¹ Acres in WSA	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Zion Park	1,298	450	0	450	0	1
Orderville Gulch	4,857	1,300	322	978	30	1

Source: USDI, BLM, 1979b.

¹The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

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dent. The scenery quality rating for the lower Orderville Gulch portion of the WSA is Class A. This designation means that it contains outstanding or dominating features. The topography here is steep and rugged with cliffs and deep canyon drainages. Color variations are extreme, with vegetative cover composed of scattered ponderosa pine and pinyon-juniper with cottonwoods and mountain brush in the bottoms. (Refer to Appendix 7 for an explanation of BLM's VRM system.)

Cultural Resources

No sampling inventory for archaeological and other cultural resources has been conducted in the Orderville Canyon WSA. Until the necessary extensive inventory work is done, the actual resources will remain unknown.

Recreation

Recreation use of the Orderville Canyon WSA is limited both by the rugged terrain and the necessity of obtaining access across private land. There are no developed recreation facilities within the WSA.

Two of the three BLM ORV categories are found in the WSA. Category A (lands open to ORV use) is found in the tributary canyons and lands above the rim, and Category B (lands limited to existing roads and trails) includes the Orderville Canyon area. Each category includes approximately 875 acres or 50 percent of the total acreage in the WSA. The bulk of the Orderville Canyon WSA is not accessible to ORVs due to the rugged terrain.

Hunting is generally poor throughout the WSA. Big game, primarily mule deer, are low in numbers. Upland game species (blue grouse, turkey, band-tailed pigeon, and mourning dove) may be found in the WSA, particularly along riparian areas. The major drawbacks of hunting in the WSA are lack of public access and equal or superior opportunities elsewhere in the region.

The primary sightseeing opportunity in the WSA is geologic in nature. The Orderville Canyon itself is an erosional feature, varying from 300 to 800 feet deep.

Presently the major use of the WSA is as an access point into the Zion Canyon system in the adjoining Zion National Park. The NPS at Zion National Park issued permits for 455 people to enter the Park through Orderville Canyon in 1981. It is believed that many more enter Zion Park via Orderville Canyon without bothering to obtain

permits. There are probably between 500 to 1,000 visitor days/year. Ninety percent of this use is attributed to primitive activities and the remaining 10 percent to other recreational activities such as hunting and sightseeing.

Wilderness Values

SIZE

The Orderville Canyon WSA is approximately 2 miles wide (east to west), 1.50 miles long (north to south), and encompasses 1,750 acres. The WSA is not a viable independent candidate for wilderness designation if Congress does not designate the contiguous NPS-proposed wilderness area in Zion National Park. If managed in part with the contiguous NPS unit, the WSA would be a viable wilderness area.

NATURALNESS

The WSA is in a natural condition. There are no known intrusions.

SOLITUDE

The opportunity to experience solitude is available in the deeply entrenched Orderville Canyon system. Some canyons are very narrow and moderately vegetated with oak brush, ponderosa pine and pinyon-juniper. The bench areas (33 percent of the WSA or 583 acres) would offer an opportunity for solitude. The WSA by itself is not considered to have outstanding opportunities for solitude.

PRIMITIVE AND UNCONFINED RECREATION

The WSA offers opportunities for unconfined recreation activities such as backpacking, rock climbing, and sightseeing. The terrain in the canyon system is very steep with boulders and dead fall timber. The canyon presently provides access to the Virgin River Canyon system in Zion National Park. The WSA by itself is not considered to have outstanding opportunities for primitive and unconfined recreation.

SPECIAL FEATURES

The most important special feature of Orderville Canyon is its scenery, which is similar to that in Zion National Park. The cliffs, deeply entrenched canyons, presence of water, and vegetation account for the spectacular views. Also, the Zion snail (*Physa zionis*) is endemic to portions of the Orderville Canyon and lends zoological and scientific interest.

ORDERVILLE CANYON WSA

Land Use Plans and Controls

The U.S. Government has surface and subsurface ownership of all 1,750 acres of public land within the WSA. There are no private or State in-holdings or valid existing rights, except for a post-FLPMA oil and gas lease associated with this WSA. A 120,620-acre proposed wilderness area in Zion National Park is contiguous to the WSA on the western border. In the past the NPS has expressed interest in some of the drainages that flow through the Park but which originate outside Park boundaries. Although the headwaters of Orderville Canyon are located outside the WSA boundary, the NPS believes that the portion of the drainage within the WSA is important to the well-being of the park as a whole. The Statement of Management for Zion National Park is "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the Park's ecological communities" (USDI, NPS, 1976). In this light, the NPS has shown interest in nondevelopment of adjacent lands in order to not impair the Park's watershed.

The House Subcommittee on Public Lands and National Parks conducted a hearing on H.R. 1214 (1984), a bill designed to transfer jurisdiction of certain lands, including Orderville Canyon WSA, from the BLM to the NPS. In response to the hearing, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit (USDI, NPS, 1984). The NPS recommended transfer of 2,080 acres, including the Orderville Canyon WSA, to Zion National Park. The rationale for adding 330 acres is to include most of the hollows and gulches that form the Orderville Canyon system. In a February 6, 1985 letter from the Secretary of the Interior to the Honorable John F. Seiberling, Chairman, Subcommittee on Public Lands and National Parks, Committee on Interior and Insular Affairs, the Orderville Canyon WSA was recommended as suitable for inclusion into the adjacent unit of the National park System. No Congressional action has been taken on that recommendation.

There are no existing or proposed rights-of-way within this WSA.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states: "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the

limited visitor utilization possibilities and rejection of the multiple use concept."

The WSA is managed under the BLM Zion MFP which allows multiple use as discussed in the Description of the No Action Alternative.

Socioeconomics

Kane and Washington Counties are the zone of influence for the Orderville Canyon WSA.

DEMOGRAPHICS

Kane County is rural with a total of 4,024 residents and an average population density of approximately one person per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Washington County is also basically a rural county except for the population centers near the City of St. George. The total population of Washington County is 26,065 for an average population density of 10.8 persons per square mile.

EMPLOYMENT

The economies of both Kane and Washington Counties are dominated, in terms of employment, by three sectors: retail trade, services, and government. In Kane County both retail trade and government account for 17 percent of the total employment, and the services sector provides 14 percent. In Washington County the retail trade sector provides 21 percent, government 19 percent, and services 11 percent of the total employment. Personal income falls in proportion similar to employment. Employment and income figures for the two counties are presented in Table 5.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production and recreation. Table 6 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has one mining claim. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy. 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.

One livestock operator has a total grazing privilege of 30 AUMs within the WSA. If all this forage were utilized, it would account for \$600 of livestock sales and \$150 of ranchers' returns to labor

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TABLE 5
1980 County Employment and Personal Income
Kane and Washington Counties, Utah

Industrial Sector	Kane County		Washington County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	1,452	12,595	7,866	83,449
Proprietors	382	2,623	1,469	14,010
Farm				
Proprietors	122	136	343	2,386
Nonfarm				
Proprietors	260	2,487	1,126	11,624
By Industry Source				
Farm	27	382	98	3,031
Nonfarm	1,043	12,213	6,299	80,418
Private	798	9,614	4,805	63,399
Ag. Serv., For., Fish and Other (L)	0	29	724	
Mining	17	196	70	1,347
Construction	51	1,544	537	9,425
Manufacturing	70	566	698	9,759
Nondurable Goods	(D)	(D)	441	5,986
Durable Goods	(D)	(D)	257	3,773
Transportation and Public Utilities	150	1,875	236	4,996
Wholesale Trade	12	230	263	2,963
Retail Trade	252	2,364	1,673	14,741
Finance, Insurance and Real Estate Services	39	392	424	5,201
Government and Government Enterprises	245	2,599	1,494	17,019
Federal, Civilian	18	252	193	2,725
Federal, Military	30	78	161	425
State and Local	197	2,269	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

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 from 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 Orderville Canyon WSA is estimated as about 1,000 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Kane and Washington Counties.

Mineral leases in the WSA cover approximately 300 acres. At \$3 per acre, lease rental fees generate up to \$900 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 permittee in the WSA can use up to 30 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$42 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

TABLE 6
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$900
Mineral Production	0	0
Mining Claim Assessment	Less than 100	0
Livestock Grazing	\$600	\$42
Woodland Products	0	0
Recreational Use	Less than \$4,100	0
Total	Less than \$4,800	Up to \$942

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. It does not account for the total income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet

requirements for all applicable Federal, State, and local permits.

3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.

4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be partially open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in 180 acres of disturbance due to uranium and oil and gas exploration and development. (Appendix 10 lists surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If uranium is

developed air quality could be reduced. The proximity of the WSA to Zion National Park may result in restriction of development to meet PSD Class I limitations. Disturbance of 180 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with locatable mineral and oil and gas exploration and development activities would probably not exceed 180 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 180 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 180 acres would increase from 234 cubic yards/year to 486 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 252 cubic yards (12 percent) over current annual soil loss. This relatively large increase is attributable to the small size of the WSA. Overall the effects of the 252-cubic-yard annual increase in soil loss would not be significant within the vicinity of the WSA nor in the drainage of Orderville Canyon.

VEGETATION

The anticipated maximum of 180 acres disturbed would impact the WSA's vegetation resource. However, the impact of such disturbance would not have a significant impact on the region as a whole.

WATER RESOURCES

Since precipitation is low and all streams are ephemeral within the WSA, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 252 cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Zion Planning Unit.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced drill holes and would not significantly impact ground water.

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MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of oil in-place (3 million estimated recoverable) and up to 60 billion cubic feet of natural gas (18 billion estimated recoverable) exists within the WSA and surrounding area. These oil and gas resources could be explored and developed, subject to Category 1 and 3 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by disturbance of an estimated 180 acres (10 percent of the WSA) through mineral development and exploration. Deer and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Mountain lion are sensitive to human intrusion. Mineral exploration and development activities would probably force mountain lion out of this area, which is used more heavily by mountain lion than other areas in the state. Nonmobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels.

No effects on golden eagle, bald eagle or peregrine falcon are expected because there no critical habitats or use areas in the WSA. Excellent potential nesting habitat for peregrine falcon occurs within the WSA and could be disturbed. Prior to surface disturbance the BLM would consult with the Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act (refer to Appendix 4) and would implement mitigation measures to protect threatened, endangered, or sensitive species.

FOREST RESOURCES

Since there are few trees other than scattered ponderosa, pinyon, and juniper, none of which are utilized (except by occasional campers or hikers) and since minimal surface-disturbing activities are anticipated, no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Zion Planning Unit MFP. The 30 AUMs currently allocated in the WSA are controlled by one livestock permittee. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected. There are no planned livestock improvements.

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 180 acres of surface disturbance from mineral exploration and development would be degraded. Therefore, VRM Class II management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area for energy and mineral exploration and development (worst-case analysis), visual quality in the WSA could be significantly reduced. The probability of extensive energy and mineral exploration and development is low.

CULTURAL RESOURCES

Disturbance of 180 acres by mineral exploration and development under this alternative could affect cultural resources. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism would continue to be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 180 acres could be disturbed by mineral

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and energy activities. Primitive recreational opportunities could be diminished on the affected areas. Overflow from Zion National Park could further increase use.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 1,000 current visitor days per year to 1,490 visitor days at the end of 20 years. Overflow from Zion National Park could further increase use. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 900 visitor days per year to about 1,341 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing etc.) would increase from 100 visitor days per year to 149 visitor days.

If roads, vehicular ways, and drill pads are located throughout the WSA (worst-case analysis), primitive recreational opportunities could be lost in the area altogether. However, roads and ways created for mineral exploration and development would improve access into the area for nonprimitive recreation.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Zion Planning Unit MFP. Potential mineral and energy exploration and development could disturb an estimated 180 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. However, the impacts to these values probably would not be significant due to the low probability of surface disturbance and reclamation practices.

The 180 acres of mineral-related disturbance could result in a significant loss of naturalness and solitude throughout the WSA as a whole if roads, vehicular ways, and drill pads are located throughout the area.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use; however, it would not complement

the NPS proposal of wilderness designation for the adjacent area.

The No Action Alternative would be inconsistent with the NPS objective of protecting natural water sources because up to 180 acres of surface disturbance with minor increases in soil loss and sediment yield could occur. The surface-disturbing activities potentially associated with this alternative would not be consistent with the "scenic, scientific, cultural, and recreational values that importantly supplement or complement those within the current park boundary" (USDI, NPS, 1984); therefore, this alternative would not be consistent with the NPS finding that the WSA is suitable for inclusion into Zion National Park.

This alternative is based on implementation of the current BLM Zion MFP and is, therefore, in conformance with it. This alternative would be consistent with the State of Utah policy to maximize economic returns.

SOCIOECONOMICS

Under this alternative, no changes are expected in existing patterns and trends of population, employment, and local income distributions. Economic development of resources in the WSA would not be affected.

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. A portion of the \$100 per year assessment fee required for each mining claim would reach the local economy. If the uranium, oil, and gas in the WSA were developed it would lead to an increase in employment and income for Kane and Washington Counties. However, 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).

There would be no livestock-related economic losses because the existing grazing use (30 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$600 annually in livestock sales and \$150 of ranchers' return to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent

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per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase 490 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 1,450 acres in the WSA open to lease that are currently not leased. If leased they would bring up to \$4,350 additional Federal lease fee revenues per year in addition to new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy.

Collection of livestock grazing fees (\$42 per year) would continue. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (1,750 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 1,750-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claim would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that the existing oil and gas lease would expire before production of commercial quantities. The oil and gas lease would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas for this alternative would be smaller than under the No Action Alternative (20 vs. 180 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, water, wildlife, forest, and livestock under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 20 acres would increase from 26 cubic yards/year to 54 cubic yards/year from the present situation. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 28 cubic yards, which is 224 cubic yards less than the No Action Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 300 acres are under oil and gas lease. However, no exploration or development of oil and gas is presently occurring within the WSA. This existing post-FLPMA lease could be developed subject to the stipulations issued at the time of leasing. It is unlikely that this lease will be developed or a show of commercial quantities made prior to its expiration date. After expiration it will not be re-issued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas (3 million barrels of oil and 18 billion cubic feet of natural gas potentially recoverable) could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of potential oil and gas recovery.

Locatable Minerals

Approximately 20 acres are under a mining claim within the WSA, principally for uranium. Up to 500 tons of uranium oxide that is recoverable could occur within the WSA. If the claim is valid development work, extraction, and patenting would be allowed to continue after wilderness designation under unnecessary or undue degradation guidelines. If the potentially recoverable minerals are not within the mining claim filed before designation, the potential for recovery of the uranium oxide would be foregone.

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It is estimated that up to 20 acres could be disturbed due to exploration of locatable mineral resources, primarily uranium, should this alternative be adopted. Because, production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development would occur even without wilderness designation. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude and the possibility that fewer acres would be disturbed. This would protect nesting habitat for peregrine falcon and a heavily used mountain lion habitat from mineral-related disturbance in the future.

The disturbance of only 20 acres due to exploration of locatable mineral resources would disrupt some wildlife populations but probably would not result in these species leaving the WSA.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Zion Planning Unit MFP. The 30 AUMs currently allocated in the WSA are controlled by one livestock permittee. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, some roads or other livestock management facilities that could be proposed and developed in the future could be restricted to preserve wilderness values.

VISUAL RESOURCES

A slight benefit would occur to the visual resources of the WSA because the VRM class would change from Class II to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities. About 20 acres of surface disturbance could result from development of valid mining claims. Although mitigative measures would be applied to minimize visual contrast created by mineral-related surface disturbance, visual quality would be

degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. Because only 20 acres would be disturbed and the potential for development of any mining claim is low, visual quality would probably not be reduced in the WSA as a whole.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

The WSA has opportunities for unconfined activities such as backpacking, rock climbing, and sightseeing. If designated, those recreational opportunities not considered outstanding in the WSA by itself would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 100 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated. 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 vicinity of the WSA. As recreation use increased, commercial operations based on primitive recreational activities could apply for use of the WSA.

Considering this WSA's proximity to Zion National Park, use could be expected to be higher than the 2-percent per year projection.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values. If roads for development of valid mining claims could not be denied, the quality of primitive recreational opportunities would be reduced.

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Because the potential for mineral production is low and wilderness designation would reduce the potential for surface disturbance, the quality of the primitive recreational experience would likely be preserved throughout the area.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values. Recreation opportunities in Zion National Park would also be protected and enhanced by complementary management in this WSA.

WILDERNESS VALUES

Designation and management of all 1,750 acres as wilderness would ensure the preservation of the wilderness values. The WSA by itself is not considered to have outstanding opportunities for either solitude or primitive and unconfined recreation. Designation, however, would complement these values within the adjacent Zion National Park proposed wilderness area. The scenic special feature in this WSA would also be protected and preserved.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous NPS wilderness proposal. The WSA forms part of the upper watershed and would allow for extended recreation hiking trails.

Thus, it is concluded that wilderness designation and management of all 1,750 acres of the Orderville Canyon WSA would protect and preserve the wilderness values of naturalness and special features except in localized areas affected by the surface disturbance related to mineral exploration.

LAND USE PLANS AND CONTROLS

Immediately adjacent to this WSA, in Zion National Park the area has been proposed as wilderness. This alternative would complement the NPS proposal. The Statement of Management for Zion National Park is a management objective "to maintain the quality and flow of water from all natural water sources that have been traditionally important in serving domestic needs and in perpetuating the Park's ecological communities" (USDI, NPS, 1976). In this light NPS has shown interest in nondevelopment of adjacent lands in order to not impair the Park's watershed. Wilderness designation of this area would be consistent with these goals. Wilderness designation would not conflict with the Secretary of the Interior's recommendation to transfer the WSA to the NPS.

The existing BLM Zion MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Zion MFP.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the County's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would be phased out.

SOCIOECONOMICS

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 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low. Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$600 of livestock sales and \$150 of ranchers' return to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use. Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

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The loss of 300 acres now leased for oil and gas would cause an eventual loss of up to \$900 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$4,350 annually

in Federal revenues from the 1,450 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

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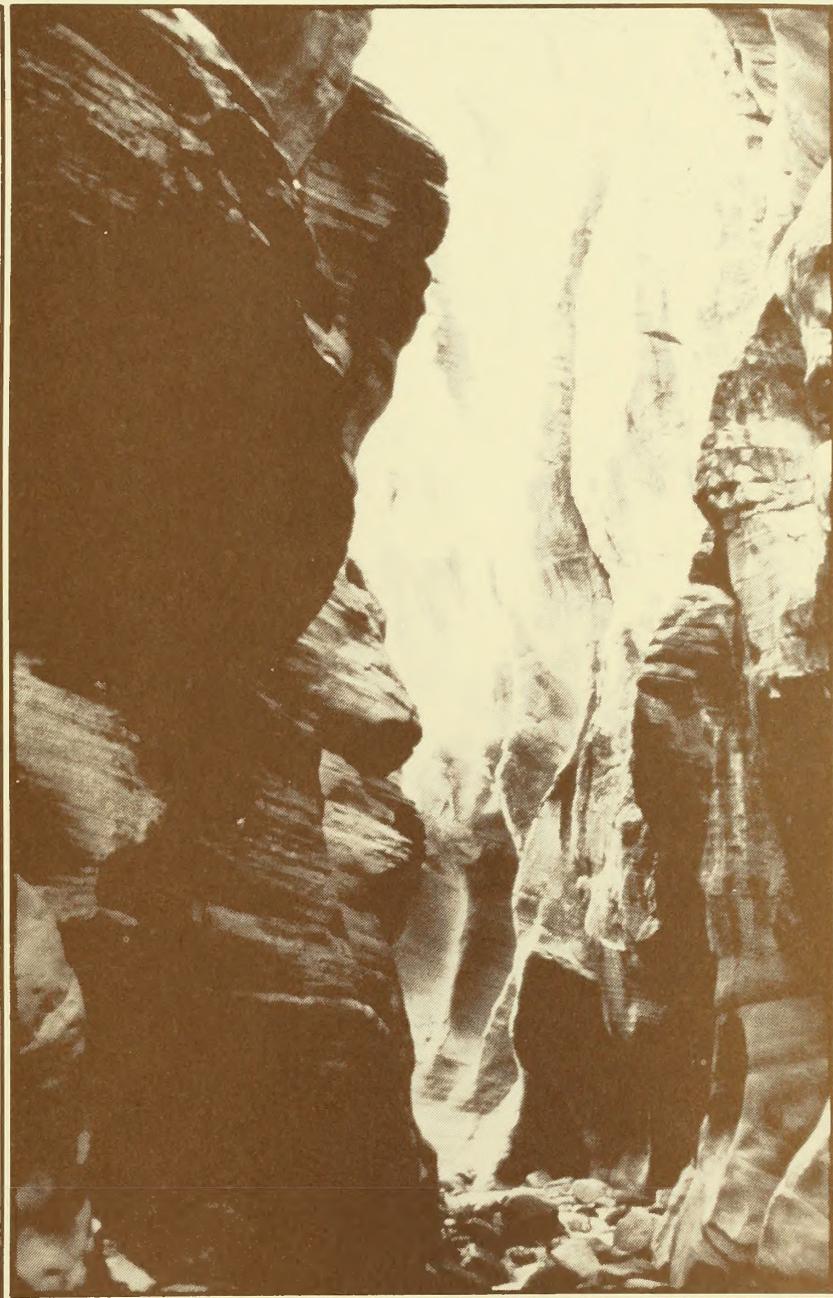
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Parunuweap
Canyon WSA



PARUNUWEAP CANYON WSA

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PARUNUWEAP CANYON WSA

(UT-040-230)

INTRODUCTION

General Description of the Area

The Parunuweap Canyon Wilderness Study Area (WSA) includes that portion of the East Fork of the Virgin River between Mt. Carmel Junction and Zion National Park. The northern boundary is adjacent to private lands south of Utah State Highway 15 above the White Cliffs. The south boundary generally follows improved roads in Elephant Cove and on Block Mesa. The WSA is approximately 25 miles northwest of Kanab, Utah, in Kane County. There are approximately 30,800 acres of public land and 1,280 acres of State land located within the WSA boundary. The WSA is managed by the Kanab Resource Area of the Cedar City District of BLM.

The topography of the WSA is dominated by the East Fork of the Virgin River and its side drainages which flow from east to west through the WSA. The dominant vegetation is pinyon-juniper.

Average annual precipitation in the Parunuweap Canyon WSA is approximately 12 to 14 inches. Highest monthly precipitation occurs from July through December, during which time two-thirds of the yearly total falls. Intensive thunderstorms are common during the summer months. Temperatures vary greatly with aspect and altitude. July and January are the warmest and coldest months, respectively. July temperatures range from 50 to 100 degrees Fahrenheit (F), while the January range is 0 to 50 degrees F. (The weather data used are from the U.S. Weather Bureau recording station in Kanab, Utah.)

Specific Issues Identified in Scoping

The major issues identified during the study phase for the Parunuweap Canyon WSA are the recreation access into Zion National Park, National Park Service (NPS) plans, and the quality of mandatory wilderness values. Other minor issues include the potential for wildlife improvement land treatments, the Foote Ranch Road, and the possibility of changing the air quality standards. General issues pertaining to the WSA are discussed in Volume I. Issues and concerns specific to Parunuweap Canyon WSA raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* The occurrence of the sensitive plant species *Erigeron sionis* in or near

this WSA should be a factor in the decision-making process.

Response: BLM has no information to indicate that *Erigeron sionis* is in the WSA. If it is found in the WSA, it will be considered in the decisionmaking process.

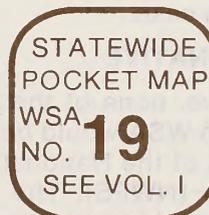
2. *Comment:* Potential water development for livestock grazing is a concern that should be analyzed in the Environmental Impact Statement (EIS).

Response: In its planning process the BLM identified 3.75 miles of pipeline, nine troughs, one water catchment, one reservoir, and one spring development to be built in the WSA. If the WSA is designated wilderness, these projects may or may not be built. This would be determined on an individual basis, based on whether or not the projects would impair wilderness values.

3. *Comment:* The Site-Specific Analysis (SSA) gives little reason for excluding portions of the north and southeast portions of the WSA. A larger partial alternative, including all of the WSA except a part of the cove where the four-wheel drive roads are located, should be analyzed in the EIS.

Response: An additional Partial Wilderness Alternative (14,100 acres) is now included in this document. It covers additional areas to the north and southeast.

4. *Comments:* (1) Why delete Parunuweap Canyon WSA when it meets all the criteria? (2) Apparently there were irrational deletions of all or parts of the WSAs and Instant Study Areas (ISAs). After review of SSA summaries in the scoping document, it becomes apparent that many areas have no resource conflicts and excellent wilderness qualities, yet no acres were recommended for wilderness.



Response: During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and, at that time, will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

Plan (MFP) (USDI, BLM, 1981a) and *Kanab-Escalante Grazing Management EIS* (USDI, BLM 1980a). The 1,640 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. No private or split estate lands are located in the WSA.

The following are specific actions that would take place under this alternative:

- All 30,800 acres would remain open to mineral location and sale. Although no mining claims now exist in the WSA, development work, extraction, and patenting would be allowed on any potential future mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809) without concern for wilderness values. The 16 existing oil and gas leases (30,180 acres) could be developed under standard and no surface occupancy stipulations (Category 1 and 3) as applied at the time of leasing. Future leases could be developed under leasing Category 1 (standard stipulations) on 20,186 acres and Category 3 (no surface occupancy) on 7,583 acres. The remaining 3,031 acres in the WSA would be closed to oil and gas leasing (Category 4). In order to meet Category 4 restrictions, existing leases on 2,411 acres would expire and would not be reissued unless a find of oil or gas in commercial quantities is shown prior to expiration.
- The present domestic livestock grazing use in the WSA would continue as authorized in the Vermilion MFP and *Kanab-Escalante Grazing Management EIS* (currently 330 Animal Unit Months [AUMs]). Use of the existing range developments (5.6 miles of fences, one cattleguard, four reservoirs, and one corral) would continue. New rangeland developments could be implemented without wilderness considerations. Proposed developments include one spring development, one catchment, one reservoir, nine troughs, and 3.75 miles of pipeline. There are no existing or proposed vegetation manipulation projects for the benefit of livestock within the WSA.
- Use, maintenance, and development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the MFP. It is proposed in the MFP to chain and seed 1,800 acres of

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

A larger Partial Wilderness Alternative was identified for the WSA during scoping and is analyzed. No other alternatives were identified during scoping.

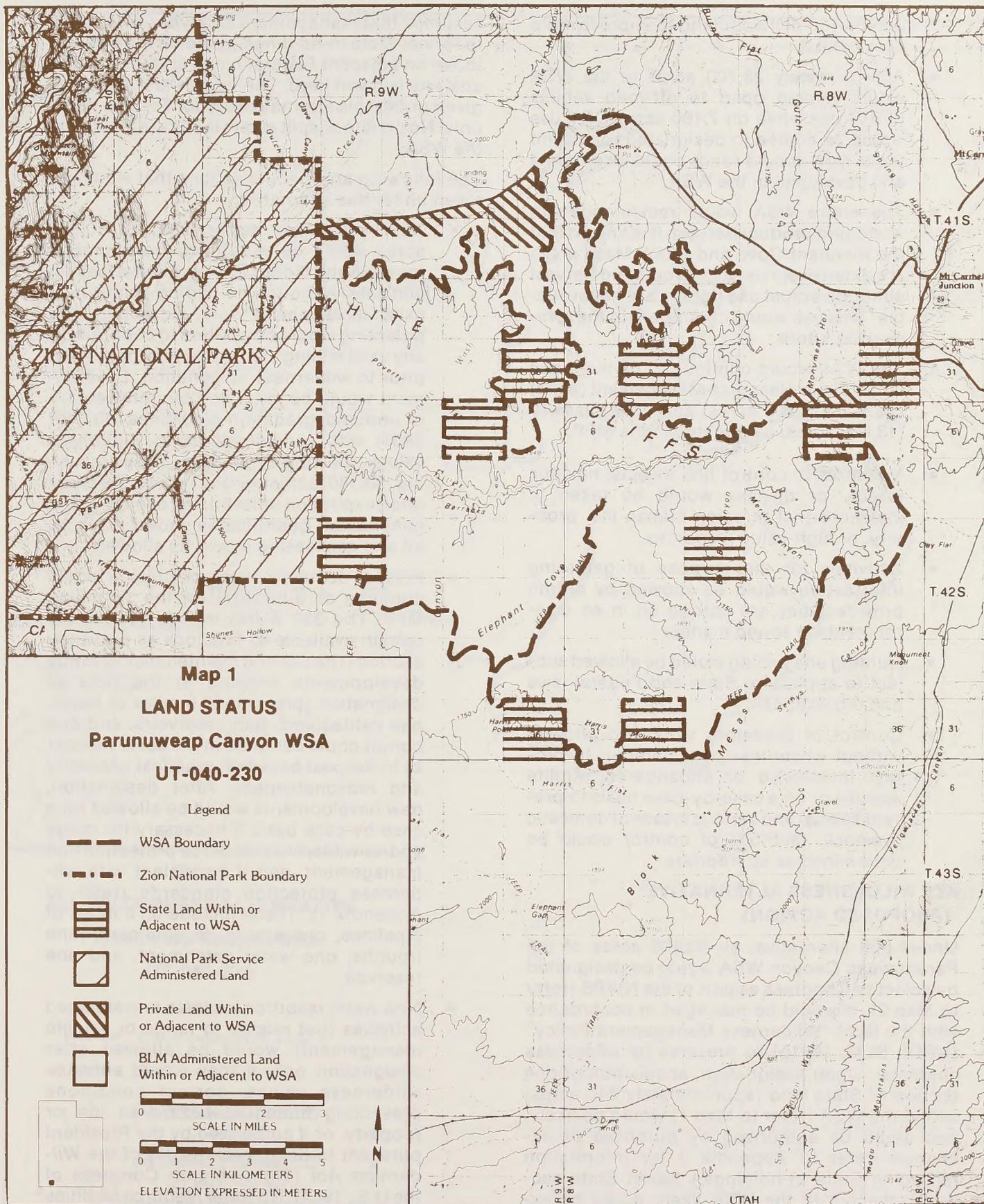
Alternatives Analyzed

Four alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (30,800 acres); (3) Partial Wilderness (14,100 acres); and (4) Partial Wilderness (7,400 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.

NO ACTION ALTERNATIVE

Under this alternative, none of the 30,800-acre Parunuweap Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Vermilion Planning Unit Management Framework

PARUNUWEAP CANYON WSA



pinyon-juniper woodland to improve mule deer habitat.

- Approximately 23,700 acres in the WSA would remain open to off-road vehicle (ORV) use while on 7,100 acres ORV use would be limited to designated roads and trails. New access roads could be planned and developed in the WSA.
- The entire WSA would remain open to woodland product harvest. It is known that the Elephant Cove and Block Mesa areas are extensively used for woodland harvest although actual use figures are not available. This use would continue into the foreseeable future.
- The WSA would continue to be managed under Visual Resource Management (VRM) Class II (17,200 acres) and VRM Class IV (13,600 acres) as directed in the MFP.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting and fishing would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness consideration to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

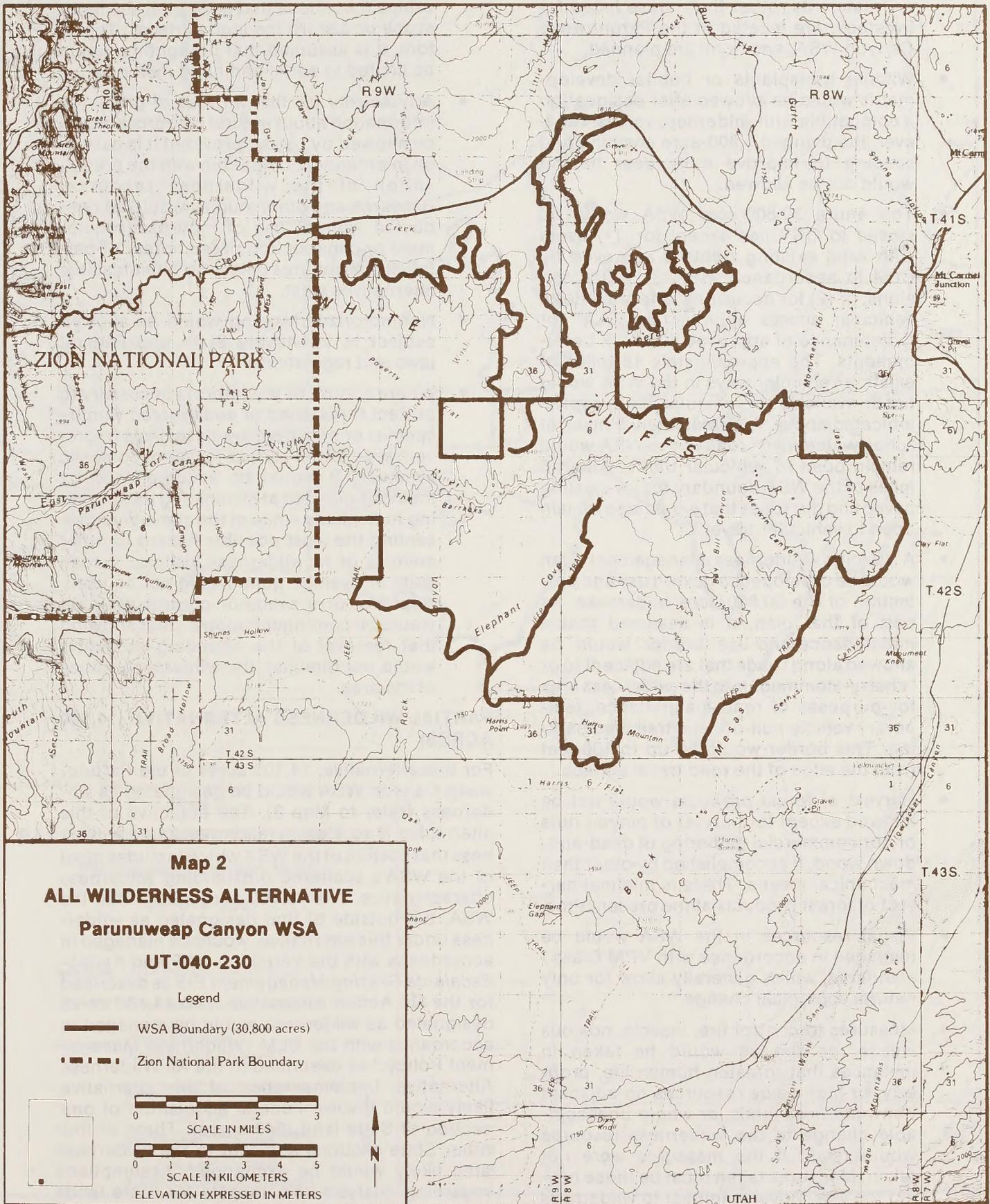
Under this alternative, all 30,800 acres of the Parunuweap Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981b) to preserve its wilderness character. Upon designation, acquisition of one section of State land (approximately 640 acres) within the WSA (refer to Map 1) would be likely, and could be authorized by purchase or exchange (refer to Appendix 3 for information regarding State in-holdings.) Seven State sections adjacent to the WSA likely would be exchanged. Should land transfers be made, it is

assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 30,800 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. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with considerations to wilderness values. Existing oil and gas leases involving 30,180 acres would not be reissued upon expiration unless a find of oil or gas in commercial quantities is shown. No new oil and gas leasing would be allowed.
- Present domestic livestock grazing would continue as authorized in the Vermilion MFP. The 330 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 (presently 5.6 miles of fence, one cattleguard, four reservoirs, and one corral) could continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for range and/or wilderness resource protection and management, and if consistent with wilderness protection standards (refer to Appendix 1). These include 3.75 miles of pipelines, one spring development, nine troughs, one water catchment, and one reservoir.
- New water resource facilities or watershed activities (not related to range 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). No water resource facilities

PARUNUWEAP CANYON WSA



Map 2

ALL WILDERNESS ALTERNATIVE
Parunuweap Canyon WSA
UT-040-230

Legend

-  WSA Boundary (30,800 acres)
-  Zion National Park Boundary



ELEVATION EXPRESSED IN METERS



or treatments, other than those listed for livestock, are located in the Parunuweap Canyon WSA, and none are planned.

- Wildlife transplants or habitat developments would be allowed after designation if compatible with wilderness values. However, the planned 1,800-acre chaining and seeding to improve mule deer habitat would not be allowed.
- The entire 30,800-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 provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. The approximately 16 miles of existing vehicular ways in the WSA would not be available for vehicular use except as indicated above. Approximately 5 miles of "cherry-stemmed" road in the WSA would remain open to vehicular traffic. About 5 miles of the WSA boundary follow existing paved and dirt roads that would also remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 30,800-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or "cherry-stemmed" into the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- 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. There is minimal harvest of forest products at the present time.
- Visual resources in the WSA would be managed in accordance with 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 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 must be those having the least adverse impact to wilderness

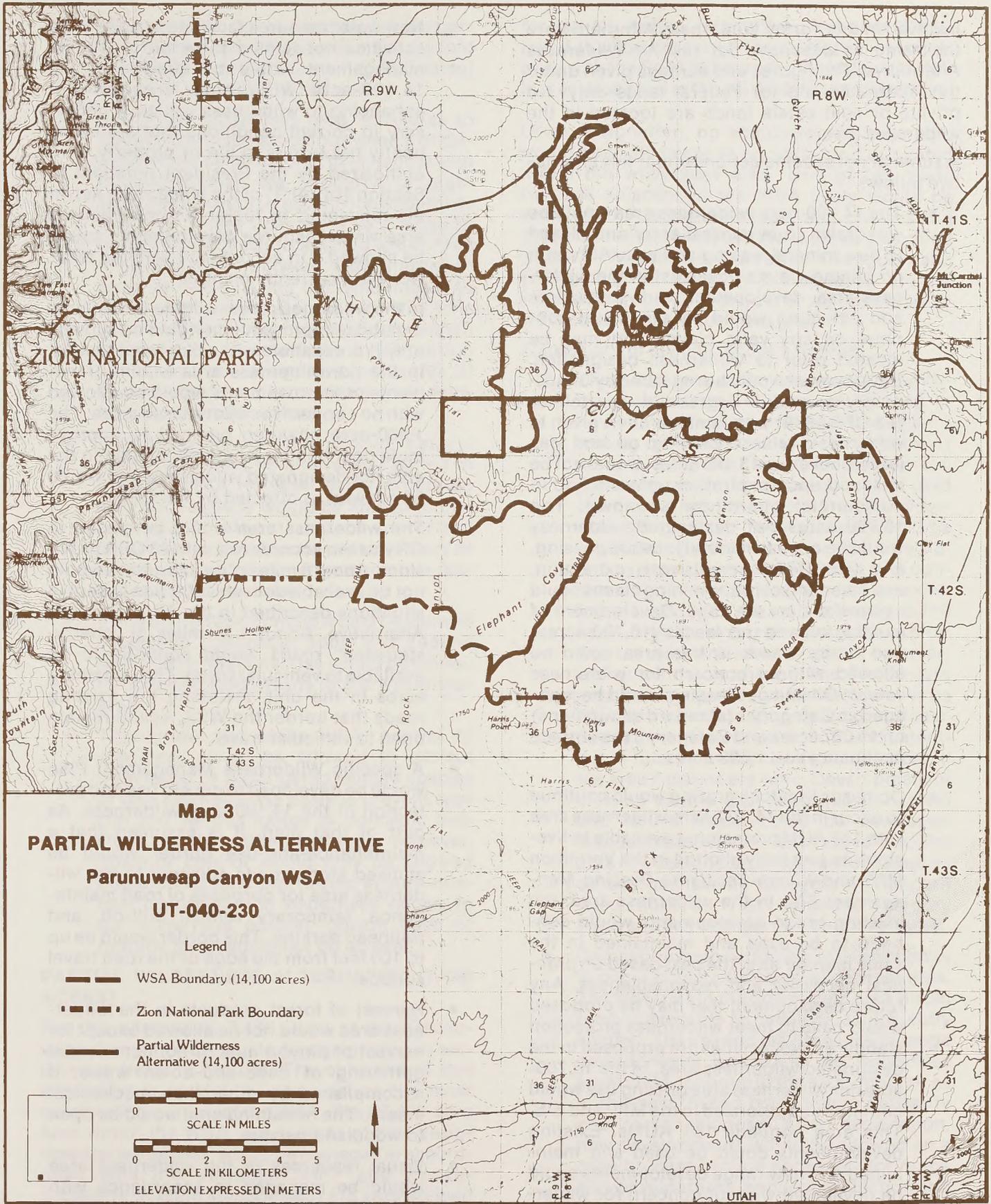
values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to aerial and hand methods.

- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

PARTIAL WILDERNESS ALTERNATIVE (14,100 ACRES)

For this alternative, 14,100 acres of the Parunuweap Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to identify and analyze as wilderness that portion of the WSA which includes most of the WSA's scattered outstanding wilderness characteristics. The 16,700-acre area within the WSA, but outside of that designated as wilderness under this alternative, would be managed in accordance with the Vermilion MFP and *Kanab-Escalante Grazing Management EIS* as described for the No Action Alternative. The 14,100 acres designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy," as described in the All Wilderness Alternative. Implementation of this alternative likely would involve Federal acquisition of one section of State land (640 acres). Three of four other State sections adjacent to the wilderness area likely would be exchanged. Assumptions regarding analysis and impacts for State lands

PARUNUWEAP CANYON WSA

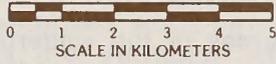


Map 3

**PARTIAL WILDERNESS ALTERNATIVE
Parunuweap Canyon WSA
UT-040-230**

Legend

-  WSA Boundary (14,100 acres)
-  Zion National Park Boundary
-  Partial Wilderness Alternative (14,100 acres)



ELEVATION EXPRESSED IN METERS

involved in this Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. The figures and acreage given under this alternative are for Federal lands only. No private or split estate lands are located in the wilderness area.

A summary of specific actions under this alternative follows.

- The 14,100-acre wilderness area would be withdrawn from mineral entry and closed to new mineral leasing and sale. Although no mining claims now exist in the wilderness area, development work, extraction, and patenting would be allowed to continue on any valid claims that may be located prior to wilderness designation. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases, covering 13,480 acres, would not be reissued upon expiration unless a find in commercial quantities is shown. The 16,700 acres not designated wilderness would be open to mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur if claims are valid. Development of existing oil and gas leases (16,700 acres) and future leases in this area could be allowed without concern for wilderness values. Oil and gas leasing would be managed as Category 1 (standard stipulations) on 15,037 acres and Category 3 (no surface occupancy) on 1,663 acres.
- Domestic livestock grazing would continue to occur in the 14,100-acre wilderness area with 145 AUMs remaining available to livestock as presently allotted in the Vermilion MFP and *Kanab-Escalante Grazing Management EIS*. In the wilderness area, the existing range developments would continue to be used and maintained in the same manner as in the past based on practical necessity and reasonableness. Any future development that may be proposed would have to meet wilderness protection standards. No facilities are proposed in the designated wilderness area. In the 16,700-acre nonwilderness area grazing use would continue as authorized in the MFP and EIS. This area contains 185 AUMs. Existing developments could be used and maintained and new range developments could be developed without concern for wilderness values.
- New water resource facilities or watershed activities not related to range or wildlife management would be allowed in the 14,100-acre wilderness area only if enhancing to wilderness values, if necessary to correct conditions that are imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the remaining 16,700-acre nonwilderness area water resource developments would be allowed if in accordance with the MFP. None are currently planned.
- In the wilderness area, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the nonwilderness area wildlife transplants or improvements would be allowed with no concern for wilderness values. The 1,800-acre chaining planned to improve mule deer habitat would be located in the area not designated wilderness and would be allowed as directed by the MFP.
- The wilderness area would be closed to ORV use in accordance with 43 CFR provisions. About 6 miles of existing ways would not be available for vehicular use except in situations described in the All Wilderness Alternative. About 1.25 miles of "cherry-stemmed" roads would continue to be available to vehicular travel. The remaining acres in the unit, including the existing roads that border the WSA, would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 14,100-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the wilderness area 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. The remaining area would be open to woodland harvest.
- 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 area not designated wilderness would be managed as VRM Class II (3,900 acres) and VRM Class IV (12,800 acres).

- Within the wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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 must be those having the least impact to wilderness values. Because of this it is assumed that firefighting would be limited to hand and aerial methods. In the portion of the unit not designated, measures of control could be taken without consideration of wilderness values.
- Gathering information about natural resources would be allowed by permit in the entire WSA. However, in the wilderness area such activity would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the entire WSA hunting would be allowed subject to applicable State and Federal laws and regulations. Use would be limited to nonmotorized means in the wilderness area.
- Throughout the entire WSA, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the wilderness area, however, predator control would only be allowed under conditions that would ensure minimal disturbance to wilderness values. In the wilderness portion, poison baits or cyanide guns would not be allowed.

PARTIAL WILDERNESS ALTERNATIVE (7,400 ACRES)

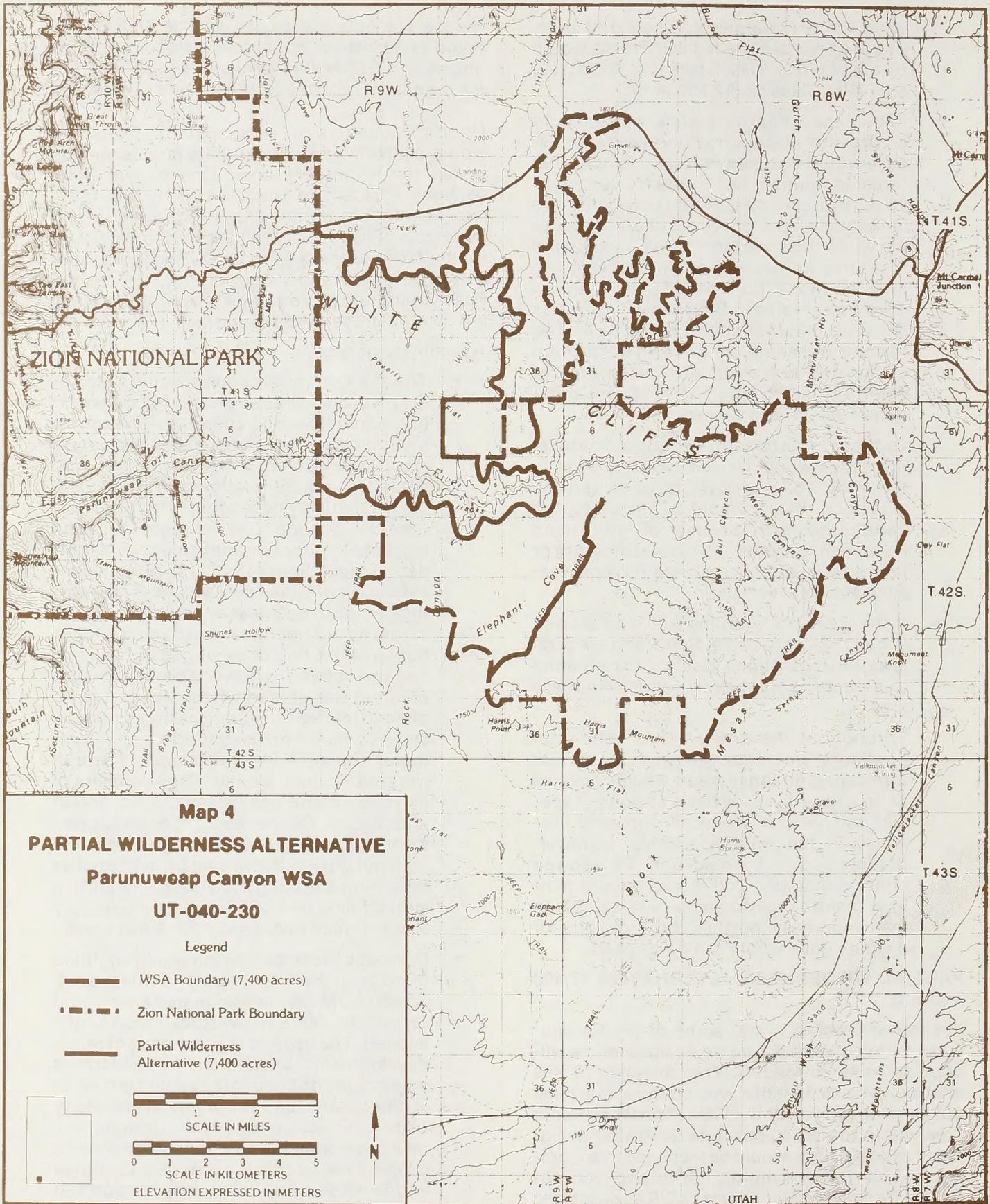
For this alternative, 7,400 acres of the Parunuweap Canyon WSA would be designated as wilderness (refer to Map 4). The objective of this alternative is to identify and analyze the most outstanding portion of the WSA. The 23,400-acre area within the WSA, but outside of that designated as wilderness, would be managed in accordance with the Vermilion MFP and *Kanab-Escalante Grazing Management EIS* as described

for the No Action Alternative. The area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative.

Upon designation, no acquisition of State land would be likely because no State land is located within the wilderness area. One of two State sections adjacent to the WSA likely would be exchanged. Assumptions regarding analysis and impacts for State lands are the same as described for the All Wilderness Alternative. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the wilderness area.

A summary of specific actions follows:

- The 7,400-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Although no mining claims now exist in the wilderness area, development work, extraction, and patenting would be allowed on any valid claims that may be located prior to wilderness designation. Development would be regulated by unnecessary or undue degradation regulations (43 CFR 3809) with consideration of wilderness values. The existing oil and gas leases, covering 6,780 acres, would not be reissued upon expiration unless a find of oil or gas in commercial quantities is shown. The 23,400-acre area not designated wilderness would be open to mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur in the area if claims are valid. Development of existing oil and gas leases (23,400 acres) and future leases could be developed without concern for wilderness values. The area not designated would be managed as oil and gas leasing Category 1 (standard stipulations) on 17,517 acres and Category 3 (no surface occupancy) on 5,883 acres.
- Domestic livestock grazing would continue to occur in the 7,400-acre wilderness area. The 80 AUMs in the designated area would remain available to livestock as presently allotted. The use and maintenance of range developments located in the wilderness area could continue in the same manner as in the past, based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for range and/or wilderness resource protection and management, and if consistent with wil-



Map 4

PARTIAL WILDERNESS ALTERNATIVE
Parunuweap Canyon WSA
UT-040-230

Legend

-  WSA Boundary (7,400 acres)
-  Zion National Park Boundary
-  Partial Wilderness Alternative (7,400 acres)



ELEVATION EXPRESSED IN METERS

PARUNUWEAP CANYON WSA

derness protection standards. No improvements are proposed in the designated area. In the 23,400-acre nonwilderness area grazing use would continue as authorized in the MFP and Grazing EIS (250 AUMs). New range developments, as previously described, could be developed there without concern for wilderness values.

- New water resource facilities or watershed activities would be allowed in the wilderness area only under the conditions described in the All Wilderness Alternative. In the nonwilderness area water resource facility developments would be allowed if in accordance with the MFP.
- In the wilderness area, wildlife transplants or habitat improvements would be allowed if they are compatible with wilderness values. In the nonwilderness area, wildlife transplants or improvements, including a planned 1,800-acre chaining and seeding to improve mule deer habitat, would be allowed without wilderness considerations.
- The wilderness area would be closed to ORV use. About 2 miles of existing ways would not be available for vehicular use except as described in the All Wilderness Alternative. "Cherry-stemmed" roads would not be involved. The remainder of the unit would remain open to ORV use on 18,400 acres and restricted to designated roads and trails on 5,000 acres. Development of new road access would be allowed in this area.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 7,400-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the wilderness 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. The remaining acres would be open to woodland harvest.
- 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 remaining acres would be managed as VRM Class II (9,800 acres) and VRM Class IV (13,600 acres).

- Measures to control fire, insects, noxious weeds, or disease would be allowed in the entire WSA. However, within the wilderness area such action would be taken only 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 measures were not taken. It is assumed that fire would be controlled only by hand or aerial methods in the designated wilderness area.
- In the entire WSA any activity for the purpose of gathering information about natural resources would be allowed by permit. In the wilderness area such activity would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures.
- Hunting would be allowed in the entire WSA subject to applicable State and Federal laws and regulations. In the wilderness area, this use would be limited to nonmotorized means.
- Throughout the entire WSA control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the wilderness area, poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The Parunuweap Canyon WSA and surrounding area have been designated Class II under the

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
PARUNUWEAP CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (30,800 Acres) (Proposed Action)	Partial Wilderness Designation (14,100 Acres)
Water Resources	A proposed 35,000 acre-foot reservoir could be constructed on the East Fork of the Virgin River. If in conformance with BLM Vermilion MFP, this would stabilize flows and probably improve the quality of the water in the river.	The reservoir would not be allowed.	The reservoir would not be allowed.
	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 1 million tons of coal, and 2,800 tons of uranium oxide.	Oil, gas, and coal likely would not be recovered. Assuming a worst-case analysis, uranium recovery may also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 1.6 million barrels of oil, 10 billion cubic feet of natural gas, 800 thousand tons of coal, and 1,500 tons of uranium could be recovered.
Mineral and Energy Resources	About 2 percent of the WSA could be directly affected by mineral and energy development, which could adversely affect wildlife habitat. Land treatment on 1,800 acres would benefit wildlife. The proposed reservoir would provide aquatic habitat but may negatively affect the endangered woundfin minnow in the Virgin River downstream of the WSA.	Wildlife would benefit from solitude. The proposed land treatment for wildlife habitat would not be allowed, however.	Wildlife would benefit. Proposed treatment of 1,800 acres in the nondesignated area would additionally benefit wildlife.
	Grazing of 330 AUMs and maintenance of existing developments would continue. Proposed new developments consisting of 1 spring development, 1 catchment, 1 reservoir, 9 troughs, and 3.75 miles of pipeline could be constructed.	Grazing of 330 AUMs and maintenance of existing developments would continue. Little effect on current livestock management is expected. Proposed new developments may not be allowed.	Grazing of 330 AUMs and maintenance of existing developments would continue, with little effect on current livestock management. Proposed new developments would be in the undesignated portion and could be allowed.
Wildlife	Effects would be the same as for the 14,100-acre Partial Wilderness Alternative.	Effects would be the same as for the 14,100-acre Partial Wilderness Alternative.	Effects would be the same as for the 14,100-acre Partial Wilderness Alternative.
Livestock			

TABLE 1 (CONTINUED)
 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
 PARUNUWEAP CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (30,800 Acres) (Proposed Action)	Partial Wilderness Designation (14,100 Acres)
Visual Resources	The quality of visual resources could be impaired on up to 2,500 acres. A proposed reservoir on the East Fork of the Virgin River would be a permanent intrusion.	Visual quality could be impaired on 40 acres.	Visual quality could be impaired on 2,330 acres (20 acres in the designated portion).
Recreation	ORV use would continue on 16 miles of ways at current moderate levels. Overall recreational use could increase from the present 1,400 visitor days per year to 2,080. Up to 700 acres of mineral-related disturbance could reduce the quality of primitive recreation. The proposed reservoir could provide water-based recreation but would block backpacking access to Zion National Park.	The WSA, including 16 miles of existing ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV use could continue on 10 miles of ways in the undesignated portion.
Wilderness Values	Wilderness values could be lost on up to 2,500 acres (8 percent of the WSA), due to mineral and energy development. The proposed reservoir would inundate areas with high quality wilderness values.	Wilderness values would be protected, except on up to 40 acres (less than 1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 10 acres which could be disturbed by development of valid mineral rights. Additional impairment could be expected on 10 percent of the 23,400 acres not designated. Overall, wilderness values could be lost on 8 percent of the WSA. However, 24 percent of the area meeting the standards for naturalness, 36 percent of the area meeting the standards for outstanding opportunities for solitude, and 42 percent of the area meeting the standards for outstanding opportunities for primitive recreation would be protected by reduced potential for disturbance.

TABLE 1 (CONTINUED)
 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
 PARUNUWEAP CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (30,800 Acres) (Proposed Action)	Partial Wilderness Designation (14,100 Acres)
Land Use Plans and Controls	<p>This alternative would be consistent with the Kane County Master Plan, State of Utah plans and policies, and the current BLM Vermilion MFP. It would not complement the NPS proposal for nearby wilderness, but would be consistent with the Washington County Water Conservancy District's proposal for a reservoir on the East Fork of the Virgin River.</p>	<p>This alternative would not be consistent with Kane County's concept of multiple use. It would be consistent with State policy if lands were exchanged, and would complement the NPS proposal for wilderness. Designation would constitute amendment of the BLM Vermilion MFP. It would conflict with the proposal for a reservoir.</p>	<p>Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Kane County's plans. It would conflict with a proposal for a reservoir.</p>
			<p>Partial Wilderness Designation (7,400 Acres)</p>
Socio- economics	<p>Annual local sales of less than \$12,340 and Federal revenues of up to \$83,769 would continue. Up to \$7,232 per year in Federal oil and gas fees could be lost due to phasing out leases to meet oil and gas category restrictions; however, up to an additional \$1,500 per year in Federal coal lease fees would be possible. Economic benefits from a proposed reservoir could be realized.</p>	<p>Annual local sales of less than \$12,340 and Federal revenues of up to \$462 would continue, but Federal revenues of up to \$84,407 would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA. Economic benefits from a proposed reservoir would be lost.</p>	<p>The effects of this alternative would be about the same as for All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$13,107 because oil and gas leases would not be reissued on the designated portion. However, up to an additional \$1,500 per year in Federal coal lease fees would be possible. Economic benefits from a proposed reservoir would be lost.</p>
			<p>Partial Wilderness Designation (7,400 Acres)</p>

Prevention of Significant Deterioration (PSD) regulations. The BLM will not consider or recommend any change in air quality classification as part of the wilderness study or wilderness recommendations. Any further air quality reclassification is the prerogative of the State government, not of the BLM (USDI, BLM, 1982b). Zion National Park, a Class I air quality area, is adjacent to the WSA.

Air quality estimates for the WSA are based on readings made in nearby Zion National Park. Tel-ephotometer readings made over a 2-year period indicate an average visibility of 120 miles. The area is well known for its excellent air quality.

Geology

The Parunuweap Canyon WSA lies within the southern portion of the Grand Staircase section of the Colorado Plateau Physiographic Province. The area is composed mainly of steep canyons and cliffs surrounded by buttes and mesas.

Elevation ranges from about 6,600 feet above sea level in the Harris Mountains at the extreme southern portion of the WSA to about 4,800 feet above sea level in the East Fork of the Virgin River Canyon at the western edge of the WSA. The dominant drainage is the East Fork of the Virgin River which flows east to west through the central portion of the unit. Other drainages flow either north or south into the Virgin River.

Rocks of Jurassic Age, totaling about 2,000 feet in thickness, and thin deposits of Quaternary Age outcrop in the WSA. The Jurassic, Navajo, and Carmel Formations form the most extensive outcrops in the unit. Underlying Mesozoic and Paleozoic rocks may be as much as 8,000 feet thick. Immediately to the east, the north-trending Sevier fault is downthrown on the west side.

Soils

Slightly over 72 percent of the entire WSA consists of rock outcrops, predominantly sandstone, with some shale and siltstone. The largest percentage of the WSA is considered to have soils only slightly susceptible to erosion.

Erosion classes are slight, 4,000 acres (13 percent) and moderate, 26,800 acres (87 percent). Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	26,800	87	34,840
Slight	0.6	4,000	13	2,400
Stable	0.3	0	0	0
Total		30,800	100	37,240

Sources: USDI, BLM, 1978b; Leifeste, 1978.

Vegetation

Existing vegetation in the WSA is largely of one vegetation association, pinyon-juniper woodland (with some ponderosa pine in suitable habitat), with a slight amount of one other association, a mixture of sagebrush and bunchgrass.

The pinyon-juniper type covers almost 98 percent (30,184 acres) of the WSA. It has a sparse understory of shrubs, including sagebrush, mountain mahogany, manzanita, serviceberry, Gambel's oak, cliffrose, and silver buffaloberry. The part with sagebrush has, in addition, big sagebrush, snakeweed, bitterbrush, rabbitbrush, green ephedra, and sandsage.

The small area of bunch grass-sagebrush accounts for about 1 percent (308 acres) and has big sage, Indian ricegrass, galleta grass, squirrel-tail grass, and the other associated plants listed above. Riparian vegetation occurs along the East Fork of the Virgin River as it flows through the WSA for approximately 10 miles. Some of the major tributaries also support riparian vegetation. Riparian zones cover approximately 1 percent (308 acres) of the WSA.

The Zion tansy (*Sphaeromeria ruthiae*) is currently under review by the Fish and Wildlife Service (FWS) for possible threatened and endangered status and may occur within the WSA. It is BLM policy to extend the same type of protection to sensitive plants that is afforded to threatened or endangered plants. There are no known threatened or endangered plants found in the WSA.

The Parunuweap Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) of the WSA is juniper-pinyon woodland. PNV is the vegetation that would exist if

PARUNUWEAP CANYON WSA

plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

The WSA is primarily composed of the East Fork of the Virgin River within Parunuweap Canyon and its tributaries. The East Fork of the Virgin River is one of the few perennially flowing streams in the area. It flows approximately 10 miles through the WSA. A 1964 estimate made at Mt. Carmel Junction (several miles upstream from the WSA) places the average annual flow at 12,000 to 13,000 acre-feet. Many of the tributary canyons to Parunuweap flow at some time during the year, notably Rock Canyon to the south and Poverty Flat Canyon to the north. Water quality is poor due to high sediment loads.

The Washington County Water Conservancy District has proposed to construct a reservoir within the WSA on the East Fork of the Virgin River with a damsite near the junction of the river and the boundary of Zion National Park. The storage capacity of the proposed reservoir is approximately 35,000 acre-feet. The feasibility of the project has not been fully explored. There are three undeveloped springs known in the WSA: one in Rock Canyon, one along the Virgin River, and the third in Elephant Cove. Two stock reservoirs are found on the east side of the Parunuweap Canyon WSA, one on the Black Mesa, the other in Joseph Canyon, a Parunuweap tributary. Two other livestock reservoirs are located north of the Virgin River, in Section 1 and the other in Section 34. Except for the springs, the water quality is poor and not potable.

There are no known private water rights located on public lands within the WSA.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 2 was assigned to the Parunuweap Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR

attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The energy and mineral resource rating summary is given in Table 3.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels; of oil; less than 60 billion cubic feet. of gas
Uranium	f4	c3	Less than 2,300 tons of uranium oxide ³
Coal	f2	c4	1 million tons ⁴
Geothermal	f1	c2	None
Hydroelectric	f2	c4	.05 to 15 megawatts

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³Approximately 20,000 acres of the WSA have this potential; the remaining portions of the WSA have a combined estimated resource of less than 500 tons of uranium oxide.

⁴In-place coal.

LEASABLE MINERALS

Oil and Gas (f2/c1)

According to SAI (1982), the WSA is considered to have a potential for only small, widely scattered oil and gas pools, similar perhaps to the Virgin Field 15 miles to the west. This is largely due to the relatively thin stratigraphic sequence which generally limits the volume of both favorable source and reservoir rocks, and to the tendency for medium-sized or larger accumulations to have been destroyed or reduced in size by recent tectonic events, deep erosion, or water flushing. The size of recoverable hydrocarbon accumulations in such an environment is anticipated to be less than 10 million barrels of oil or, if gas, no more than 60 billion cubic feet.

To date, however, there is no evidence indicating the existence of commercially recoverable oil and gas resources within this WSA. Two wells have tested the oil and gas favorability near the Sevier fault along the eastern side of the WSA. One well is located approximately 2 miles east of the WSA along the upthrown portion of the fault, and the other is about 4 miles to the south, along the downthrown portions of the fault. The well on the downthrown side reached a total depth of 10,503 feet and bottomed in pre-Cambrian rocks. Oil shows were reported from Cambrian, Mississippian, and Triassic rocks. The well on the upthrown side was dry and penetrated Cambrian rocks at a total depth of 9,119 feet.

Under the current land use plan 3,031 acres are protected from oil and gas activities and are closed or suspended to oil and gas leasing (Category 4). An additional 7,583 acres are open to leasing with no surface occupancy stipulations (Category 3), but may be explored by directional drilling from outside areas allowing surface occupancy. The remaining 20,186 acres are open to oil and gas leasing subject to the standard stipulations (Category 1). There are presently 16 oil and gas leases covering 30,180 acres (98 percent of the WSA). Only 620 acres including one 50-acre lease application (2 percent of the WSA) are unleased. Under present Department of the Interior policy this acreage will not be leased, nor will any other land whose leases expire while the WSA is under interim management protection. Two pre-FLPMA leases cover approximately 325 acres (1 percent of the WSA) and post-FLPMA leases cover 29,855 acres (97 percent of the WSA).

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-

FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981b). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Of the 3,031 acres closed or suspended to leasing, 2,411 acres have been leased for blocking purposes only. These leases were issued with a clear understanding that there would be no surface occupancy and that the resources may never be exploited. These closed tracts were leased in the event that if the land use planning were ever changed to accommodate future leasing, then the tracts would already have been blocked up and would be ready for exploration or development. As of July 1981, leasing of suspended or closed areas for blocking purposes was halted and is not expected to resume.

Coal (f2/c4)

Most of the Parunuweap Canyon WSA lies south of the Kolob Coal Field and the sedimentary bedrock is of pre-Cretaceous Age (noncoal bearing). However, the extreme northern tip of the WSA (approximately 500 acres) includes the lower part of the Tropic Formation of Cretaceous Age. According to Doelling and Graham (1972), the lower coal zone of the Tropic-Dakota Sandstone occurs within the WSA and individual coal beds range from 1 to 5 feet thick. Total tonnage is estimated to be about 1 million tons of in-place coal. Maximum overburden in the WSA is about 300 feet.

Doelling and Graham (1972) report that the coal in the Kolob Field varies in quality from one area to another but that, in general, the coal is of poor quality and of moderate to high sulfur content. In the immediate area of the WSA, the coal has an average moisture content of 14.4 percent, an ash content of 6.5 percent, a sulfur content of 1.67 percent, and a heat value of 10,942 British thermal units (Btu) per lb. (Doelling and Graham, 1972).

Part of the coal within the WSA has been subjected to coal fires and it is not known how much of the 1 million tons would be recoverable. Since the coal is relatively close to the surface (less than 300 feet in depth), any mining would probably be by surface methods. However, because coal seams are thin and partially burned, the probability for leasing and development is quite low. There are no existing or pending coal leases in the unit.

Geothermal (f1/c2)

The WSA lies within the Colorado Plateau Physiographic Province. This province is characterized by a low heat flow, a long history of relative tectonic stability, and a general lack of thermal springs. The scarcity of hot springs may be due, in part, to a lowered regional water table caused by deep stream incision. If thermal waters do exist they occur only at considerable depth (Muffler, 1978).

Most investigators consider recent crustal instability, high heat flow, and young igneous rocks (less than 1 or 2 million years old) as important criteria for a geothermal resource of commercial proportion. No hot springs or young igneous rocks are known to occur within or near the vicinity of the WSA. The nearest thermal springs to the WSA are approximately 15 miles to the west, where a cluster of springs discharge at temperatures ranging from 20 to 42 degrees Centigrade (C) (National Oceanic Atmospheric Administration, 1979). Therefore, very little potential exists for geothermal resources within the WSA (SAI, 1982).

Hydroelectric (f2/c4)

According to SAI (1982), and based solely on the flow of the East Fork of the Virgin River, the WSA is estimated to have a potential only for the development of small-scale (0.05 to 15 megawatts) hydroelectric capacity.

LOCATABLE MINERALS

No claims, prospects, or any evidence of other mineralization are known to exist within the WSA.

Uranium (f4/c3, f2/c3, f2/c1)

Approximately 20,000 acres in the northern portion of the WSA are located within an 1,100-square-mile area considered by the U.S. DOE (1983) to have a relatively high certainty (c3) to contain large potential resources of uranium (f4). About 2,000 acres in the eastern portion of the WSA are considered by the U.S. DOE (1983) to be located in an area favorable for uranium concentration (f2/c3). These areas are identified as the Leeds speculative potential resource area and the Southwest Utah favorable area, respectively. The remainder of the WSA (approximately 8,800 acres) is not considered by the U.S. DOE (1983) to be in either a potential resource area or a favorable area. This portion of the WSA has been assigned a low certainty (c1) for the occurrence of small deposits of uranium (f2) based primarily on the presence of favorable host rocks and the proximity to other higher rated areas.

Speculative potential resource areas are defined by the U.S. DOE (1983) as those estimated to occur in undiscovered or partly defined deposits in: (1) formations or geologic settings not previously productive within a productive geologic province; or (2) within a geologic province not previously productive. The U.S. DOE (1983) estimates that there is a 90-percent probability for the Leeds speculative potential resource area to contain a total of about 4,200 tons of uranium oxide at a minimum grade of 0.01 percent. The U.S. DOE estimates that about 2,300 tons of uranium oxide would be available from within the WSA at a forward cost of \$100/lb. The areal extent of such a deposit would be about 250 acres (based on 0.01-percent minimum grade and a 6-meter average thickness for host rocks).

Favorable areas are defined by the U.S. DOE (1983) as geographic areas in which available data indicate the existence of geologic environments favorable for the concentration of uranium. No estimates of possible tonnages were made by the U.S. DOE for either the favorable area or those areas rated only f2/c1. However, the f2 rating assigned to these areas indicates that any deposit would not be expected to exceed 500 tons of uranium oxide at a forward cost of \$100/lb. The areal extent of this size of deposit probably would not exceed 180 acres (based on 0.01 minimum grade and a 6-meter average thickness for host rocks). Any mining operation in the WSA would be by underground methods.

The probability of development in the WSA is low even for the more favorable area. Only 3 percent

of the 1,100-square-mile speculative potential resource area is coincident to the WSA.

At the present time there are no mining claims located within the WSA for uranium.

SALABLE MINERALS

Minor deposits of stream gravel and other loose rock material that could be used for construction occur within the WSA. These deposits are not unique or economically significant due to the presence of ample similar materials nearby the WSA.

Wildlife

The Parunuweap Canyon WSA provides four different major habitat types for wildlife. These are pinyon-juniper, cliff, riparian, and sage. The riparian habitat is located along the East Fork of the Virgin River and its tributaries and provides for the greatest diversity of wildlife species.

The habitat types present can support 52 species of mammals, 156 species of birds, 23 species of reptiles, seven species of amphibians, and one species of fish. No wildlife inventory has been conducted in the area, however, to determine the actual number of species present. The lone fish species, the speckled dace, is present in the East Fork of the Virgin River.

There are no wildlife management facilities within the WSA.

Game species in the WSA are mule deer, cougar, cottontail rabbit, mourning dove, and bandtailed pigeon. Mule deer are common yearlong residents in the WSA. The area north of the East Fork of the Virgin River is critical deer winter range. Small numbers of cougar are also yearlong residents of the WSA. Cottontail rabbit occur throughout the WSA but are more concentrated in the Block Mesa area. Mourning dove are fairly common throughout the WSA from May to September. Bandtailed pigeon roost mainly in the area around the East Fork of the Virgin River. The river also provides a resting area for spring and fall migrating waterfowl.

One Federally endangered species, the bald eagle (*Haliaeetus leucocephalus*), occasionally uses the lands north of the river as a winter roosting area. They do not, however, use the area for nesting. No other sensitive, threatened, or endangered species are known to occur within the WSA.

The Parunuweap Canyon WSA is located within the East Zion Habitat Management Plan Area.

This plan, as well as the Vermilion MFP, proposes an 1,800-acre pinyon-juniper chaining and seeding within the WSA to restore depleted browse species for mule deer. This land treatment project is located in an area which currently has very little winter forage.

Forest Resources

Almost the entire WSA is composed of the pinyon-juniper vegetation type. It is characterized by a dominant tree overstory of pinyon pine, Utah juniper, scattered Gambel's oak, and some ponderosa pine in favorable habitat.

The area has forest resources considered suitable for firewood, post, and Christmas tree cutting. The Elephant Cove and Block Mesas sections of the WSA have been used extensively for these purposes. These areas have been identified in the Vermilion MFP as having some of the best potential within the Kanab Resource area for these uses. Accurate data of the amount of forest resources harvested in this area in the past are not available.

Livestock and Wild Horses/Burros

Livestock grazing values within this WSA are limited because of the rough broken terrain and large rock outcrop areas. There are nine allotments wholly or partially within the WSA. Eleven operators graze cattle within these allotments. However, portions of three allotments within the WSA are completely unsuitable for livestock grazing. Grazing values have not been assigned to these areas. The remaining area supports 330 AUMs of livestock use annually. Table 4 summarizes livestock use in the Parunuweap Canyon WSA. There are no existing vegetation manipulation projects for the benefit of livestock and none are proposed. Other improvements have been installed and additional ones are proposed. Table 5 lists existing and proposed improvements. The eight permittees use vehicles on the 16 miles of ways in the WSA for livestock management.

There are no wild horses or burros in the WSA.

Visual Resources

Approximately 17,800 acres, or about 58 percent of the WSA, are within the scenery quality A classification. Class A areas are those where features of landform, waterform, and/or vegetation patterns are of unusual or outstanding quality. Another 4,300 acres, or 14 percent of the WSA,

PARUNUWEAP CANYON WSA

TABLE 4
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	No. of Operators	Number of AUMs	Season of Use
Sethy's Can.	7,630	4,100	1	8	6/1 - 10/31
Clay Flat	5,420	2,100	1	10	5/1 - 11/31
Virgin River Barracks	3,800	3,800	1	145	12/1 - 4/30
Point Flume	7,915	2,700	1	10	8/16 - 10/15
Hollow	220	200	1	10	5/1 - 11/30
Poverty Flat	9,651	8,600	2	47	11/1 - 3/30
Rock Springs	6,732	2,300	1	37	6/16 - 11/15
Elephant Cove	7,604	6,500	2	87	5/1 - 10/31
Yellow Jacket	10,036	500	1	7	7/1 - 4/30
Total		30,800	11	330	

Source: USDI, BLM, 1978b.

¹The allotment acreage within the WSA is considered unsuitable for livestock grazing and no AUMs are attached to this portion. The suitability of an area for grazing is determined by a number of factors including steepness of the terrain, distance of forage from water, production of vegetation, etc.

²Eight of the eleven operators are allowed to graze livestock within the WSA. Three operators do not graze livestock within the WSA because the portions of their allotments within the WSA are unsuitable for livestock grazing.

TABLE 5

Existing and Proposed Livestock Management Improvements

Allotment	Existing Improvement	Proposed Improvement
Sethy's Canyon	0.6 mile of fence, 1 cattleguard, 1 reservoir	None
Clay Flat	1.5 mile of fence, 1 reservoir	None
Virgin River	1 corral, 1.75 miles of fence	1 mile of pipeline and trough
Rock Spring	1 mile fence, 1 reservoir	Reservoir
Elephant Cove	0.75 mile of fence	2.5 miles of pipeline and 8 troughs, 1 water catchment
Yellow Jacket	None	1 spring development and 0.25 mile of pipeline
Poverty Flat	1 reservoir	None

Source: USDI, BLM, 1978b.

fall into Class B. These areas include visual variety but lack outstanding or dominating features. The remainder of the unit, 8,700 acres (28 percent), is in Class C having little variety and a tendency to be monotonous.

Over half of the Parunuweap Canyon WSA (56 percent) is assigned to VRM Class II, with the remaining 44 percent in Class IV. (Refer to Appendix 7 for more information on BLM's rating system.)

The Parunuweap Canyon WSA is adjacent to Zion National Park. The visual resource in the area immediately adjacent to the Park possesses scenic values comparable to those found in the National Park.

Cultural Resources

No sampling inventory for archaeological and other cultural resources has been conducted in the Parunuweap Canyon WSA, and there is only a negligible amount of intensive inventory work within the unit. There are some known sites, petroglyphs, and an alcove architectural site along the East Fork of the Virgin River and in Meadow Canyon.

Eighty-eight inventoried archaeological sites are found in the portion of Parunuweap Canyon within Zion National Park. However, all of the significant sites occur below the narrows portion of the canyon. Consequently, the canyonlands of the WSA may not be equal in significance, archaeologically speaking, as the canyons of the Park. Given this knowledge, the WSA is considered to have a potential for cultural resources; however, until the necessary extensive inventory work is completed, the actual resources will remain unknown.

Recreation

Although the Parunuweap Canyon WSA offers opportunities for both primitive and nonprimitive types of recreation use, very little data on existing visitor use are available. The recreational use of the WSA is currently estimated at 1,400 visitor days annually. No visitor days are related to commercial outfitting. Approximately 25 percent of the use is attributed to primitive activities and approximately 25 percent is attributed to recreational activities (such as hunting and sightseeing) that currently utilize vehicular access on existing ways. There is approximately 50 percent attributed to use solely for ORV play activities.

Approximately 23,700 acres (77 percent of the WSA) are designated as open to ORV use. On 7,100 acres, ORV use is limited to existing roads and trails. This latter category includes the Parunuweap Canyon and all or portions of major tributary canyons such as Rock Canyon, Meadow Canyon, Burnt Flat Gulch, and Poverty Wash.

Big game hunting is generally poor to fair throughout the WSA because of the dense tree cover, low game populations, and the seasonality of mule deer use.

Wilderness Values

SIZE

The size of the WSA is 30,800 acres. It is approximately 10 miles wide (east to west) and 10 miles long (north to south).

NATURALNESS

All 30,800 acres contain the naturalness characteristic. Naturalness is defined as an area where the evidences of man are substantially unnoticeable to the average visitor and where individual minor imprints of man exhibit no cumulative impact that is substantially noticeable. An imprint of man remaining in the WSA is the 4 miles of dune buggy trail from Elephant Cove to the Foote Ranch. There are also other ways (16 miles total), fences, reservoirs, corrals, etc., found within the WSA. These imprints involve less than 1 percent of the WSA.

In the Parunuweap Canyon WSA, the high quality of naturalness has not changed since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the BLM's *Interim Management Policy* (USDI, BLM, 1979).

SOLITUDE

The WSA affords outstanding opportunities for solitude that are most closely identified with both topographic and vegetation screening situations. The size of this WSA neither enhances nor detracts from the outstanding opportunities for solitude present in the WSA. The configuration of the WSA neither enhances nor detracts from the outstanding opportunities present.

The major screening elements contributing to the outstanding solitude opportunity are the numerous canyons cutting into benches, cliffs, and mesas and the vegetation screening resulting from the dense riparian growth in the canyons. The presence of these elements varies through-

out the WSA. The WSA contains four distinct topographic features: White Cliffs-Poverty Flat, The Barracks or Parunuweap Canyon, Elephant Cove, and the Block Mesas. Each of these sections possesses solitude to a different degree.

The White Cliffs-Poverty Flat area includes that portion of the WSA north of the East Fork of the Virgin River Canyon. The White Cliffs are an extension of the cliffline above the river in Zion National Park. In the WSA, however, the White Cliffs are set back from the canyon of the East Fork (The Barracks) by the intervening Poverty Flat bench. Where it consists of unbroken canyons, the White Cliffs escarpment is very irregular and characterized by points, outlying buttes, and short penetrating canyons. In the upper Mineral Gulch (Burnt Flat Gulch) drainage, the escarpment ends and the Navajo Sandstone is replaced by the Carmel Formation. The area below the cliffs is tilted toward the river canyon with elevations at the base of the White Cliffs averaging 800 feet higher than the rim at The Barracks. In general, the Poverty Flat bench is an extremely rugged and broken area with sandstone exposures and outcropping extending between canyons. Ponderosa pine predominates on the rocky areas.

In the western portion of this area, a large unnamed canyon with several branches extends northward to the base of the White Cliffs. The Poverty Wash Canyon bisects Poverty Flat in a northeasterly direction and then breaks through the White Cliffs. The eastern edge of this area is delineated by the Mineral Gulch and Meadow Creek Canyon system which cuts completely through the eastern end of the White Cliffs escarpment. Although these canyons do not possess perennial streams, the bottoms often exhibit dense riparian growth. The canyons are also meandering and most of them possess narrows. Meadow Creek Canyon and Mineral Gulch are large deep canyons. At its confluence with Meadow Creek, Mineral Gulch is almost 1 mile wide and 600 feet in depth. The opportunity for solitude in the White Cliffs-Poverty Flat section is outstanding because of these superior topographic screening situations. Vegetation screening also contributes to the opportunity in certain canyon situations. On either side of lower Poverty Wash Canyon, several flat isolated benches exist with a moderate cover of pinyon-juniper forest. The opportunity is not outstanding in these areas. Outstanding opportunities for solitude are present on approximately 8,600 acres of this portion of the WSA.

The eastern part of the WSA includes a portion of the Block Mesa landform. The Block Mesas are an elevated platform of Navajo Sandstone capped with the Carmel Formation. Elevations in this portion of the WSA range from 5,800 feet to a high point on Harris Mountain of 6,500 feet. The perimeter of the Block Mesas is a 250- to 350-foot-high Navajo Sandstone cliff, an extension of the White Cliffs. Although the upper Carmel Formation does not form abrupt cliffs, the mesa top generally rises another 100 feet above the sandstone cliffs. The Block Mesas are deeply cut by canyons and coves. Peninsulas, such as Harris Mountain, and isolated buttes, such as the Elephant Buttes, are the characteristic result. The WSA includes approximately 9,000 acres of this landform east and north of Sethy's Canyon and Clay Flat. A portion of Harris Mountain is within the WSA. Elephant Cove borders the area on the west. On the north, the East Fork Canyon is considered part of the landform and it is here that the greatest amount of canyon dissection occurs. Bay Bill and Merwin Canyons are the other major named canyons in this area.

The elements that contribute to the opportunity for solitude in this area are derivative of topographic screening. The canyon's tributary to the East Fork of the Virgin River Canyon possesses excellent topographic screening as it has deep canyons cut in Navajo Sandstone. On the top of the mesa, superior opportunities for solitude occur where one narrow point extends into Elephant Cove. In general, the mesa top is moderately vegetated with shrubs, pinyon-juniper, and occasional open stands of ponderosa pine and would not offer an outstanding opportunity. However, above the upper ends of several canyons, some heavily vegetated areas exist in the more broken ravine or rimrock areas. These pockets offer outstanding opportunities for solitude. Solitude is present on approximately 4,440 acres of the Block Mesas section. Important areas include the East Fork canyon above the Barracks, Bay Bill Canyon, Merwin Canyon, and a point extending into Elephant Cove. Large areas lacking solitude include the Joseph Canyon area east of Clay Flat and the area adjacent to the road above Sethy's Canyon.

The 9,100-acre Elephant Cove area in the southwestern portion of the WSA is bounded by The Barracks section on the north and the Block Mesas on the east and southeast. Elephant Cove can be characterized as a large, sandy area with an extensive forest of pinyon-juniper of moderate density and little topographic relief. Most of Elephant Cove does not exhibit the topographic or vegetation screening necessary to provide out-

standing opportunities for solitude. There are, however, several areas within Elephant Cove where these conditions do not prevail and outstanding opportunities are present. Rock Canyon and several other canyons extend southward from The Barracks. Although these canyons are not as entrenched in Elephant Cove as they are in The Barracks, they do offer opportunities for solitude not found elsewhere in Elephant Cove. Rather than sandy soils, rimrock, slots, and other types of sandstone exposures are typical of the canyons. Ponderosa pine is the most common tree in the canyons. In those canyons where the sandstone is sufficiently dissected, the opportunity for solitude is outstanding. Approximately 900 acres of canyons possess solitude. Much of the terrain at the base of the White Cliffs in the eastern and southern portion of Elephant Cove consists of ravines or sand dunes. For example, sand dunes completely cover the White Cliffs on the north face of Harris Mountain. In many of these situations, visitors could easily screen themselves from one another and the opportunity for solitude is outstanding. This opportunity is available on approximately 1,500 acres.

The Barracks is a section of the Parunuweap Canyon that begins about 3 miles below the Foote Ranch. The Barracks extends across the WSA and then terminates less than 1 mile inside Zion National Park. Approximately 2,200 acres of the WSA are occupied by The Barracks. The Barracks is a canyon consisting of a number of entrenched meanders and narrows. Side canyons are numerous. Riparian vegetation is abundant in both the main canyon and the side canyons. In places, the river occupies the entire floor of the canyon. The topographic and vegetation screening is exceptional and all of The Barracks possesses an outstanding opportunity for solitude.

The sites and sounds of human activities are not present from places within the WSA, with the exception of the Foote Ranch Road which traverses through the unit. Travel along this road can, during certain times of the year, be apparent and would detract from the unit's solitude.

It would be easy for a visitor to find seclusion in The Barracks and White Cliffs areas of the WSA. Seclusion would be much more difficult to find in areas such as Elephant Cove.

In summary, it is felt that approximately 17,600 acres or 57 percent of the WSA present outstanding opportunities for solitude. The topographic and vegetation screening enables visitors to find a secluded spot in the majority of the WSA.

PRIMITIVE AND UNCONFINED RECREATION

The backpacking activity within the WSA was determined outstanding in quality. Portions of the WSA also exhibit a diversity of recreational activities (birdwatching, photography, sightseeing, exploration, rockclimbing, and hunting) that makes the opportunity for primitive recreation outstanding.

The trip through the Parunuweap Canyon and The Barracks into Zion National Park is the focus for backpacking within the WSA. In addition to the usual access through the Foote Ranch (private land), several route variations are possible that are of superior backpacking quality. Access to The Barracks can be gained via the Mineral Gulch and Meadow Creek Canyons. Although the Poverty Wash Canyon route bypasses a portion of The Barracks, it offers excellent backpacking opportunities. It is possible to enter Parunuweap Canyon from the head of Merwin Canyon. There are also tributary canyons that provide side trips during an extended backpack of Parunuweap Canyon. Bay Bill Canyon, lower Rock Canyon, and all of the short canyons in The Barracks section thus add to the backpacking area within the WSA. The canyon system between Poverty Wash and Zion National Park is an additional backpacking objective. This area beneath the White Cliffs is drained by numerous canyons tributary to the unnamed canyon entering the Parunuweap Canyon immediately east of the National Park boundary. In summary, the entire Barracks section, the remainder of the East Fork Canyon, Mineral Gulch, Meadow Creek Canyon, Poverty Wash Canyon, Merwin Canyon, Bay Bill Canyon, and the canyon area east of Zion National Park all contribute to the backpacking activity. Approximately 11,800 acres of the WSA exhibit outstanding opportunities for primitive recreation because of the outstanding quality of the backpacking activity.

In addition to the backpacking area in the canyons, certain other areas possess opportunities for primitive and unconfined recreation. These are areas where a diversity of recreation activities can occur. Hunting, rockclimbing, birdwatching, photography, exploration, and sightseeing activities provide a diversity of activities sufficient to provide an outstanding opportunity. The entire WSA offers opportunity for the hunting and birdwatching activities. Conversely, the rockclimbing activity is limited within the WSA to the White Cliffs and areas in The Barracks. The exploration activity is limited to the more remote sections such as the west Poverty Flat area and The Barracks. Because they occur on a larger

area than the exploration or rockclimbing activities, the photography and sightseeing activities effectively define the area of activity diversity in the WSA.

Much of the Parunuweap Canyon WSA contains scenery of high significance. These scenic features are considered the obvious objectives of any photography or sightseeing activity. Areas of important scenic value include the entire Parunuweap Canyon, Mineral Gulch, and Meadow Creek Canyons, the slickrock country adjacent to the park, the White Cliffs, and the Bay Bill Canyon system. The White Cliffs on the east side of Elephant Cove are of photographic and sightseeing value. Because of their viewing perspectives, the points and peninsulas above Elephant Cove and the Bay Bill East Fork Canyons also provide sightseeing and photographic opportunities.

It is felt that the primitive recreation opportunities on 17,500 acres or 57 percent of the WSA meet the outstanding criterion for lands under wilderness review. Although the WSA has one recreational opportunity of outstanding quality and a diversity of recreational opportunities is present throughout the majority of the WSA, the WSA lacks two or more opportunities of outstanding quality and offers no rare, unusual, or otherwise notable recreation activity.

SPECIAL FEATURES

The Parunuweap Canyon WSA possesses two special features: scenic and historic values.

Several distinctive landscapes are present within the boundaries of the Parunuweap Canyon WSA. Important scenic values are associated with some of these landscapes. In the western portion of the WSA, the Parunuweap Canyon and the White Cliffs landscapes are shared with Zion National Park. The scenic values here are equivalent to those present in the National Park. This portion of the WSA possesses the highest quality scenery to be found in the WSA. Significant scenic values of less quality are found in other areas of the WSA. These areas include the Mineral Gulch/Meadow Creek Canyons, the Bay Bill Canyon system, and the White Cliffs on the east side of Elephant Cove. Scenic values are present on approximately 12,600 acres of the WSA.

The major historical feature is the Elephant Gap Road (Foote Ranch Road) which is believed to follow the route of the pioneer road from Pipe Spring, Arizona to Long Valley, Utah. Approximately 4.50 miles of this route are present in the WSA.

Land Use Plans and Controls

The WSA lies within the BLM's Vermilion Planning Unit which is being managed under the land use decisions of the Vermilion MFP (USDI, BLM, 1981a). The present principal uses within the WSA are livestock grazing, woodcutting, and recreation (both hiking and ORV use). The BLM has surface and subsurface ownership of all 30,800 acres of public land within the WSA's boundary. The State has subsurface and surface ownership of the 640 acres of State land. State lands are managed by the State Land Board for the purpose of generating revenues for the public school system. The Parunuweap Canyon WSA borders Zion National Park on the west. The NPS has recommended the area adjacent to the WSA be designated wilderness. In the past the NPS has expressed a desire that areas adjacent to Zion National Park be managed in a manner that would complement the management established within the Park itself (USDI, NPS, 1976).

Although some recreation use is made of the East Fork of the Virgin River, this is not one of the more significant use areas in or out of the park. One reason for this is because normal access in and out of the river is across private land. It is possible to stay entirely upon public or NPS lands, but it is an inconvenience to hikers to do so.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

The WSA is zoned for multiple use by the county except for approximately 500 acres in the northern portion of the WSA which are zoned for agriculture. There are no recorded rights-of-way, easements, or grants of any type within the WSA's boundary.

The Washington County Water Conservancy District has proposed a 35,000-acre-foot reservoir on the East Fork of the Virgin River within the WSA. The dam would be located near the junction of the river and the Zion National Park Boundary and would back water up to Mineral Gulch. The major purpose of the reservoir would be to provide water storage for irrigation, municipal water, and water based recreation such as boating and fishing. Stabilizing the flow of the river would

provide water year round and increase the efficiency of the Quail Creek Hydroelectric Power Plant that is downstream of the proposed dam. It is estimated that the increase in power output would pay for the project. The feasibility of the project has not been fully investigated and a schedule has not been developed.

Socioeconomics

DEMOGRAPHICS

The WSA is located in Kane County, Utah. Kane is a rural county having an average population density of less than one person per square mile. This density is very low when compared to the State-wide average of 17 persons per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Much of the population in this county (4,024 in Kane County) is concentrated in small communities rather than being evenly distributed throughout the area.

The major population center in the county is the City of Kanab, the county seat. The 1980 population of Kanab and adjacent areas was 4,024 persons (USDC, Bureau of the Census, 1981). Kanab lies along the major access route to the WSA, State Highway 89. Kanab is expected to receive the greatest share of any socioeconomic impacts resulting from designation of the WSA as a wilderness area.

EMPLOYMENT

The economy of Kane County is dominated by the government and services sectors in terms of employment (USDC, Bureau of Economic Analysis, 1982). The three most important sectors of the Kane County economy in terms of 1980 employment are: government and retail trade (each 17 percent of total employment) and services (14 percent). Table 6 presents employment and income figures for Kane County.

It is difficult to estimate current employment and income in the small communities of the area due to the lack of information at the municipal level and restricted disclosure of the available data. It is assumed that most of the nongovernment employment and income in the area is based in the agriculture and services sectors. This is based on available countywide data (Five County Association of Governments, 1982) and the low number of retail trade outlets, government offices, and major industries in the area. The services sector is expected to be a dominant sector because of the importance of services in the community of Kanab.

PARUNUWEAP CANYON WSA

TABLE 6

**Employment and Personal Income
Kane County, Utah**

Industrial Sector	Employment	Personal Income (\$1,000)
Total	1,452	12,595
Proprietors	382	2,623
Farm Proprietors	122	136
Nonfarm Proprietors	260	2,487
By Industry Source		
Farm	27	382
Nonfarm	1,043	12,213
Private	798	9,614
Ag. Serv., For., Fish., and Other	(L)	0
Mining	17	196
Construction	51	1,544
Manufacturing	70	566
Nondurable Goods	(D)	(D)
Durable Goods	(D)	(D)
Transportation and Public Utilities	150	1,875
Wholesale Trade	12	230
Retail Trade	252	2,364
Finance, Insurance, and Real Estate	39	392
Services	202	2,427
Government and Government Enterprises	245	2,599
Federal, Civilian	18	252
Federal Military	30	78
State and Local	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.
(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include livestock production, woodland production, and recreation. Table 7 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

No oil and gas or minerals have been produced in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Eight livestock operators have a total grazing privilege of 330 AUMs within the WSA. If all this forage were utilized, it would account for \$6,600 of livestock sales and \$1,650 of ranchers' returns to labor and investment.

Some woodland products are harvested from the WSA; however, the harvests have been relatively small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

TABLE 7

Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$90,540
Mineral Production	0	0
Livestock Grazing	\$6,600	\$462
Woodland Products	Unknown	Unknown
Recreational Use	Less than \$5,740	0
Total	Less than \$12,340	Up to \$91,002

Source: BLM. File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local sales that would be generated by these expenditures.

The WSA's nonmotorized recreational use is moderate and related local expenditures are low. The WSA's motorized recreational use is moderate. Related local expenditures are well distributed and cannot be measured. 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 statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Parunuweap Canyon WSA is estimated as about 1,400 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane County.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 7).

Mineral leases in the WSA cover approximately 30,180 acres. At up to \$3 per acre, lease rental fees generate up to \$90,540 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 330 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$462 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas, locatable mineral, and coal exploration and development. The area would be open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough

terrain and low resource potential. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: coal, 500 acres; oil and gas, 160 acres; and uranium, 40 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.) A proposed wildlife chaining and seeding would also disturb 1,800 acres and a proposed reservoir on the East Fork of the Virgin River would be allowed.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If coal and other minerals are developed, air quality could be reduced up to the PSD Class II limitations; however, the proximity of the WSA to Zion National Park may result in restriction of mineral development to meet PSD Class I limitations. Disturbance of 700 acres would result in increases in fugitive dust emissions. The amount would depend upon reclamation practices and dust control measures. There would be slight increases in fugitive dust during the chaining and reseeded of 1,800 acres of pinyon-juniper woodland; however this is not expected to exceed air quality limitations.

GEOLOGY

Impacts to geology could occur because surface disturbances associated with coal, locatable minerals, and oil and gas exploration and development activities would probably occur on about 700 acres. Coal mining would occur by surface mining methods. This could affect the WSA's geology.

SOILS

It is estimated that up to 700 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 700 acres would increase from 910 cubic yards/year to 1,890 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss due to mineral development in the WSA would increase by approximately 980 cubic yards (2.6 percent) over current annual soil loss. This is a small increase and the effects would likely be imperceptible because of the high salinity currently in the streams.

The 1,800-acre chaining and seeding would cause a temporary (2 to 3 year) increase in soil loss. However, once the new seedings were established, a reduction from the current rate of soil loss could be expected.

VEGETATION

The anticipated maximum of 2,500 acres disturbed (700 from minerals and 1,800 from pinyon-juniper chaining) would impact the area's sparse vegetation. While this impact would occur on approximately 8 percent of the WSA there would not be a significant impact to the area as a whole. Approximately 200 acres of riparian vegetation would be inundated by the proposed reservoir.

Depending on the location of disturbance, there could be conflicts with protection of Zion tansy (*Sphaeromeria ruthiae*), a FWS candidate species under review for threatened or endangered status. Before authorizing surface-disturbing activities (2,500 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate informal consultation with the FWS as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Since precipitation is low and existing streams are heavy carriers of silt, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 980 cubic yards of annual soil loss from mineral-related surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Vermilion Planning Unit. The reservoir on the East Fork of the Virgin River could be built and would create a permanent source of water in the central part of the WSA. It would stabilize flows and probably improve water quality in the river.

The chaining and reseeded of 1,800 acres of pinyon-juniper could cause a temporary (2 to 3 year) increase in TDS. However, after the new seedings were established, water quality could be expected to improve.

Mineral exploration and development in the area is generally confined at or near the surface or with

widely spaced wells and, with the exception of coal activities, would not significantly impact ground water. Surface coal mining to a maximum depth of 300 feet could impact ground water. Although the extent is unknown, all activities would have to comply with State and Federal water laws.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The potential for up to 10 million barrels of oil in-place (3 million estimated recoverable) and up to 60 billion cubic feet of natural gas (18 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 and 3 stipulations, and would not be affected by the adoption of this alternative. Existing leases on 2,411 acres that are now closed to leasing (Category 4) would not be reissued. Approximately 620 unleased acres would remain closed to leasing. Approximately 160 acres of surface disturbance could take place if exploration and development were to occur on the 20,186 acres open to leasing with standard stipulations. Oil and gas could also be produced on the 7,583 acres open to leasing without surface occupancy (Category 3). However, due to the small size of deposits, no development is expected.

Coal

An estimated coal resource of 1 million tons of in-place coal on 500 acres is found in the WSA. This resource is not currently leased. However, the resource could be explored and developed in the future and would not be affected by this alternative. It is estimated that up to 500 acres of surface disturbance would occur from coal strip mining. The likelihood of coal production is thought to be minimal in the WSA because the coal quality is poor and part of the coal has been subject to coal fires.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 2,300 tons of uranium oxide in the Leeds potential resource area and deposits of up to 500 tons in the remaining portion of the WSA could be developed. Approximately 40 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood for development is thought to be minimal in the near future because of economic considerations (e.g., transportation, low

potential, etc.). There are currently no mining claims in the WSA.

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of one water catchment, one livestock reservoir, and the improvement and maintenance of springs. The reservoir proposed on the East Fork of the Virgin River would provide a permanent water source in the WSA and could provide a new aquatic habitat within the WSA. However, stabilization of water flow in the Virgin River could have a negative affect on the endangered wound fin minnow downstream of the WSA. The effects on these species would be analyzed in an independent study of the reservoir project if an official application is submitted to BLM and/or the Corps of Engineers.

Wildlife habitat would be improved by chaining and seeding 1,800 acres of deer habitat. However, disturbance of an estimated 700 acres (2.2 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer, cougar, and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Less mobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels. The bald eagle, who uses the area for winter roosting, would also avoid the disturbed area.

FOREST RESOURCES

The WSA has good stands of pinyon-juniper for posts and firewood cutting. The proposed land treatments and mineral activity would reduce the supply of these resources. However, after the initial chaining, there would be an increase in the dead-and-down wood supply.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Vermilion MFP. The 330 AUMs currently allocated in the WSA are controlled by eight livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. The limited motorized vehicle use for livestock management purposes would continue. The one spring development, one catchment, one reservoir, nine troughs, and 3.75 miles of pipeline and the proposed reservoir on the East Fork of the Virgin River could be developed and would result in improved livestock distribution.

VISUAL RESOURCES

Under this alternative, visual quality in the WSA would be partially protected by limitations placed on potential surface-disturbing activities (ORV use on 7,100 acres would be restricted to existing roads and trails, 3,031 acres would be closed to oil and gas leasing, 7,583 acres would be closed to surface occupancy, and 17,200 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, under this alternative, 1,800 acres of vegetation manipulation and 700 acres of mineral-related exploration and development along with a reservoir on the East Fork of the Virgin River are possible. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity for mineral and energy development. VRM objectives would probably not be met in VRM Class II areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. The reservoir would be a permanent intrusion and would probably not meet VRM Class II standards. Visual quality could be significantly reduced in the WSA as a whole.

CULTURAL RESOURCES

The archaeological resources in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 700 acres by mineral exploration and development and 1,800 acres by pinyon-juniper chaining as well as potential inundation by a proposed reservoir under this alternative could affect archaeological sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism would continue to be a problem and would increase in proportion to the general population increase.

RECREATION

The quality of the user's primitive recreational experience would be reduced by surface-disturbing activities. Under this alternative 1,800 acres of vegetation manipulation would occur and mineral-related exploration and development are possible on 700 acres. If roads, vehicular ways, and drill pads are located throughout the

WSA (worst-case analysis), primitive recreational opportunities could be lost in the area altogether. However, roads and ways created for energy and mineral exploration and development would improve access into the area for nonprimitive recreation. Sixteen miles of way would be left open to ORV use.

Construction of a reservoir with inundation of the East Fork of the Virgin River would block an access way for backpacking into Zion National Park that is a main attraction for visitors to the WSA. However, water-based recreation associated with the proposed reservoir could lead to increases in nonprimitive recreation.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 1,400 current visitor days per year to 2,080 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 350 visitor days per year to about 520 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing, etc.) would increase from 350 visitor days per year to 520 visitor days. ORV play activity would increase from 700 visitor days per year to 1,040 visitor days per year.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Vermilion MFP. Under this alternative, wilderness characteristics in the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e., ORV use would be restricted to existing roads and trails on 7,100 acres, 3,031 acres would be closed to oil and gas leasing, and 17,200 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, under this alternative 1,800 acres of vegetation manipulation would occur and 700 acres of mineral exploration and development are possible. The related surface disturbance would result in a significant loss of naturalness and outstanding opportunities for solitude and primitive, unconfined recreation throughout the WSA as a whole if roads, vehicular ways, and drill pads are

located throughout the area. The potential for mineral development and related disturbance is low in this WSA.

The reservoir proposed on the East Fork of the Virgin River would inundate an area with outstanding opportunity for solitude and primitive and unconfined recreation.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use, but it would not complement the NPS proposal of wilderness designation for the adjacent NPS lands because the WSA would not be recommended as wilderness. This alternative is based on implementation of the current BLM Vermilion MFP and is, therefore, in conformance with it. The No Action Alternative would be consistent with State of Utah plans and policies which emphasize economic return and would allow for construction of a reservoir on the East Fork of the Virgin River proposed by the Washington County Water Conservancy District if in conformance with the BLM Vermilion MFP.

SOCIOECONOMICS

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 with the exception that oil and gas leases on 2,411 acres would expire and would not be reissued. If the uranium, coal, and oil and gas in the WSA were developed it would lead to an increase in employment and income for Kane County. However, the probability of economic development of minerals within the WSA is low.

There would be no livestock-related economic losses because the existing grazing use (330 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotments would continue to produce \$6,600 annually in livestock sales and \$1,650 of ranchers' return to labor and investment.

Any economic benefits of a reservoir proposed for the East Fork of the Virgin River could be realized. The costs, benefits, and feasibility of the reservoir have not been studied, but would be analyzed in an independent study of the proposal if an official application is made to the BLM and/or Corps of Engineers.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local

expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase to 2,080 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy. Surface-impacting activities and a proposed reservoir that could be allowed without designation could increase recreational use due to improved access and the availability of water based recreation.

Federal and State revenues would be reduced slightly by this alternative. There are 2,411 acres in the WSA closed to leasing. These areas were leased prior to the establishment of the oil and gas category system. These leases would not be reissued; therefore, there would be a reduction of up to \$7,233 in annual revenues to the Federal and State Government. Although the likelihood is low, approximately 500 acres of coal leases could be issued and bring up to an additional \$1,500 per year in Federal leasing revenues. Collection of livestock grazing fees (\$462 per year) would continue.

All Wilderness Alternative (30,800 Acres) (Proposed Action)

As identified in the Description of the Alternatives section, the major changes that could occur in the 30,800-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The proposed 1,800-acre pinyon-juniper chaining and seeding would not be allowed. About 16 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that mining claims would be located prior to designation and would eventually be explored and developed, causing an estimated 40 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities and that coal would not be leased (there are presently no leases). Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed (Appendix 10 lists surface disturbance assumptions and estimates for the WSA) and a reservoir proposed for

the East Fork of the Virgin River would not be allowed.

Because potentially disturbed areas for this alternative would be smaller than under the No Action Alternative (40 vs. 2,500 acres [700 acres from mineral exploration and development and 1,800 acres from pinyon-juniper chaining]), the impacts from development and surface disturbance on air quality, geology, soils, vegetation, water, forest, and cultural resources under the All Wilderness Alternative would be insignificant. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur unless the work could be done in a manner nonimpairing to wilderness values. The proposed water-related range improvements would be analyzed on a case-by-case basis to determine if they could be constructed. It is doubtful if the proposed livestock reservoir and catchment could be built.

Locatable mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 30,180 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA. Existing pre-and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of potential oil and gas recovery.

Coal

The extreme northern tip of the WSA may have potential for coal development. Approximately 500 acres of the WSA have an estimated 1 million tons of coal in-place. Part of the coal has been subjected to coal fires; therefore, it is unknown how much coal is recoverable. None of the coal is presently leased and it would not be leased under this alternative. It is, therefore, concluded that up to 1 million tons of coal resource under this alternative would be foregone. However, the potential for this resource is low within the WSA, and the likelihood for development is thought to be minimal.

Locatable Minerals

There are presently no mining claims in the WSA; however, claims can be located up to the time of designation. Up to 2,300 tons of uranium in the Leeds potential resource area and up to 500 tons of recoverable uranium oxide in the remainder of the area could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case, the potential for recovery of the uranium oxide would be foregone.

It is estimated that up to 40 acres could be disturbed due to exploration of locatable mineral resources, primarily uranium, should this alternative be adopted. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, the proposed 1,800 acres of chaining and seeding for wildlife habitat improvement would not be allowed. If future land treatments and water improvements were curtailed, potential habitat for deer and nongame species would be reduced.

In addition, disturbance due to exploration of locatable mineral resources on 40 acres could disrupt wildlife populations and result in these species leaving the area.

The occasional presence of bald eagle would remain the same in much of the WSA, except on

those 40 acres of mineral disturbance where this species would leave the area. Any benefits to aquatic habitat from the reservoir proposed on the East Fork of the Virgin River would be lost and potential effects on endangered fish in the Virgin River would be avoided.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Vermilion MFP. The 330 AUMs currently allocated in the WSA are controlled by eight livestock permittees. Since limited use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to preserve wilderness values. In the case of the one reservoir, one catchment, one spring development, nine troughs, and 3.75 miles of pipeline proposed, which of these would be allowed, if any, is unknown since each would be considered on a case-by-case basis.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under 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), through closure of the area to ORVs, and through closure of the entire area to future mineral leasing and location.

Under this alternative the disturbance from 1,800 acres of planned vegetation manipulation would not occur and the possible mineral-related surface disturbance would be reduced from 700 acres to 40 acres, associated with development of valid mining claims. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. If roads for development of valid mining claims (worst-case analysis)

could not be denied, VRM Class I objectives may not be met on portions of the WSA. Because the potential for development of mining claims is low, visual quality would probably not be reduced in the WSA as a whole. Any negative effects from construction of a dam and reservoir on the East Fork of the Virgin River would be avoided.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although primitive recreation use is currently moderate (about 1,400 visitor days a year), the WSA has outstanding primitive recreational values. If designated, those high quality recreational opportunities would be recognized, managed, and preserved. However, the woodcutting and dune buggy travel in the Elephant Cove area (700 visitor use days) would be eliminated. Approximately 16 miles of ways would be closed to use.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 1,040 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. 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 vicinity of the WSA. The potential for water based recreation on a reservoir on the East Fork of the Virgin River would be lost.

Mineral-related surface disturbance on up to 40 acres could cause localized impairment of values. If roads for development of valid mining claims could not be denied, the quality of primitive recreational opportunities would be reduced.

Because the potential for mineral production is low and wilderness designation would reduce the potential for surface disturbance, the quality of the primitive recreational experience would likely be preserved throughout the area.

It is concluded that this alternative could benefit primitive recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of primitive recreational values. ORV use, however, would be eliminated, which has historically been the greatest recreational use.

WILDERNESS VALUES

Designation and management of all 30,800 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive recreation. Solitude would be preserved on approximately 17,600 acres that meet and 13,200 acres that do not meet the standards for outstanding opportunities. Naturalness would be preserved on all 30,800 acres and primitive and unconfined recreation would be preserved on 17,500 acres that meet and 13,300 acres that do not meet the standards for outstanding opportunities. The special scenic and historic features in this WSA would also be protected and preserved.

No development of leases is foreseen under this alternative. The possible mineral-related surface disturbance would, therefore, be reduced from 700 acres to 40 acres for development of valid mining claims. Mitigation to protect wilderness values would be considered during mining claim development, but road construction and use of motorized equipment could be allowed for development of valid mining claims if there are no reasonable alternatives. Because there are presently no mining claims and potential for mineral development is low, no significant impact to wilderness values is expected. However, mineral-related disturbance, including access, would eliminate naturalness and the opportunities for solitude and primitive, unconfined recreation on the affected areas and could reduce these values in the area as a whole if disturbance occurred over a broad area.

Outstanding opportunities for seven recreational activities (backpacking, bird watching, photography, exploration, rockclimbing, hunting, and sightseeing) would be preserved. Although recreational use could increase, use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous NPS wilderness proposal. These areas share a common watershed, canyon system, extended recreation travel trails (hiking and backpacking), and archaeological values.

Thus, it is concluded that wilderness designation and management of all 30,800 acres of the Parunuweap Canyon WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 17,600 acres) and primitive recreation (outstanding on 17,500 acres) except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

This alternative would complement the NPS wilderness proposal for the adjacent proposed wilderness area in Zion National Park. The existing BLM Vermilion MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Vermilion MFP.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, designation would conflict with the Master Plan because oil and gas leases would not be reissued and future leasing and location of minerals would not be allowed.

If the 1,280 acres of State land within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns.

Wilderness designation would conflict with the proposal of the Washington County Water Conservancy District to construct a dam and reservoir on the East Fork of the Virgin River. The feasibility of the reservoir has not been fully studied.

SOCIOECONOMICS

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 7) as well as loss of poten-

tial increases in income and Federal revenues that could occur under the No Action Alternative.

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 oil and gas 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 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$6,600 of livestock sales and \$1,650 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. However, no such potential range improvements have been proposed.

Any economic benefits from power generation, irrigation, recreation, etc. associated with the reservoir proposed on the East Fork of the Virgin River would be lost. The uses, value, and feasibility of the reservoir have not been fully studied, but will be addressed in an independent study if an official application is made to BLM and/or the Corps of Engineers.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is moderate (700 visitor days per year). The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 27,769 acres of oil and gas leases that could continue under the No Action Alternative would cause an eventual loss of up to \$83,307 per year of lease fees to the Federal Treasury. In addition, the potential to lease 500 acres of coal would be foregone resulting in a potential loss of up to \$1,500 per year to the Federal Treasury.

**Partial Wilderness Alternative
(14,100 Acres)**

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 14,100-acre area designated as wilderness and the 16,700-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, mining claims would be located before designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities and that coal (100 acres) would not be leased. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed.

It is assumed that, within the nondesignated area, 510 acres would be disturbed sometime in the future due to uranium (20 acres), oil and gas (90 acres), and coal (400 acres) exploration and development. Overall, 530 acres of surface disturbance due to mineral development would occur within the WSA, 170 acres less than under the No Action Alternative and 490 acres more than with the All Wilderness Alternative. (Appendix 10 lists the mineral-related surface disturbance assumptions and estimates for the WSA.) The proposed 1,800-acre pinyon-juniper chaining and reseeding would be in the nondesignated area and the impacts would be the same as identified in the No Action Alternative.

It is also assumed that a proposed reservoir on the East Fork of the Virgin River would not be allowed.

The analysis of the No Action Alternative, based on 700 acres of surface disturbance (due to mineral development) shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes 530 acres of surface disturbance due to mineral development.

The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. All of the area that is now within the Category 4 area (closed to leasing) would be within the designated area. There are approximately 13,480 acres of oil and gas leases in the area that would be designated wilderness. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas falls within the area that would be designated as wilderness under this alternative. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potential resource of up to 1.4 million barrels of oil and 8 billion cubic feet of natural gas could be foregone. This would allow recovery of 1.6 million more barrels of oil and 10 billion more cubic feet of natural gas than with the All Wilderness Alternative.

It is concluded that, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, this alternative is not expected to result in any significant loss in recovery of the oil and gas resource.

Coal

Approximately 100 acres of the in-place coal are within the portion of the WSA that would be designated wilderness. This acreage is presently not leased. It is assumed that this coal would not be leased and would result in 200,000 tons of in-place coal foregone. However, the potential for this resource is low within the WSA, and the likelihood for production is small even without wilderness designation.

Locatable Minerals

There are presently no mining claims in the WSA; however, claims can be located up to the time of designation. Development work, extraction, and patenting could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined

valid) would be closed to prospecting and development (USDI, BLM, 1981b).

It cannot be determined how much of the potentially recoverable 2,300 tons of uranium oxide in the Leeds potential resource area and the 500 tons of uranium oxide in the remainder of the WSA are within the area that would be designated as wilderness under this alternative. Assuming that the locatable minerals are evenly distributed in the WSA and that the mineral deposits were not included in mining claims filed before designation, the potential for recovery of the uranium in the designated area would be foregone. This could allow for recovery of 1,500 more tons of uranium oxide than the All Wilderness Alternative.

Because this metal is not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

LIVESTOCK

The effect of designation of 14,100 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the 330 AUMs allocated, 145 would be within the designated portion of the WSA and 185 within the nondesignated portion. Development of future roads or other livestock management facilities for use with 145 AUMs in the designated portion could be restricted to preserve wilderness values. Because no improvements have been proposed in the designated portion of the WSA and motorized vehicles are used very little in livestock management, little effect on the management of livestock grazing is expected.

VISUAL RESOURCES

Because total mineral-related surface disturbance in the WSA would be 530 acres under this alternative as opposed to 700 acres under No Action and 40 acres under All Wilderness, the impact on visual resources would be less than under the No Action Alternative and slightly more than under the All Wilderness Alternative. In the portion recommended for designation, 20 acres of surface disturbance resulting from mineral exploration and development would cause localized long-term degradation of scenic values and would exceed VRM Class I management objectives. An additional 510 acres in the nondesignated portion of the WSA could be disturbed and would not meet VRM Class II objectives. Disturbance of a

total of 530 acres within the WSA would result in localized long-term impairment of visual values and could significantly affect visual resources in the WSA as a whole.

RECREATION

Impacts on recreation values and opportunities for the 14,100-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to the lack of such activity in the area; however, approximately 6 miles of ways within the WSA would be closed to ORV use.

In the area that would not be designated (16,700 acres), little change in recreational use is expected.

WILDERNESS VALUES

Impacts to wilderness values would be the same as under the All Wilderness Alternative on the 14,100 acres that would be designated wilderness. Size, naturalness (all 14,100 acres affected are natural), outstanding opportunities for solitude (12,100 acres that meet and 2,000 acres that do not meet the standards) and primitive recreation (including 13,900 acres that meet and 200 acres that do not meet the standards), and special features would be preserved. Although recreational use could increase (refer to Recreation section under the All Wilderness Alternative), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreation values would be expected. There could be some loss of wilderness values due to allowable surface disturbance from mineral exploration activities on up to 20 acres. Additionally, sights, sounds, and emissions of activities within and adjacent to the 16,700-acre area that would not be designated could result in loss of solitude and primitive recreational values within the designated portion.

In the 16,700-acre area that would not be designated, there could be 510 acres of disturbance from mineral and energy exploration and development activities. Those activities could degrade wilderness values (naturalness, special features, and opportunities for solitude and primitive recreation) from the commencement of activities through rehabilitation. There would be a loss of naturalness on the 1,800 acres proposed for vegetation manipulation. Thus, slight long-term impairment of wilderness values in the portion that could not be designated would be expected. Additionally, the sights, sounds, and emissions of those mineral and energy activities could impair

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solitude and primitive recreation values in the portion that would be designated.

The portion that would be designated is contiguous with the proposed wilderness in Zion National Park and would, therefore, complement NPS management.

LAND USE PLANS AND CONTROLS

This alternative would complement the NPS proposal, because the designated portion would be contiguous with these lands. Designation of 14,100 acres as wilderness would not conform to the *Kane County Master Plan*, as discussed in the All Wilderness Alternative. Designation would not be in conformance with the Vermilion MFP; Congressional designation would constitute an amendment of the MFP. If the 640 acres of State land within the designated area are exchanged for lands outside the wilderness area, this alternative would not conflict with the State policy to maximize economic returns.

Partial wilderness designation would conflict with the proposal of the Washington County Water Conservancy District to construct a dam and reservoir on the East Fork of the Virgin River. The feasibility of the reservoir has not been fully studied.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any changes in existing patterns and trends of population, employment, and local income distribution. The 330 AUMS and \$462 in grazing fees (\$6,600 in sales or income and \$1,650 in returns to ranchers) would continue. Any economic benefits of a proposed reservoir on the East Fork of the Virgin River would be lost. Up to \$33,207 per year in Federal oil and gas leasing revenue, (\$50,100 less than with the All Wilderness Alternative), would be lost as oil and gas leases would not be reissued. An additional potential of up to \$300 in coal lease fees would also be lost, but \$1,200 in coal lease fees would be possible from the nondesignated portion. Overall, the local economic impact from this alternative would be considered insignificant as would economic impacts from the No Action and All Wilderness Alternatives.

Partial Wilderness Alternative (7,400 Acres)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness

Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 7,400-acre area designated as wilderness and the 23,400-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, mining claims would be located before designation and would eventually be explored and developed, causing an estimated 10 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. No coal resources are found in the designated portion of the WSA.

It is assumed that, within the nondesignated area, 650 acres would be disturbed sometime in the future due to uranium (30 acres), oil and gas (120 acres), and coal (500 acres) exploration and development. Overall, 660 acres of mineral-related surface disturbance would occur within the WSA; 40 acres less than under the No Action Alternative, 610 acres more than with the All Wilderness Alternative, and 130 acres more than the Partial Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) The proposed 1,800-acre pinyon-juniper chaining and reseeded would be in the nondesignated area and the impacts would be the same as identified in the No Action Alternative.

It is also assumed that a proposed reservoir on the East Fork of the Virgin River would not be allowed.

The analysis of the No Action Alternative, based on 700 acres of mineral-related surface disturbance and development, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which is based on 650 acres of surface disturbance.

Restrictions on management and development methods within the designated portion of the WSA would result in essentially the same impacts on development of water sources, mineral and energy resources, wildlife, and land use plans as described for the All Wilderness Alternative. However, the magnitude would be less because only 7,400 acres would be designated wilderness.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. All of the Category 4 area would be in the designated portion. There are approximately 6,780 acres of oil and gas leases in this area. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas falls within the area that would be designated as wilderness and closed to leasing under this alternative. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated to be recoverable. It is assumed that the loss of potential resource recovery would be in direct proportion to the size of the area designated. Using this assumption, exploration and development of a potential resource of up to .7 million barrels of oil and 4 billion cubic feet of natural gas could be foregone. This would allow recovery of 1.3 million more barrels of oil and 14 billion more cubic feet of natural gas than with the All Wilderness Alternative.

It is concluded that, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, this alternative is not expected to result in any significant loss in recovery of the oil and gas resource.

Coal

None of the WSA's coal resource would be in the designated portion of the WSA; therefore, the coal resource could be developed as described in the No Action Alternative.

Locatable Minerals

There are no mining claims presently in the WSA; however, claims can be located up to the time of designation.

In the designated area, development work, extraction, and patenting could occur on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981b).

It cannot be determined how much of the potentially recoverable 2,300 tons of uranium oxide in the Leeds potential resource area and the 500

tons of uranium oxide in the remainder of the WSA are within the area that would be designated as wilderness under this alternative. Assuming that the locatable minerals are evenly distributed in the WSA and that the mineral deposits are not included in mining claims filed before designation, the potential for recovery of up to 672 tons of uranium oxide would be foregone. This would allow for recovery of 1,628 more tons of uranium oxide than the All Wilderness Alternative.

Because these metals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

LIVESTOCK

The effects of designation of 7,400 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the 330 AUMs allocated, 80 would be within the designated portion of the WSA and 250 within the nondesignated portion. Development of future roads or other livestock management facilities for use with the 80 AUMS in the designated portion could be restricted to preserve wilderness values. Because no developments have been proposed in the designated portion of the WSA and motorized vehicles are used very little in livestock management, little effect on the management of livestock grazing is expected.

VISUAL RESOURCES

Because total mineral-related surface disturbance in the WSA would be 660 acres under this alternative, as opposed to 700 acres under the No Action Alternative and 40 acres under the All Wilderness Alternative, the impact on visual resources would be less than under the No Action and slightly more than under the All Wilderness Alternatives. In the portion recommended for designation, 10 acres of surface disturbance resulting from mineral exploration and development could cause localized long-term degradation of scenic values and exceed VRM Class I management objectives. An additional 650 acres in the nondesignated portion of the WSA would be disturbed and would not meet VRM Class II objectives. On 500 acres (now managed under Class IV objectives) that would be disturbed by coal development, long-term impairment of visual values would result. Disturbance of a total of 660 acres within the WSA would result in localized long-term impairment of visual values and could significantly affect visual

resources in the WSA as a whole. However, the likelihood of this occurring is low because of the WSA's low potential for mineral development.

RECREATION

Impacts on recreational values and opportunities for the 7,400-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to the lack of such activity in the designated area; however, approximately 2 miles of ways within the WSA would be closed to ORV use.

In the area that would not be designated (23,400 acres), little change in recreational use is expected due to the limited recreational values.

WILDERNESS VALUES

Impacts to wilderness values would be the same as under the All Wilderness Alternative on the 7,400 acres that would be designated wilderness. Designation and management of 7,400 acres of the WSA as wilderness would ensure the preservation of the wilderness values of size, naturalness (all 7,400 acres appear natural), and outstanding opportunities for solitude (including 6,400 acres that meet the standard and 1,000 acres that do not meet the standard) and primitive and unconfined recreation (including 7,400 acres that meet the standard). Although recreational use could increase (refer to the Recreation section under the All Wilderness Alternative), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Wilderness designation would contribute to the preservation of the area's wilderness values on 7,400 acres. Under this alternative, the potential for surface-disturbing activities that could impair wilderness values would be reduced in the designated portion of the WSA through management under VRM Class I (which generally allows for only natural ecological change), through closure of the area to ORV use, and through closure of the entire area to future mineral leasing and location. There could be some loss of wilderness values due to 10 acres of surface disturbance from locatable mineral exploration and development.

In the 23,400-acre area that would not be designated, there would be 650 acres of disturbance from mineral and energy exploration and development activities. Those activities would degrade wilderness values (naturalness, special features, and opportunities for solitude and primitive recreation) from the commencement of activities through rehabilitation. There would be a loss of naturalness on the 1,800 acres proposed for vegetation manipulation. Thus, long-term impairment of wilderness values in the portion that would not be designated would be expected. Additionally, the sights, sounds, and emissions of those mineral and energy activities could impair solitude and primitive recreation values in the portion that would be designated.

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use Plans and Controls section as described for the All Wilderness Alternative. This alternative would complement the NPS proposal, because the designated portion would be contiguous with their wilderness proposal. There are no State lands within the wilderness area under this alternative. Partial wilderness designation would conflict with the proposal of the Washington County Water Conservancy District to construct a dam and reservoir on the East Fork of the Virgin River. The feasibility of the reservoir has not been fully studied.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any changes in existing patterns or trends in population, employment, and local income distributions. The 330 AUMs would remain available to cattle in the nine allotments. The \$462 in grazing fees (\$6,600 in sales and \$1,650 in returns to ranchers) would continue to be generated. Any economic benefits of a proposed reservoir on the East Fork of the Virgin River would be lost. Up to \$13,107 per year in Federal oil and gas leasing revenue (\$70,200 less than with the All Wilderness Alternative) would be lost as oil and gas leases would not be reissued. Overall, the local economic impacts from this alternative would be considered insignificant, as would economic impacts from the No Action and All Wilderness Alternatives.

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Canaan Mountain WSA



CANAAN MOUNTAIN WSA

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CANAAN MOUNTAIN WSA

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INTRODUCTION

General Description of the Area

The Canaan Mountain Wilderness Study Area (WSA) is located in southeastern Washington County, Utah and southwestern Kane County, Utah. The WSA consists of 47,170 acres of public land. Approximately 42,858 acres are in Washington County and 4,312 acres in Kane County. The WSA adjoins the recently designated BLM Cottonwood Point Wilderness Area in Arizona. Approximately 3,250 acres of State land and 160 acres of private land are located within the WSA.

The WSA is located approximately 25 miles west of Kanab, Utah and is bordered by Zion National Park on the north. Canaan Mountain is a spectacular plateau that towers 2,000 feet above the surrounding lands. From the slickrock of the plateau top, a panorama of Zion National Park, the Arizona Strip, and the Pine Valley Mountains is visible. There is a variety of vegetation, including hanging gardens, ponderosa pine, Douglas fir, aspen, sage, maple, and pinyon pine.

The WSA has a cold desert climate. Annual precipitation averages approximately 12 to 15 inches with about half occurring in the form of winter snow and half as summer thunderstorms. Temperatures are usually mild but may reach into the high 90s during summer and dip below 0 degrees Fahrenheit (F) in winter.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the study phase are private lands, water rights, rangeland treatments, and potential for an air quality classification change from Class II to I. Issues and concerns specific to Canaan Mountain WSA raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* Flood control development may be needed in Canaan Mountain WSA. Would these structures or improvements be preserved if the area were designated wilderness?

Response: Flood control developments could be constructed in the WSA if designated wilderness, as noted in the Description of the All Wilderness Alternative. However, no need

for specific flood control developments has been identified.

2. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede developments in local communities.

Response: The WSA currently supplies some irrigation and culinary water. These uses could continue following wilderness designation. A reservoir proposed in the WSA on South Creek that would provide water for sprinkle irrigation of about 200 acres of potential farmland would not be allowed unless specifically approved by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). This information is included in the Environmental Impact Statement (EIS) for consideration by BLM and others.

3. *Comment:* Private water rights are held on Maidenhair and Stateline Springs (which have been improved) and on Cottonwood Spring (which has plans for improvement and a pipeline in the near future).

Response: This area is no longer in the WSA because of the Arizona Wilderness Act of 1984.

4. *Comment:* Potential water development for livestock grazing is an issue.

Response: Water developments for livestock are discussed in the Description of the Alternatives section. Seven springs, four reservoirs, and one water catchment have been proposed in the BLM's planning process.

5. *Comment:* The area offers outstanding scenery, views of Zion National Park, the Pink Cliffs, Markagunt Plateau, and the Arizona Strip.

Response: Scenery has been identified as a wilderness special feature and is discussed in the Affected Environment, Wilderness Values section.



6. *Comment:* Water Canyon, Smithsonian Butte, Eagle Crags, the plateau summit, and surrounding lands need adequate protection.

Response: The recreational and scenic values of these areas are described in the Affected Environment, Wilderness Values section. Protection of these areas is analyzed in the Environmental Consequences section.

7. *Comment:* Livestock grazing and range support activities should not be an issue in this WSA because Canaan Mountain borders Zion National Park. The full wilderness potential of this WSA should be retained.

Response: Livestock grazing is a historical use in the WSA. Wilderness designation could conflict with and/or preclude proposed developments for livestock (refer to the Environmental Consequences of Alternatives, All Wilderness Alternative section). BLM will review and consider all information concerning this WSA before making its final recommendation on wilderness suitability.

8. *Comment:* Cottonwood Canyon in the Cottonwood Allotment is used to trail livestock to and from the Goat Ranch Allotment. This trail is not shown on BLM maps of existing range improvements. The continued use of this trail under wilderness designation is a concern.

Response: Historical grazing practices, such as livestock trailing, will be allowed to continue. Refer to the Description of the Alternatives, All Wilderness Alternative section.

9. *Comment:* The WSA has remarkable wilderness values and low known mineral or commercial values, but the boundaries need to be carefully refined.

Response: A Partial Wilderness Alternative has been developed that recognizes the high wilderness values of the WSA, areas without high wilderness values, and resource conflicts.

10. *Comment:* The WSA does qualify in terms of size, but size is not the only qualification.

Response: BLM acknowledges that other qualifications also are important. BLM has utilized, collectively, all of the standards and criteria set forth in the "Wilderness Study Policy" (USDI, BLM, 1982b) as qualifications for wilderness consideration.

11. *Comment:* The impacts to solitude re-

sulting from air routes over the WSA should be considered.

Response: Outside sights and sounds were considered when identifying the area's outstanding solitude. Commercial airline flights were not considered to significantly impact the area's solitude.

12. *Comment:* Do outstanding opportunities exist in Cottonwood Canyon (the Draft Site-Specific Analysis [SSA] says not)?

Response: Cottonwood Canyon does not provide outstanding opportunities for solitude.

13. *Comments:* (1) There is potential for boundary adjustment on the southwest to permit road improvement and flood control measures, plus land exchange of two sections of State land and a planned reservoir in the Arizona portion; (2) Boundaries of this WSA should follow topographical features in the Arizona portion rather than from legal subdivisions; (3) To facilitate management, boundaries should follow the rims rather than legal survey lines; and (4) The northern boundary, as drawn in the preliminary planning suitability recommendations, was drawn with regard to natural features which form a logical boundary.

Response: The southern portion of the unit that is in Arizona has been designated as wilderness and thus eliminated from further study by the Arizona Wilderness Act of 1984. Topographic boundaries were used to delineate the Cottonwood Point Wilderness Area. A Partial Wilderness Alternative has also been developed to reduce known resource conflicts and follow topographic features in Utah. (Refer to the Description of the Alternatives, Partial Wilderness Alternative section.)

14. *Comment:* The EIS should discuss land use conflicts as a result of wilderness designation (especially around the perimeter and near private land holdings).

Response: The Affected Environment and Environmental Consequences sections identify and discuss any conflicts with land use plans and private in-holdings.

15. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping two comments regarding boundary changes were received for the Canaan Mountain WSA. The first comment suggested a boundary adjustment on the southwest to permit road improvement, flood control measures, construction of a reservoir, and a State land exchange. A review of this suggestion showed that the Partial Wilderness Alternative analyzed in this document accommodates most of these concerns. A second comment suggested that the boundary in the Arizona portion of the WSA be changed from legal survey lines to geographical lines. This comment was not considered because the Arizona lands were removed from the Canaan Mountain WSA and designated as wilderness under the Arizona Wilderness Act.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (47,170 acres); and (3) Partial Wilderness (32,800 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.

NO ACTION ALTERNATIVE

Under this alternative, none of the 47,170-acre Canaan Mountain WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Virgin River and Vermilion Management Framework Plans (MFPs) (USDI, BLM, 1979b and 1981a).

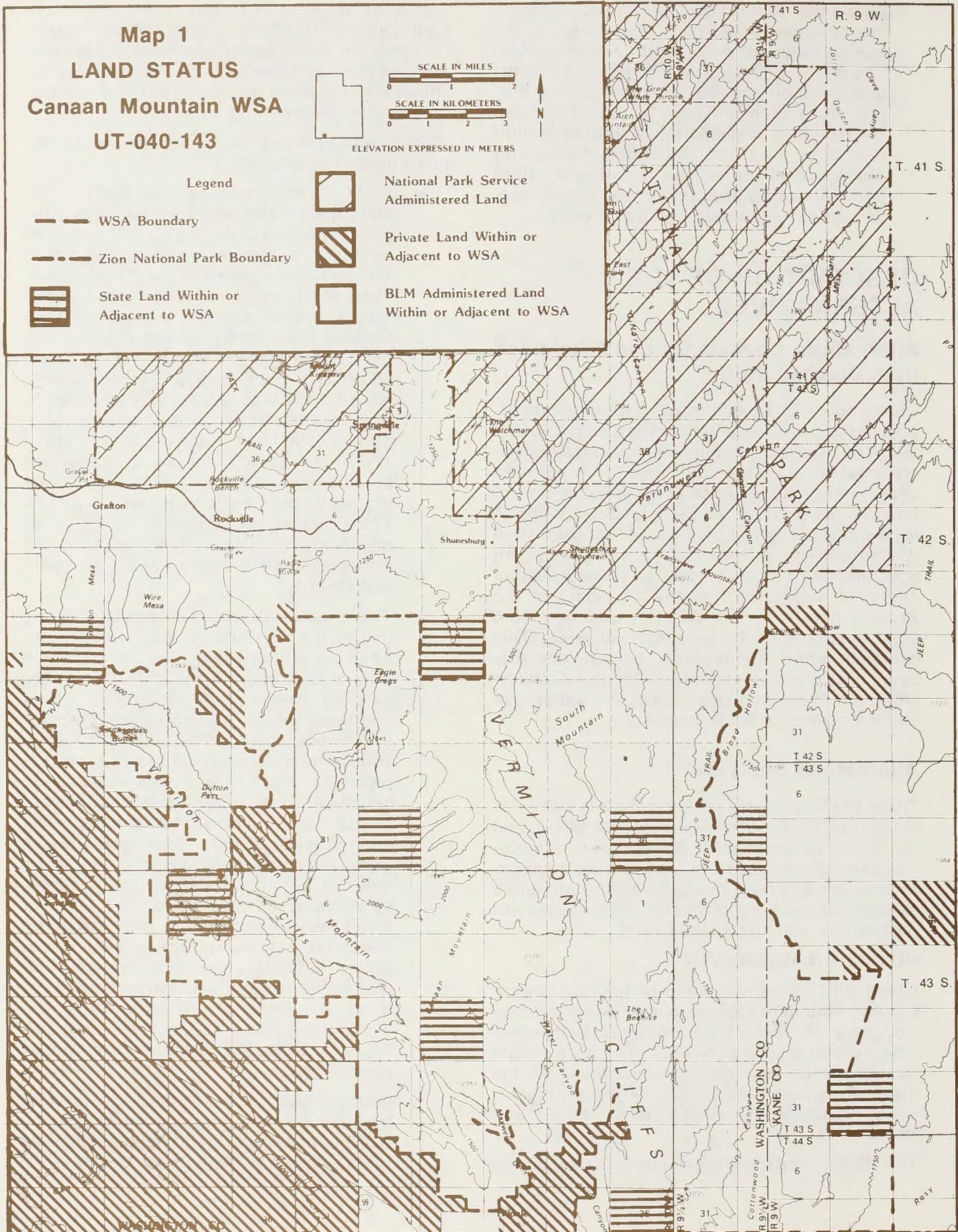
The State lands (approximately 4,080 acres)

within the WSA (refer to Map 1) have not been identified in the MFPs for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership. Refer to Appendix 3 for further information on State in-holdings.

The following are specific actions that would take place under this alternative:

- All 47,170 acres would remain open to mineral location and sale. Development work, extraction, and patenting would be allowed on future mining claims. No mining claims are currently located in the WSA. Development would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809). Existing oil and gas leases (44,170 acres) could be developed subject to stipulations issued at the time of leasing. Future leases could be developed under leasing Category 1 (standard stipulations) on about 17,270 acres and Category 3 (no surface occupancy) on about 12,600 acres. Leasing would not be allowed (Category 4) on 17,300 acres. Approximately 14,300 acres of existing leases would expire and would not be reissued in order to meet Category 4 restrictions.
- The present domestic livestock grazing use of the 47,170-acre WSA would continue as authorized in the MFPs (1,050 Animal Unit Months [AUMs]). Use of the existing livestock developments would continue. These include 10 miles of fences, a livestock corral, drive trail, four reservoirs, nine developed springs, 4.5 miles of pipelines, and nearly 1 mile of irrigation canals. Several other livestock developments are proposed and include seven spring developments, four reservoirs, a water catchment, .25 mile of pipeline, 1.5 miles of livestock trail, .75 mile of fence, spraying and reseeding of 500 acres of sagebrush and chaining, and reseeding about 700 acres of pinyon-juniper woodland. These developments could be implemented without wilderness considerations. An irrigation reservoir proposed within the WSA on South Creek could also be built without consideration of wilderness values.
- Nearly 28,860 acres of the WSA encompassing Canaan and South Mountains would remain closed to off-road vehicle (ORV) use. The remaining 18,310 acres

CANAAN MOUNTAIN WSA



would remain open to ORV traffic.

- The entire 47,170-acre area would continue to be open to harvest of forest products; however, there is no harvest at the present time and none is planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (41,470 acres) and Class III (5,700 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting and fishing would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

Under the All Wilderness Alternative, all 47,170 acres of the Canaan 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" (USDI, BLM, 1981b) to preserve its wilderness character. Upon designation, acquisition of approximately 3,250 acres of State land within the WSA is likely, and would be authorized by purchase or exchange (refer to Appendix 3). Three State sections adjacent to the WSA likely would be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 47,170 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 designation, develop-

ment would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases on 44,170 acres would not be reissued upon expiration unless a find of oil or gas resources in commercial quantities is shown.

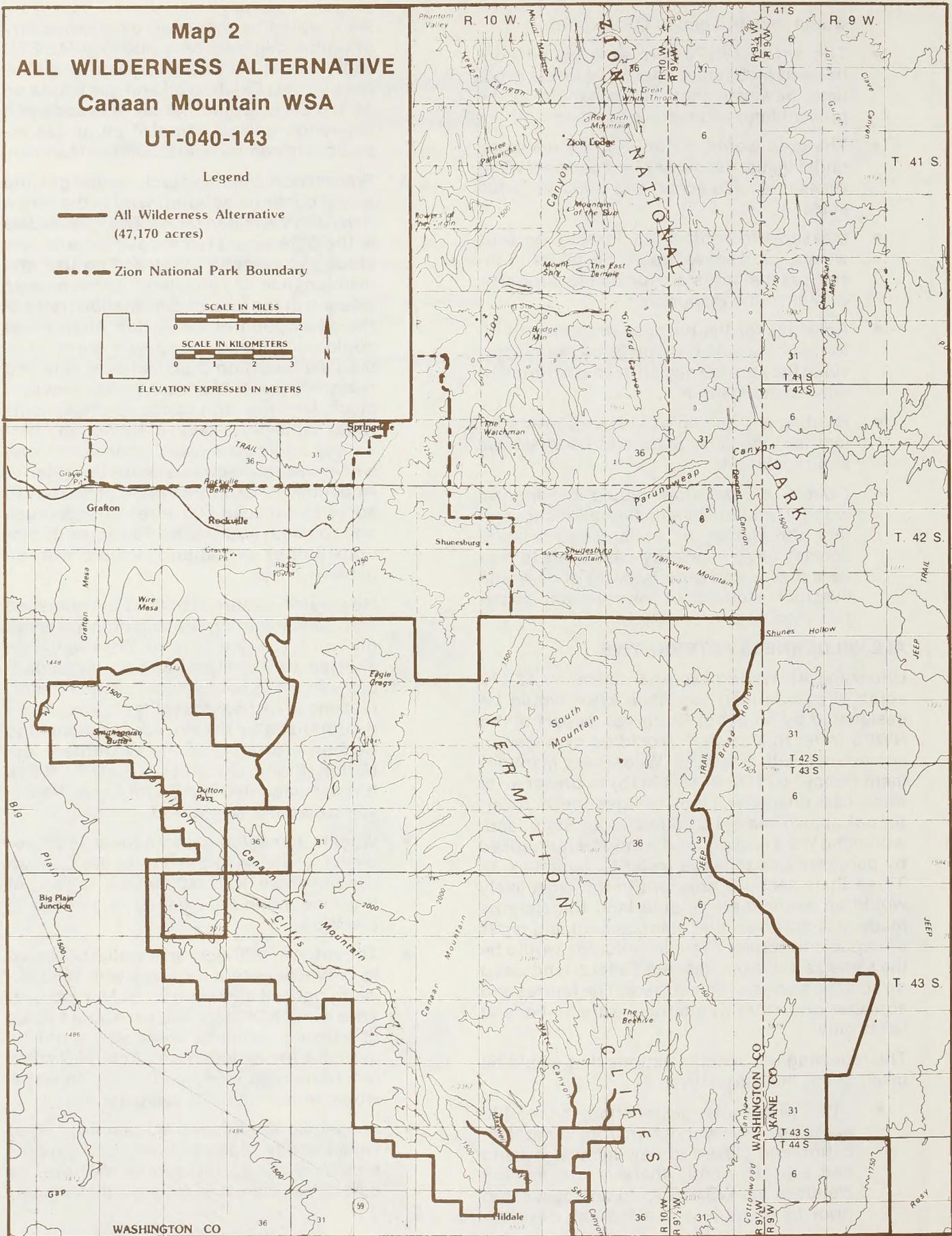
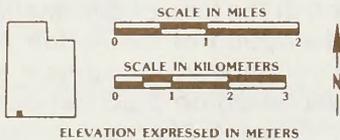
- Present domestic livestock (cattle) grazing would continue as authorized in the Virgin River and Vermilion MFPs. The 1,050 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of designation (refer to the description of No Action Alternative) could continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new livestock facilities and range improvements (refer to the description of No Action Alternative) would be allowed if consistent with wilderness protection standards (refer to Appendix 1). Land treatment proposals to spray and reseed 500 acres of sagebrush and to chain and reseed 700 acres of pinyon-juniper woodland would not be allowed.
- New water resource facilities or watershed activities including an irrigation reservoir on South Creek within the WSA would be allowed after designation only if compatible with wilderness values, needed to correct imminent hazards 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). It is assumed that the South Creek Reservoir would not be allowed.
- Wildlife transplants and habitat improvements would be allowed after designation if compatible with wilderness values. At this time, none are existing or planned in this WSA.
- The entire 47,170-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 4 miles of existing vehicular ways would not be available for vehicular use. About 2.7 miles of "cherry-stemmed" roads within the WSA would remain open to vehicular use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 47,170-acre wilderness. As part of that plan, it is assumed that a main-

CANAAN MOUNTAIN WSA

Map 2 ALL WILDERNESS ALTERNATIVE Canaan Mountain WSA UT-040-143

Legend

-  All Wilderness Alternative (47,170 acres)
-  Zion National Park Boundary



tenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 47,170 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 47,170-acre area would be taken 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. 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 on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

For the Partial Wilderness Alternative, 32,800 acres of the Canaan Mountain 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. Potential conflicts with proposed vegetation manipulation and livestock reservoir construction would be avoided and most of the area with outstanding wilderness values would be designated as wilderness. The 32,800 acres analyzed as wilderness under this alternative includes primarily the plateau tops and steep canyon areas in the WSA. The 14,370-acre area within the WSA but outside of that designated as wilderness would be managed in accordance with the Virgin River and Vermilion MFPs, as described for the No Action Alternative. The 32,800-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative.

This alternative would likely involve Federal acquisition of about three sections of State land by purchase or exchange (refer to Appendix 3). Five State sections adjacent to the lands designated by this alternative likely would be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows.

- The 32,800-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. No mining claims are currently located in the WSA. Should any be located prior to wilderness designation development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), with consideration given to wilderness values. The existing oil and gas leases, covering 29,800 acres, would not be reissued upon expiration unless a find in commercial quantities of oil or gas resources is shown. The 14,370-acre area not designated wilderness would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur if claims are valid. The area not designated would be managed as oil and gas leasing Category 1 (standard stipulations) and Category 3 (closed to surface occupancy). Existing leases (14,370

acres) and future leases in this area could be developed without concern for wilderness values.

- Livestock grazing would continue to occur in the 32,800-acre wilderness area. The 735 AUMs in the 32,800-acre area would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of wilderness designation (3 miles of fence, one corral, two reservoirs, and five springs) could continue in the same manner as in the past based on practical necessity and reasonableness. In the 14,370-acre non-wilderness area grazing use would continue as authorized in the MFP (315 AUMs). New range facilities and improvements, including vegetation manipulation (1,200 acres) projects, could be developed in this area without concern for wilderness values.
- In the 32,800-acre wilderness new water resource facilities or watershed activities would be allowed only if compatible with wilderness, needed to correct imminent hazards to life or property, or authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the remaining 14,370-acre area water resource developments would be allowed if in accordance with the MFPs. A reservoir proposed on South Creek could be built without consideration of wilderness values.
- In the 32,800-acre wilderness, wildlife transplants or habitat improvements would be allowed if compatible with wilderness values. In the remaining 14,370-acre area, wildlife transplants or improvements would be allowed with no concern for wilderness values. None are now proposed.
- The 32,800-acre wilderness would be closed to ORV use. The 2.7 miles of "cherry-stemmed" roads and the 4 miles of way would be outside the designated wilderness area. The remainder of the unit (14,370 acres), including the existing roads bordering the WSA, would remain open to vehicular travel. ORV use in the 14,370-acre non-wilderness area would be managed as directed by the Virgin River and Vermilion MFPs.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 32,800-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed

along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

- Harvest of forest products in the 32,800-acre wilderness would not be allowed except for harvest of pinyon nuts or non-commercial gathering of dead-and-down wood if accomplished by other than mechanical means. The remaining 14,370 acres would be open to woodland harvest.
- Visual resources on the 32,800-acre wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The remaining 14,370 acres would be managed as VRM Class II (10,370 acres) and III (4,000 acres) as outlined in the Virgin River and Vermilion MFPs.
- Within the 32,800-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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. It is assumed that, in the 32,800-acre area, firefighting would be limited to hand and aerial methods. In the 14,370-acre nonwilderness area, measures of control would be taken without wilderness considerations.
- In the nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 32,800-acre wilderness such activity would be allowed by permit provided it would be compatible with wilderness protection. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures.
- Hunting would be allowed subject to applicable State and Federal laws and regulations in the nonwilderness area. In the 32,800-acre wilderness, hunting would be subject to applicable laws and regulations but would be limited to nonmotorized means.
- Throughout the 14,370-acre nonwilderness area control of predators would be allowed without wilderness consideration to pro-

protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 32,800-acre wilderness area, control of predators would be allowed to protect such wildlife species or livestock, but only under conditions that would assure minimal disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The area is presently classified as Class II under the Prevention of Significant Deterioration (PSD) regulations as outlined by the Clean Air Act as amended in 1977. The air is usually clear and visibility extends over 100 miles. Occasionally a light haze can be seen over the valley floor. These pollutants derive from the industrial complexes in Las Vegas and southern California. Zion National Park, a Class I air quality area, is adjacent to the WSA along the northeast boundary.

Geology

Canaan Mountain is a spectacular plateau comprised of three closely connected terraces coupled with a 4-mile hogback trending to the northwest and terminating at Smithsonian Butte. The WSA is on the western edge of the Colorado Plateau Physiographic Province and is considered part of the Grand Staircase area. The southern geographic subunit is Canaan Mountain proper. The escarpment created by the leading edge of this terrace towers majestically 2,000 feet above Colorado City, Arizona; Hildale, Utah; and Utah Highway 54.

Rosy Canyon and Broad Hollow form the eastern boundary of the WSA. Lower Mountain lies north of Canaan Mountain proper and is created by the east wall of Horse Valley Wash and the west face

of the South Creek drainage. It is bounded on the north above Rockville by the Eagle Crags. The southern portion of the WSA extends along the Vermilion Cliffs to the Arizona border.

The top of the unit is a panorama of rippling slick-rock, sandstone pinnacles, cones, balanced boulders, fractures, and scours forming an irregular plateau of sandstone. Massive cliffs of Navajo Sandstone form the skyline. At the base of the Navajo cliffs are more gentle slopes of the red-brown siltstone of the Kayenta Formation, below which the Moenave Sandstone forms the lower red-brown cliffs. Below the Moenave are the softer, lighter-colored Chinle shales. These formations also form the walls of Zion Canyon across the Virgin River immediately to the north.

The rock formations along with their scattered flora are the visual character of this WSA and the basis for the topographic screening comprising the outstanding solitude characteristic and the barrier to user access that has kept this unit natural.

Soils

The soils of this WSA are light and finely textured sands, originating from the sandstone caprock and lacking in organic matter. Soil depth is very shallow as evidenced by the abundance of exposed slickrock throughout the unit. The soils are subject to wind and water erosion. Erosion potential is slight to moderate. The U.S. Department of Agriculture, Soil Conservation Service (1977) capability rating (VIII) is the lowest possible class and indicates extreme difficulty in surface rehabilitation and no potential for agricultural uses other than limited grazing. Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

**TABLE 2
Erosion Condition**

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.3	9 470	20	12,310
Slight	0.6	37 700	80	22,620
Stable	0.3	0	0	0
Total		47,170	100	34,930

Sources: USDI, BLM, 1978b and 1979a; Leifeste, 1978.

CANAAN MOUNTAIN WSA
TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
CANAAN MOUNTAIN WSA

Resource	Alternatives		
	No Action	All Wilderness (47,170 Acres)	Partial Wilderness Designation (32,800 Acres) (Proposed Action)
Water Resources	The proposed South Creek Reservoir could be built to provide sprinkler irrigation to 200 acres of potential farm land.	The reservoir could not be constructed.	The South Creek Reservoir could be developed to provide irrigation water.
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 4,700 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 1 million barrels of oil, 5 billion cubic feet of natural gas, and 1,410 tons of uranium oxide could be recovered.
Wildlife	About 0.4 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.	Wildlife in the designated area would benefit from solitude. About 0.5 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 1,050 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of seven springs, four reservoirs, one catchment, 0.25 mile of pipeline, 1.5 miles of trails, 0.75 mile of fence, and 1,200 acres of land treatments, could be implemented to improve livestock distribution.	Grazing of 1,050 AUMs and maintenance of existing developments would continue. Some proposed new developments and the 1,200-acre land treatment that would improve livestock distribution would not be allowed.	Grazing of 1,050 AUMs and maintenance of existing developments would continue. Some proposed developments and the proposed land treatments would be in the undesignated portion and could be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 1,500 acres.	Visual quality could be impaired on up to 40 acres.	Visual quality could be impaired on up to 1,400 acres, including 30 acres in the designated portion. About 70 percent of the Class A scenery would be in the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 4 miles of ways at current low levels. Overall recreational use could increase from the present 250 visitor days per year to 370 over the next 20 years. Up to 200 acres of mineral-related disturbance, 100 acres of inundation by a proposed reservoir, and 1,200 acres of land treatments could reduce the quality of primitive recreation. The reservoir would be small but would provide water-based recreation.	The WSA, including 4 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation. The reservoir would not be built.	ORV recreational use could continue on 4 miles of ways in the undesignated portion. Up to 100 acres of mineral-related disturbance, a 100-acre proposed reservoir, and 1,200 acres of land treatments could reduce the quality of primitive recreation.

CANAAN MOUNTAIN WSA

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
CANAAN MOUNTAIN WSA

Resource	Alternatives		
	No Action	All Wilderness (47,170 Acres)	Partial Wilderness Designation (32,800 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 1,500 acres (3 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 40 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.	In the designated area, wilderness values would be protected, except on 30 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on about 10 percent of the 14,370 acres not designated. Overall, wilderness values could be lost on less than 3 percent of the WSA. However, 70 percent of the area meeting the standards for naturalness, 87 percent of the area meeting the standards for outstanding opportunities for solitude, and all of the area meeting the standards for outstanding opportunities for primitive recreation would be in the designated portion and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, and the current BLM Vermilion and Virgin River MFPs. It would be consistent with private plans for construction of a reservoir on South Creek. It would be partly consistent with the <i>Washington County Master Plan</i> , which recommends partial wilderness. It would not complement the NPS recommendation for nearby wilderness or the adjacent Cottonwood Point BLM wilderness area in Arizona.	This alternative would be inconsistent with Kane and Washington Counties' policies. It would be consistent with State policy if lands were exchanged, and would complement the NPS proposal for wilderness and the BLM wilderness area. Designation would constitute amendment of the BLM Vermilion and Virgin River MFPs. It would not be consistent with private plans for a reservoir on South Creek.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Kane County's concept of multiple use, and partial designation would be consistent with Washington County's recommendation. Partial designation would be consistent with private plans for reservoir construction on South Creek.
Socio-economics	Annual local sales of less than \$22,025 and Federal revenues of up to \$133,980 would continue.	Annual local sales of less than \$22,025 and Federal revenues of up to \$1,470 would continue, but Federal revenues of up to \$89,610 from mineral leasing would be foregone. The opportunity for a future reservoir and energy and mineral development with local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$46,500.

Vegetation

Within this WSA, there are four subvegetative types. The ponderosa pine-mountain shrub type (35,350 acres) occurs at the higher elevations mainly on the plateau tops of the WSA. The main areas it occupies are the Canaan Mountain proper and South Mountain. Ponderosa pine and Douglas fir trees are scattered throughout with isolated solid stands in groves and canyons. Large areas of slickrock void of vegetation are also in these areas. In some parts of the WSA slickrock occupies as much as 50 percent of the surface area. Some of the more common plants include pinyon pine, manzanita, Gambel's oak, Utah serviceberry, Indian ricegrass, western wheatgrass, and wyethia.

Pinyon-juniper is the second largest type and makes up approximately 9,000 acres (20 percent) of the WSA. It is found on the talus slopes surrounding the mountains and on the south end of South Mountain. Pinyon pine and Utah juniper are scattered throughout with understory shrubs such as Utah serviceberry, manzanita, and live-oak dominating the vegetative composition. Herbaceous vegetation includes such grasses and forbs as Indian ricegrass, galleta, sand dropseed, eriogonum, and penstemon. Vegetative cover makes up a small percentage (approximately 20 percent) of the total landscape. Rockslides, large boulders, and exposed, eroding soils make up the bulk of the land surface.

The sagebrush type, occurring on approximately 2,320 acres (5 percent) of the WSA, is mainly found in Cottonwood Canyon. The soils in this canyon are sandy, deep, and very productive. Big sagebrush, sandsage, and rubber rabbitbrush make up the bulk of the vegetation. Such herbaceous grasses and forbs as Indian ricegrass, sand dropseed, grama grass, and eriogonum occur but make up less than 2 percent of vegetation. The general aspect of this type is solid, locked stands of sagebrush and rabbitbrush with a very small percentage of other plants.

Riparian vegetation, covering 500 acres (less than 1 percent) of the area is located in the following drainages: just over Short Creek, Squirrel Creek, Water Canyon Creek, Maxwell Canyon Creek, Canaan Wash, Horse Canyon Wash, South Creek, Shune Creek, and Second Creek (approximately 13 miles total). Vegetation composition within these riparian areas varies greatly. Some of the more common plants are cottonwood, box elder, willow, salt cedar, sedges, and rushes. Associated with these riparian areas are numerous hanging gardens developed under protective overhanging

cliffs. Plants common to these areas are maiden-hair fern, shooting star, scarlet monkey flower, and cliff columbine.

The Canaan Mountain WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

No sensitive, threatened, or endangered plant species are known to occur within the WSA.

Water Resources

The Canaan Mountain WSA lies within the Virgin River subbasin of the Colorado River hydrologic subregion. The major drainages that flow into the Virgin River from the northern part of the unit include Horse Valley Wash, South Creek, Shunes Creek, and Second Creek. South Creek (3 miles) and Horse Valley Wash (1 mile) are perennial streams, whereas Second Creek is intermittent. The southern portion of the unit drains into the Fort Pearce Wash, which empties in the Virgin River about 25 miles west of the Canaan Mountain area. The major associated streams (all intermittent) in the southern part of the WSA are Maxwell Canyon, Water Canyon, Squirrel Creek, Short Creek, and Cottonwood Canyon.

Water on the Canaan Mountain complex is found in shallow lakes, pot holes, and small springs and seeps. Excellent fresh water springs, which are used for culinary purposes, are found several hundred feet below the rim at the base of the formation. Recharge comes from winter snow and late summer thunderstorms. The principal supplier of ground water is found in bedrock aquifers, namely the Navajo Sandstone Member. Dependability of these sites varies. This is due to the permeability of the Navajo Sandstone and lack of impervious geologic layering at the higher elevations. Most known water sources are on Canaan Mountain proper, although there are numerous springs and seeps scattered throughout the unit. Live water from springs is found in all the major drainages. Other water sources in the unit include four livestock reservoirs (refer to Livestock section).

Most of the area is well watered for livestock and wildlife during the spring and early summer, but

many seeps and potholes dry up by mid-July. Recreationists use many of the same water sources although potability is often questionable.

Bottom lands around Rockville and Springdale are irrigated by water diverted from the Virgin River, South Creek, and Shunes Creek. In the southern portion of the unit irrigation water is diverted from Squirrel Creek, Water Canyon, and Short Creek to a reservoir on private land near Hildale and Colorado City. Culinary water for Hildale is taken from Maxwell Canyon. Water is also diverted from the springs above Canaan Ranch for livestock, irrigation, and culinary uses. Water quality for these uses is good due to closed systems (pipelines).

Nine developed springs used for livestock, culinary, and/or irrigation are within the WSA boundary. Some of these are more reliable than others. The springs in Water Canyon appear the most stable and are used as public water for Hildale. Recharge for the springs probably originates on Canaan Mountain and production is dependent on precipitation and runoff. Seven springs are proposed for development for livestock use in the *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a). There are also four livestock reservoirs, a water catchment, and .25 mile of pipeline proposed within the WSA.

A withdrawal containing approximately 1,040 acres for public water reserves exists along Water Canyon, Squirrel Creek, and Short Creek within WSA boundaries.

There are two existing State water rights (Certificate No. 8558 on Horse Valley Wash Springs and Certificate No. 8788 on Squirrel Creek, tributary to Short Creek) in the WSA. There are other valid rights in both Maxwell Canyon and Water Canyon. There is one valid diligence claim (No. 81-1526) on seven springs north and east of Canaan Ranch. There is also one pending water rights application (No. 81-1177) on Short Creek Spring. The area is presently closed to further applications, but the Utah State Water Engineer has stated that some applications could be considered depending on the water use and location.

There are three existing rights-of-way for pipelines: U-25916 above Canaan Ranch, U-25917 in Maxwell Canyon, and U-5036 in Squirrel Creek. There is also a right-of-way for the irrigation canal in Water Canyon (SL 062930). A right-of-way for a 34-surface-acre, 740-acre-foot reservoir pool in South Canyon was issued in 1984 with an optional renewal date of 1991. The dam would be on State land but the water pool would be on 34 acres of BLM land within the WSA. A stipulation to the

grant requires that the reservoir be drained if the WSA is designated wilderness. Recent feasibility studies showed the proposed dam site to be undesirable and the applicant modified the original proposal by moving the dam site to inside the WSA and enlarging the reservoir pool to 100 surface acres. This proposal was rejected by BLM until Congressional decision on the wilderness status of the Canaan Mountain WSA. The applicant has decided to hold the original grant until Congressional decision and it is doubtful that the reservoir would be built as presently granted. The purpose of the reservoir would be to provide water for sprinkler irrigation of 200 acres of potential farmland.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 2+ was assigned to the Canaan Mountain WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The energy and mineral resource rating summary for the WSA is given in Table 3.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic ft. of gas
Uranium (30% of WSA)	f3	c3	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c1	None
Hydroelectric	f1	c4	None
Uranium (70% of WSA)	f4	c3	Less than 4,200 tons of uranium oxide

Sources: SAI, 1982; U.S. DOE, 1983.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas (f2/c1)

Based on the geologic similarities between this WSA and the Virgin Field (approximately 8 miles to the northwest), SAI considers the oil and gas favorability to be relatively low (f2) (less than 10 million barrels of oil and 60 billion cubic feet of natural gas), and assigned a certainty of occurrence rating of low (c1). High exploration costs and the unsuccessful record of exploration to date make this WSA a relatively unappealing exploration area.

The tops of Canaan Mountain and South Mountain (approximately 17,300 acres) are in Category 4 and are closed to oil and gas leasing, and about 12,600 acres along the perimeter of the Utah portion of the WSA are in Category 3 (closed to surface occupancy). Leasing and exploration are allowed in this area. The rest of the unit is open to leasing (Category 1).

Oil and gas leases are divided into pre- (before October 1976) and post-FLPMA (after October 1976). If pre-FLPMA and post-FLPMA leases are not under production prior to wilderness designation, the existing leases would be phased out. Pre-FLPMA leases are governed by stipulations determined at the time of lease application. These stipulations may allow for the impairment of wilderness values and, thus, development costs may

be less economically restrictive than post-FLPMA. Post-FLPMA leases may be nonimpairing to wilderness values; therefore, development costs for these leases are more economically restrictive, especially for reclamation. Post-FLPMA leases require topographic contouring, increased seeding rates and mixtures, hydromulching, and restricted access (USDI, BLM, 1981b).

There are five pre-FLPMA oil and gas leases (700 acres) with valid existing rights for exploration and development. Twenty-one post-FLPMA leases (43,470 acres) have been issued with various protective stipulations. All the State sections within the WSA are under lease. Approximately 3,000 acres of WSA are not under lease. It is possible that oil and gas may exist at 2,000 feet or more at depths beneath Canaan Mountain, but no commercial deposits have been found in the general vicinity. The depth for drilling and difficulty of access would discourage prospecting until more favorable areas outside the WSA have been investigated.

Coal (f1/c4)

All bedrock of sedimentary origin within the WSA is pre-Cretaceous Age and is not known to be coal-bearing anywhere in the region. Therefore, this unit has a low favorability (f1) with a high degree of certainty (c4).

Geothermal (f2/c1)

The nearest known thermal hot spring is 10 miles to the west near Hurricane, Utah. However, the WSA is within an area characterized by a major structural transition and high heat flow, and it is possible that low temperature thermal resources may exist at shallow depths. This unit has been assigned a favorability of f2 with a certainty of c1.

Hydroelectric (f1/c4)

Potential sites for development of small-scale hydroelectric facilities do not occur within this WSA because sufficient water does not flow except during times of heavy precipitation. Accordingly, the unit has been assigned a favorability of 1 with a certainty of 4.

LOCATABLE MINERALS

There are no mining claims in the WSA. Approximately 38,000 acres of the WSA are located within an 1,100-square-mile area considered by the U.S. DOE to have a relatively high certainty (c3) to contain large potential resources of uranium (f4). This area is identified on the map by the U.S. DOE (1983) as the Leeds speculative potential resource area. The remainder of the WSA is not considered by the U.S. DOE (1983) to be in either a potential

resource area or a favorable area for uranium concentration. Nevertheless, the WSA has been assigned a low certainty (c1) for the occurrence of small deposits of uranium (f2). The U.S. DOE (1983) estimates that there is a 90-percent probability for the Leeds speculative potential resource area to contain a total of about 4,200 tons of uranium oxide at a minimum grade of 0.01 percent which would be available at a forward cost of \$100/lb. The areal extent of such a deposit would be about 750 acres (based on an 0.01-percent minimum grade and a 6-meter average thickness for host rock). The f2 rating assigned to the southeast portion of the WSA indicates that any deposit, if it did exist, would not be expected to exceed 500 tons of uranium oxide at a forward cost of \$100/lb. The areal extent of this size deposit would not exceed 100 acres (based on an 0.01-percent minimum grade and a 6-meter average thickness for host rock).

Wildlife

There is no crucial or critical habitat in the WSA, nor are management facilities or vegetation treatments planned specifically for wildlife.

Various mammals, birds, reptiles, and amphibians occur in the WSA. This diversity exists because of the variety of habitats. The primary big game animal in the WSA is mule deer. Presently the WSA supports approximately 300 mule deer. Mule deer occur throughout the WSA during the winter with some deer using the top of Canaan Mountain and South Mountain during the summer.

Approximately 3,000 acres have been identified by BLM and the Utah Division of Wildlife Resources (UDWR) as being highly suitable potential habitat for desert bighorn sheep. The identified zone lies on the talus slopes immediately under the northern rim of Canaan Mountain. Desert bighorn sheep have inhabited the WSA in the past, and the WSA could potentially support up to 100 bighorn sheep. In 1977 desert bighorn sheep were released in Zion National Park adjacent to the proposed release area. Radio telemetry information indicates use of the WSA by these sheep has been light.

Cougar, coyote, and bobcat use of the area is generally light, with most activity centered around drainages. Other game animals found in the WSA are Gambel's quail, mourning dove, and cottontail. Use by these animals in the riparian areas is moderate, with light use in the balance of the WSA.

A variety of raptors occupy the WSA, the most common being the redtailed hawk and Cooper's hawk. A prairie falcon nest is located near Smithsonian Butte, a golden eagle nest in South Creek, and a number of Cooper's hawk nests are located in riparian areas. Peregrine falcon and bald eagle, both threatened and endangered species, use the WSA. Peregrine falcon sightings have been recorded in the general area and a known active nest is located adjacent to the WSA in Zion National Park. Nesting sites of the peregrine have not been found within the WSA, but an adequate prey base and suitable nesting areas do exist. The bald eagle, a winter visitor to the area, has been sighted a number of times along the Virgin River, adjacent to the WSA. No known roosting sites have been recorded, but potential sites do exist. A number of sensitive animals including the desert shrew, spotted bat, Lewis woodpecker, and golden eagle also occur within the WSA.

Forest Resources

Approximately 44,350 acres of the WSA are covered by stands of pinyon pine, Utah juniper, and ponderosa pine. These woodland and timber lands do not supply woodland products because of inaccessibility. Ponderosa pine was harvested on top of Canaan Mountain between 1915 and 1928. A sawmill and windlass were set up and milled lumber was lowered nearly 2,000 feet to Canaan Ranch. Based on interviews with the owner, it was determined that the operation was never profitable.

Stands of pinyon pine and Utah juniper occur at lower elevations but legal access into these areas is blocked by private lands. Forest resources within the WSA are marginal. No significant interest has been raised for the commercial or non-commercial harvesting of woodland products in this area.

Livestock and Wild Horses/Burros

Of the 47,170 acres in the Canaan Mountain WSA, approximately 7,000 acres are not allotted for livestock grazing use. Of the remaining 40,170 allotted acres, approximately 45 percent is classed as suitable for grazing and 55 percent is classed as unsuitable due to steep, rough terrain and low forage production. Vegetation condition, in terms of livestock forage, ranges from fair to poor in the WSA, with the great majority being in poor condition. Livestock grazing is the only agricultural use existing within the WSA. However, water sources in the unit are used for irrigation outside of the

unit in the Canaan Ranch, Colorado City, and Hildale areas.

Under present grazing management practices (Kanab-Escalante Grazing Management EIS), there are six grazing allotments that lie at least partially within the WSA boundaries. Seventeen livestock operators run a total of 501 cattle. The seasons of use vary yearly from yearlong grazing to seasonal use. Total annual authorized use on the six allotments is 3,298 AUMs. An estimated 1,150 AUMs are produced within the WSA (refer to Table 4).

Existing range improvements include approximately 10 miles of barbed wire fence used to restrict livestock movement. Most fences are on allotment boundaries, but some divide pastures. One livestock corral and the Squirrel Canyon Trail and Cottonwood Canyon are used for moving cattle to and from the grazing allotments and to water. The Broad Hollow, South Creek, and Water Canyon Trails are not presently in use.

Livestock water developments include four livestock reservoirs, nine developed springs, approximately .25 mile of pipeline for watering livestock, 1.5 miles of pipeline in Squirrel Canyon used for irrigation, 1 mile of irrigation canal in Water Canyon, 1 mile of pipeline used for irrigation at Ca-

naan Ranch, and about 1.75 miles of pipeline in Maxwell Canyon used for culinary purposes in the Colorado City area. In addition, there are numerous undeveloped springs and potholes in the slickrock where livestock water.

The *Kanab-Escalante Grazing Management EIS* proposed development of seven springs, four reservoirs, one water catchment, and .25 mile of pipeline for watering livestock. Also planned are 1.5 miles of livestock trail and .75 mile of barbed wire fence. Land treatment proposals include spraying and reseeding approximately 500 acres of sagebrush and chaining and reseeding about 700 acres of pinyon-juniper at the base of the mountain.

There are no wild horses or burros using the area.

Visual Resources

Canaan Mountain contains a unique combination of natural features creating a diverse visual panorama. Dominating the landscape are expanses of sandstone slickrock exhibiting geologic features such as pinnacles, cones, fractures, scours, and natural arches. Stunted forms of ponderosa and pinyon pine grow out of scattered pockets of soil. The contrasting colors of green

TABLE 4
Livestock Grazing Use Data

Allotment	Number of Permittes	Livestock Number/Class	Season of Use	Total Allotment AUMs	Estimated AUMs in WSA
Big Plains	1	1 cow	yearlong	12	1
Buttermilk	1	10 cattle	05/16-10/15	50	10
Canaan Mountain	2	56 cattle	06/01-09/30	224	224
Canaan Ranch	1	24 cattle	11/01-05/31	168	34
Cottonwood	1	11 cattle	yearlong	131	30
Cottonwood Point	1	35 cattle	yearlong	424	300
Goat Ranch	1	108 cattle	05/16-09/30	486	243
Grafton Mesa	1	35 cattle	05/01-10/31	210	0
Grapevine	1	30 cattle	06/01-09/30	120	60
Horse Valley	1	35 cattle	05/01-10/31	210	32
Maxwell Canyon	1	7 cattle	05/15-10/31	40	30
Pine Springs	1	112 cattle	11/15-03/15	448	8
Rock Springs	1	101 cattle	06/15-11/15	505	44
Rusel Field	1	5 cattle	yearlong	60	3
Trail Well	1	18 cattle	11/01-03/31	90	0
Well Springs	1	13 cattle	05/01-02/28	120	30
Total	17	501 cattle		3,298	1,050

Sources: USDI, BLM, 1978b and 1979a.

against the reds, yellows, and whites of sandstone present 47,170 acres of Class A scenery similar in quality to adjacent Zion National Park. Approximately 88 percent of the WSA (41,470 acres) was assigned a VRM Class II rating. A VRM Class III rating was assigned to approximately 5,700 acres along the boundaries of the WSA. Refer to Appendix 7 for a description of the BLM VRM rating system.

Cultural Resources

Historical values include the remains of the lumber operation which existed on Canaan Mountain between 1915 and 1928. Remaining evidence includes parts of a windlass pulley system used to lower sawed lumber to the valley floor (2,000 feet) a few miles north of the Canaan Ranch. Piles of rotten wood and collapsed buildings are found near Sawmill Springs along the west rim of Canaan Mountain.

There is a lack of archaeological survey data and no significant archaeological sites having National Register potential have been identified within the WSA. Several insignificant campsites of unknown affiliation have been identified in Broad Hollow off the east boundary and Shunes Creek off the north boundary. Therefore, it is probable there may be other sites within the WSA boundary. Virgin Anasazi and Southern Paiutes are known to have inhabited southern Utah, and it is likely they hunted in the WSA. All cultural sites are protected by present legislation.

Recreation

The Canaan Mountain WSA receives relatively little primitive-type recreation use even though the WSA offers numerous opportunities for this type of recreation. BLM personnel estimate present use at less than 250 visitor days per year. Approximately 28,860 acres of the WSA, encompassing Canaan and South Mountains, are closed to ORV use. Although the remainder of the WSA is open, it receives no noticeable ORV use. Approximately 4 miles of way are found in the WSA.

A Recreation and Public Purposes Act lease area in Maxwell Canyon that has been "cherry-stemmed" receives community recreation use from Colorado City for activities such as baseball, football, barbecues, and picnics. Colorado City hikers also use Water Canyon and hike to the springs inside the WSA.

Sightseeing is presently the major recreational use of the WSA. The El Captain escarpment above Colorado City and the Eagle Crags and Smithsonian Butte areas are photographed and viewed by

many motor vehicle tourists. The Eagle Crags and Smithsonian Butte areas are visible to all visitors to Zion National Park from Highway 15. Almost 250,000 vehicles annually use Highway 59 below the El Captain escarpment, and it is estimated that approximately 1 million visitor experiences result from this highway use. Canaan Mountain is viewed from Lava Point in Zion National Park which recorded 9,400 viewers in 1980. The WSA is also highly visible from the Zion National Park-Kolob Terrace Highway 14 overlooks 35 miles to the north of the unit. Scheduled airline flights between Page, Arizona and St. George, Utah and Las Vegas and Denver frequently incorrectly identify Canaan Mountain as Zion National Park to passengers. Scenic flights by aviation companies in St. George and Cedar City, Utah are frequently flown over the interior of the WSA.

Developed trailheads exist at the northwest boundary for the Eagle Crags trail and 3 miles north of Colorado City for the Squirrel Canyon trails and Water Canyon. The Eagle Crags trail is presently under construction and will follow a livestock trail onto the Lower Mountain. Other trailheads exist at Broad Hollow and Cottonwood Canyon. With the exception of Cottonwood Canyon, all of these trails feed the main Canaan Mountain trail which leads to the old sawmill area. The trail system on Canaan Mountain is a result of early logging and livestock use of the WSA. Where the trail system crosses expanses of slick-rock, it is often quite faint.

Drinking water for hikers within the WSA is unpredictable both to source and quality. During the spring, tanks and seeps are plentiful. During the summer, water sources become scarce and difficult to locate. Potability is often questionable.

Wilderness Values

SIZE

The WSA contains 47,170 acres and is 10 miles long (north to south) and over 10 miles wide (east to west).

NATURALNESS

The WSA is in a natural condition with minor exceptions. Imprints of man in the WSA include vehicular tracks on Canaan Mountain and in the main Cottonwood Canyon channel, an old house trailer, fences, several spring developments, reservoir pools, 4 miles of way, and remnants of the old sawmill operation. These imprints combined involve less than 1 percent of the WSA. A baseball field with access road, wooden booths, and restrooms are on a Recreation and Public Purposes

Act (R&PP) lease in Maxwell Canyon that has been "cherry-stemmed." Approximately 2 acres of disturbance resulted from feasibility and archaeological studies for the South Creek Reservoir. The disturbed areas have been rehabilitated.

In the Canaan Mountain WSA, the high quality of naturalness has changed little since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision.

SOLITUDE

The WSA affords outstanding opportunities for solitude (37,000 acres) due to topographic screening and, in some instances, topographic combined with vegetation screening. Approximately 10,170 acres do not meet the standards for solitude.

The size of this WSA enhances the outstanding opportunities for solitude present in the WSA. The degree to which outstanding opportunities for solitude are present in the WSA is most influenced by the topographic makeup of the unit. In some areas vegetation screening, combined with topographic screening, also contribute to the opportunity. The specific natural screening elements that contribute to the outstanding opportunities for solitude are detailed below.

The WSA is an irregular plateau capped by massive exposures of Navajo Sandstone. The plateau's sandstone surface is extremely rough and broken. Although the Canaan Mountain landscape is often considered comparable to the adjacent Zion National Park landscape, a major distinction does exist. The sandstone plateau in Zion National Park is so incised by canyons that only a series of small remnant plateaus remain. In contrast, Canaan Mountain lacks the canyon incision and thus retains a large and contiguous plateau top. Furthermore, the Canaan Mountain plateau exhibits an extremely high ratio of exposed rock to soil cover. Although there are scattered areas of smooth open slickrock, these expansive rock exposures are exceedingly rough and dissected and offer virtually unlimited opportunities for a visitor to avoid the sights, sounds, and evidence of other visitors to the plateau top. It is this particular set of topographic screening factors that offers an outstanding opportunity for solitude.

Another natural screening element that contributes to the outstanding opportunities for solitude is the extensive cliffline of the Vermilion Cliffs. The cliffline offers outstanding opportunities for solitude because extensive vertical jointing of the Navajo Sandstone has occurred within a cliffline of high relief. This phenomenon is responsible for multi-faceted broken and slotted cliff faces of

considerable aerial expanse and lower talus slopes that are very steep and irregular. This type of escarpment offers innumerable secluded spots.

A third natural screening element is the several canyons that penetrate the cliffline and plateau top. In general, these canyons are deep, narrow, and heavily vegetated. In the canyons, topography and vegetation thus combine to offer a superior natural screening opportunity.

Plateau top areas where the topographic screening is considered outstanding include most of Lower Mountain and the Eagle Crags, Canaan Mountain, and South Mountain in their entirety, and all of the plateau between Short Creek Canyon and Cottonwood Canyon.

The sights and sounds of human activities are present from some of the rims of the Canaan Mountain WSA. However, this "island in the sky" effect could enhance the awareness of solitude. Noise from aircraft does not limit the area's outstanding opportunities for solitude.

PRIMITIVE AND UNCONFINED RECREATION

The WSA possesses a diversity of primitive recreational activities. Several of these activities are of superior quality. About 28,000 acres provide outstanding opportunities for primitive and unconfined recreation, but 19,170 acres do not meet the standard for outstanding opportunities. These activities include hiking, backpacking, hunting, horseback riding, rock climbing, photography, bird watching, and sightseeing for botanical and geological features. The backpacking and horse packing activities are considered of outstanding quality.

The backpacking activity is the most area-extensive of all of the activities identified as being of outstanding quality. It is assumed that the horse packing activity would occur only within the area conducive to the backpacking opportunity. Within this backpacking area, the horse packing activity would be limited because some areas are probably negotiable only by foot.

The backpacking activity is limited in the canyon areas and restricted on the clifflines. The entire Short Creek-Squirrel Canyons system is favorable for backpacking. Backpacking in Water Canyon is essentially limited to the canyon bottom. Backpacking is possible in most of the South Creek Canyon basin. The upper cliffline or rim of South Creek Canyon cannot be backpacked. A similar situation exists in the Shunes Creek Canyon. The floor of Cottonwood Canyon also provides backpacking opportunities and represents

a major access route to the plateau tops of the southeastern portion of the WSA. Most of the WSA's clifflines act as barriers to the plateau backpacking opportunities. Although it is possible to backpack the perimeter of the plateau along the talus slopes, this activity is not considered an opportunity of outstanding quality.

The remaining individual activity identified as being of outstanding quality is sightseeing. Scenery is one of the several objectives of travel within the WSA. Because the scenery resource or value is present in a large portion of the WSA, sightseeing for scenery is considered available throughout areas where backpacking or hiking opportunities are superior.

SPECIAL FEATURES

The Canaan Mountain WSA possesses scenic and historical values as special features.

A variety of landscape types are evident in the Canaan Mountain WSA. Each of these landscapes exhibits high scenic values. In general, the WSA can be described as a sandstone plateau isolated by an impressive escarpment broken in places by deep canyons. The WSA is very similar in character to Zion National Park and Cottonwood Point Wilderness which abut Canaan Mountain on the north and south, respectively.

The northwestern portion of the WSA is essentially shaped by the South Creek Canyon. The South Mountain plateau borders this canyon on the east. On the west, the Lower Mountain plateau extends northward to terminate in the Eagle Crags above Rockville, Utah. The main Canaan Mountain plateau section lies at the head of South Creek Canyon. South Creek Canyon is the largest canyon in the WSA. It possesses a perennial stream, vegetation characteristic of a north-facing canyon, and deep narrows sections in its upper reaches. Waterfalls are present in a tributary canyon below the Lower Mountain.

The Eagle Crags are an important scenic feature of the Lower Mountain. Much of Lower Mountain is a sandy sagebrush park interspersed with sandstone outcroppings and clumps of ponderosa pine. Elevations reach 6,700 feet south of the Eagle Crags, but the average elevation on the Lower Mountain is about 6,400 feet.

The Canaan Mountain plateau is one of the dominant visual features of the WSA. The surface of Canaan Mountain exhibits parallel fracturing and jointing of the sandstone, several large expanses of slickrock, and scattered clumps of ponderosa pine and aspen. On the northwest, the plateau top reaches the highest point in the WSA at 7,340 feet

and then abruptly terminates in a series of narrow finger-like projections and peninsulas. In the area of The Pines, a spectacular 1,400-foot wall in upper Horse Valley Wash marks the edge of the plateau. Smithsonian Butte, a major visual landmark in the area, is a detached 6,600-foot remnant of the main Canaan Mountain plateau.

The southwest face of Canaan Mountain is part of the Vermilion Cliffs and it constitutes a major landmark in southwestern Utah and the Arizona Strip. The escarpment reaches 2,000 feet above Canaan Ranch and terminates in the El Captain promontory above Maxwell Canyon. The abrupt rim or edge effect created by the cliffline is a major landscape feature of the Canaan Mountain plateau top.

In general, the areas exhibiting scenic values are congruent with the areas possessing outstanding opportunities for solitude. Both wilderness characteristics are a derivative of the topographic character of the WSA. Approximately 36,000 acres exhibit scenic values.

The lumber operation that existed on the mountain during 1915 to 1928 is considered of significant historical value. An ingenious windlass pulley system was established on the south edge of the mountain and men, equipment, and supplies were lifted the 2,000 feet to the mountain by this means. As many as 25 men were employed. Logs as large as 4 feet in diameter were harvested. It is estimated that several million board feet of lumber were removed during the operation.

Access to the operation was by four routes: the Eagle Crags (South Creek) trail, up Short Creek; by way of an extremely precarious route just west of the cable system; up the tram itself; and by way of The Pines at the head of Horse Valley Wash. Logging extended only 2 to 3 miles from the sawmill because of the difficulty of access from one area of the mountain to another and also because of primitive means of transportation.

The logging operation on the mountain ceased in 1928 with removal of the mill and relocation in Rockville. Portions of the cable and windlass, a few sawed lumber slabs, one small building, and some machinery parts are remaining evidence of the operation. These remains are in a deteriorating condition.

Land Use Plans and Controls

The WSA lies within the BLM's Virgin River and Vermilion Planning Units and is being managed under the land use decisions in the MFPs for those units (USDI, BLM, 1979b and 1981a). The

present principal uses within the WSA are recreational activities such as hiking and sightseeing, livestock grazing, and point sources for water.

The BLM has closed 28,860 acres to ORV use to protect natural values. The Cedar City District records indicate a long-term recognition of Canaan Mountain's primitive values as does the Virgin River Unit Resource Analysis and MFP. In 1976, a Canaan Mountain activity plan was prepared in conjunction with a primitive area designation proposal. However, the designation was not made due to the impending passage of FLPMA. The District Manager's MFP decision is to "manage the area as recreation lands in a manner that will preserve natural values and allow operation of natural processes." The *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a) proposes Allotment Management Plans encompassing this WSA.

There are existing rights-of-way for water lines and a canal (U-25916, U-25917, SL-062930, and U-5036) which supply irrigation and culinary water. R&PP lease U-17609 in Maxwell Canyon has been "cherry-stemmed" out of the WSA. A right-of-way has been granted for construction of an irrigation reservoir on South Creek (refer to the Water Resources section for further details on the reservoir proposal).

The State lands (4,080 acres) within the WSA are used for livestock grazing and mineral leasing. There is physical access to only one of the State sections in the WSA. The 160 acres of private land are used for grazing. Access to the private land is provided by a "cherry-stemmed" road.

The National Park Service (NPS) has indicated that wilderness designation of this WSA would be in their best interests. The northwestern areas (Smithsonian Eagle Crags) have been identified as part of Zion's Integral Vista Program. The Canaan Mountain unit would complement the adjoining administratively endorsed Zion wilderness area.

The Arizona BLM Wilderness Area, Cottonwood Point, adjoins the unit along the Arizona border. This area was inventoried as part of the Canaan Mountain WSA. However, the Arizona Wilderness Bill of 1984 designated Cottonwood Point as wilderness and, therefore, further study is unnecessary.

The *Washington County Master Plan* (Planning and Research Associates, 1971) identifies the WSA as an "open space" zone and the Washington County Commission (1982) has indicated they would support designation for a portion of the unit.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands . . . Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

Socioeconomics

DEMOGRAPHICS

The Canaan Mountain WSA is located in Washington County (42,858 acres) and Kane County (4,312 acres), Utah.

Kane County is a rural county with a total of 4,024 residents and an average population density of less than one person per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Washington County is also basically a rural county except for the population concentrations near the City of St. George. St. George is approximately 45 highway miles west of the WSA. The total population of Washington County in 1980 was 26,065 for a density of 10.8 persons per square mile.

EMPLOYMENT

The three most important employment sectors are retail trade, government, and services. In Kane County the government and retail sectors dominated, each providing 17 percent of the total 1980 employment, while services followed with 14 percent. Retail trade accounted for 21 percent of the total 1980 employment in Washington County while government provided 19 percent and the services sector accounted for 11 percent (USDC, Bureau of Economic Analysis, 1982). The strength of the retail sectors in the two counties is indicative of the importance of tourism in southwestern Utah. Employment and personal income figures are provided in Table 5.

The communities lying nearest the WSA are Hildale, Utah and Colorado City, Arizona. Residents of these two communities have expressed a desire to remain relatively isolated. This desire is expressed both in the geographic isolation of the communities and the lack of retail trade outlets catering to nonresidents of the communities. These two communities lie along the major access route to the WSA.

TABLE 5
1980 Employment and Personal Income
Kane and Washington Counties, Utah

Industrial Sector	Kane County		Washington County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	1,452	12,595	7,866	83,449
Proprietors	382	2,623	1,469	14,010
Farm				
Proprietors	122	136	343	2,386
Nonfarm				
Proprietors	260	2,487	1,126	11,624
By Industry Source				
Farm	27	382	98	3,031
Nonfarm	1,043	12,213	6,299	80,418
Private	798	9,614	4,805	63,399
Ag. Serv., For., Fish and				
Other (L)	0	29	724	
Mining	17	196	70	1,347
Construction	51	1,544	537	9,425
Manufacturing	70	566	698	8,759
Nondurable Goods	(D)	(D)	441	5,986
Durable Goods	(D)	(D)	257	3,773
Transportation and Public Utilities	150	1,875	236	4,996
Wholesale Trade	12	230	263	3,963
Retail Trade	252	2,364	1,673	14,741
Finance, Insurance and Real Estate Services	39	392	424	5,201
Government and Government Enterprises	202	2,427	875	13,243
Federal, Civilian	245	2,599	1,494	17,019
Federal, Military	18	252	193	2,725
State and Local	30	78	161	425
	197	2,269	1,140	13,869

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral leasing, livestock production, and recreation. Table 6 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

No oil and gas or minerals have been produced from the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Seventeen livestock operators have a total grazing privilege of 1,050 AUMs within the WSA. If all

this forage were utilized, it would account for \$21,000 of livestock sales and \$5,250 of ranchers' returns to labor and investment.

Some woodland products are harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures are insignificant to both the local economy and individual businesses. The WSA's motorized recreational use and related local expenditures are also 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 statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Canaan Mountain WSA is estimated as about 250 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane and Washington Counties.

The WSA generates Federal revenues from mineral leases and grazing fees (refer to Table 6).

Oil and gas leases in the WSA cover approximately 44,170 acres. At up to \$3 an acre, lease rental fees generate up to \$132,510 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 1,050 AUMs per year. Based on a

TABLE 6
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$132,510
Livestock Grazing	\$21,000	\$1,470
Recreational Use	Less than \$1,025	None
Total	Less than \$22,025	Up to \$133,980

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

\$1.40 per AUM grazing fee, the WSA can potentially generate \$1,470 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

An undetermined amount of Federal revenues has also been generated annually from rights-of-ways and land use permits issued for areas within the WSA.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to land treatment and oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but would probably be low due to the WSA's rough terrain and limited resource potential. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: oil and gas, 160 acres; and uranium, 40 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.) Approximately 500 acres would be sprayed and reseeded and 700 acres would be chained and reseeded. About 100 acres could be inundated by a proposed reservoir on South Creek.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If oil and gas and uranium are developed, air quality could be reduced up to the PSD Class II limitation; however, the proximity of the WSA to Zion National Park may result in restriction of mineral development to meet the PSD Class I limitation. Disturbance of 200 acres due to mineral activities would result in only minor increases in fugitive dust emissions. The 700 acres of chaining would result in slight increases in fugitive dust during the clearing.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium and oil and gas exploration and development activities would probably not exceed 200 acres. These activities and the proposed vegetation manipulations would not significantly affect geology.

SOILS

It is estimated that up to 200 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 200 acres would increase from 260 cubic yards/year to 540 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. The 1,200 acres of land treatment could improve erosion condition in the treated area; the amount of change is unknown.

Therefore, under this alternative maximum annual soil loss in the WSA would increase by approximately 280 cubic yards (0.80 percent) over current annual soil loss. This is a small increase and the effects would likely be imperceptible.

VEGETATION

The anticipated maximum of 200 acres of disturbance due to mineral exploration and development would not significantly impact the WSA's sparse vegetation. The proposed 1,200 acres of land treatment would change the affected area from a pinyon-juniper or sagebrush type to a grassland type. The vegetation would gradually revert to the original type unless the area were treated again. Approximately 100 acres of pinyon-juniper and riparian vegetation would be inundated by the proposed reservoir. Overall, vegetation would be altered on only 3 percent of the WSA.

WATER RESOURCES

Since precipitation is low and all disturbance would have to meet State water quality standards, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 280 cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFPs for the Virgin River and Vermilion Planning Units. Construction of a reservoir on South Creek could occur and would allow sprinkler irrigation of 200 acres of potential farmland outside the WSA.

The chaining and reseeded of 500 acres of pinyon-juniper could cause a temporary 2- to 3-year increase in TDS. However, after the new seedlings are established, water quality could be expected to improve.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of oil in-place (3 million estimated recoverable) and up to 60 billion cubic feet of natural gas (18 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 and 3 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place in the Category 1 area if exploration and development were

to occur. However, due to the small size of these deposits, no development is expected under this alternative.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 4,200 tons of uranium oxide on 70 percent of the area and a potential deposit of less than 500 tons on 30 percent of the WSA could be developed. Approximately 40 acres could be disturbed due to exploration and development. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.). No mining claims are presently located within the WSA.

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of water catchments, reservoirs, and the improvement and maintenance of springs. Desert bighorn sheep may migrate into the area and become established near isolated water sources. However, disturbance of an estimated 200 acres (0.4 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Desert bighorn sheep would avoid the area. Less mobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels. The proposed 1,200 acres of land treatment would improve deer habitat.

The peregrine falcon, bald eagle, golden eagle, desert shrew, spotted bat, and Lewis woodpecker would also avoid the disturbed area. Before authorizing surface-disturbing activities (1,500 acres total including the inundated area) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the Fish and Wildlife Service (FWS), as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4) and implement appropriate mitigating measures. Because necessary measures would be taken to protect these animals, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive animal species would be preserved under the No Action Alternative. The proposed reservoir would add a

new aquatic ecosystem to a predominantly dry area.

FOREST RESOURCES

The WSA's forest resources have not been used for many years (except by occasional campers or hikers) and, since minimal surface-disturbing activities are anticipated, no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Virgin River and Vermilion MFPs. The 1,050 AUMs currently allocated in the WSA are controlled by 17 livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected. The four proposed reservoirs, seven spring developments, one catchment, .25 mile of pipeline, 1.5 miles of trail, .75 mile of fence, and 1,200 acres of land treatment could be developed and would result in improved livestock distribution and carrying capacity.

VISUAL RESOURCES

Under this alternative, visual quality in the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e., 28,860 acres would remain closed to ORV use, 17,300 acres would be closed to oil and gas leasing, and 41,470 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, under this alternative, 1,200 acres of vegetation manipulation would occur and 200 acres of mineral-related exploration and development are possible. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity. VRM objectives would probably not be met in Class II areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. The proposed reservoir on South Creek would alter visual quality on 100 acres during construction but could be designed to meet standards after rehabilitation.

CULTURAL RESOURCES

The archaeological sites in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 200 acres from mineral exploration and development, 1,200 acres from vegetation manipulation, and 100 acres from development of a dam and reservoir under this alternative could affect archaeological sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 200 acres could be disturbed by mineral and energy activities and 1,200 acres of vegetation manipulation. Primitive recreational opportunities could be diminished on the affected areas. The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 250 current visitor days per year to 370 visitor days at the end of 20 years.

The proposed reservoir would be small (100 surface acres) but could provide additional water-oriented recreational activities (e.g. swimming, fishing) in the vicinity of Colorado City.

WILDERNESS VALUES

Under this alternative, some wilderness values in the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e. 28,860 acres would remain closed to ORV use, 17,300 acres would be closed to oil and gas leasing, and 41,470 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, 1,200 acres of vegetation manipulation, 200 acres of mineral exploration and development and a 100-acre reservoir project are possible. The related surface disturbance would result

in a significant loss of naturalness, solitude, and outstanding opportunities for primitive, unconfined recreation throughout the WSA as a whole if roads, vehicular ways, and drill pads are located throughout the area. However, the potential for mineral development and related disturbance is low in this WSA.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use. The No Action Alternative would be partially consistent with Washington County plans, which support wilderness designation on a portion of the WSA. It would not complement the NPS proposal of wilderness designation and the adjoining BLM Wilderness Area in Arizona. This alternative is based on implementation of the current BLM Virgin River and Vermilion MFPs and is, therefore, in conformance with these plans. The No Action Alternative would be consistent with State of Utah plans and policies that emphasize economic return from State land and with private plans to develop water on South Creek.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. However, the existing ability to explore and develop mineral resources would be changed slightly because 14,300 acres of existing oil and gas leases would expire and would not be reissued. If the uranium or oil and gas in the WSA were developed it would lead to an increase in employment and income for Kane and Washington Counties. However, 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).

There would be no livestock-related economic losses because the existing grazing use (1,050 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$21,000 annually in livestock sales and \$5,250 of ranchers' return to labor and investment. The proposed developments could result in better livestock production and possibly additional carrying capacity. The economic impact, however, is unknown. A slight increase in local income could result from irrigation of 200 acres of potential farmland with water from the proposed South Creek Reservoir.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent

per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 123 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would be reduced by this alternative. There are 14,300 acres in the WSA that are leased but will be closed to future leasing following expiration of the current leases unless a commercial reserve is found. If not reissued, there would be a loss of up to \$42,900 in revenues to the Federal and State Governments.

Collection of livestock grazing fees (\$1,470 per year) would continue. Additional forage that would be produced by proposed new range improvements and allocated to livestock under this alternative could increase Federal revenues. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (47,170 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 47,170-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be managed under VRM Class I. The 1,200 acres of vegetation manipulations and the 100-acre South Creek Reservoir would not be allowed.

For the following analysis it is assumed that mining claims would be staked before wilderness designation and would eventually be explored and developed, causing an estimated 40 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas for this alternative would be smaller than under the No Action Alternative (40 vs. 1,500 acres [200 acres of mineral-related activities, 1,200 acres of vegetation manipulation, and 100 acres inundated by a reservoir]), the impacts from development and sur-

face disturbance on air quality, geology, soils, vegetation, water, forest, and cultural resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements might not occur. New developments would only be allowed if they could be constructed in a manner not impairing to wilderness values. The proposed South Creek Reservoir would not be built and potential irrigation water would be lost.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 44,170 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas, with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable, could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of potential oil and gas recovery.

Locatable Minerals

There are presently no mining claims in the WSA. Up to 4,200 tons of uranium oxide in 70 percent of the WSA and 500 tons in 30 percent of the WSA could occur. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it

is estimated that up to 40 acres could be disturbed due to exploration and development of the locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 4,700 tons of uranium oxide would be foregone. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of habitat and solitude. However, water is a limiting factor for wildlife in this WSA. If future water improvements were curtailed and the four proposed livestock reservoirs were not constructed and seven springs developed and the 1,200 acres of land treatment foregone, potential expanded habitat for deer, bighorn sheep, and nongame species would be reduced. Bighorn sheep may migrate into the area, but their numbers would remain low due to the limited availability of water during the summer.

The South Creek Reservoir would not be built, and increases in aquatic habitat would not be possible.

In addition, disturbance due to exploration of locatable mineral resources could disrupt wildlife populations and result in these species leaving the disturbed area.

The presence of the peregrine falcon, bald eagle, golden eagle, desert shrew, spotted bat, and Lewis woodpecker would remain the same in much of the WSA, except in those 40 acres of mineral-related disturbance where these species would leave the disturbed area. Prior to approval of surface-disturbing activities, the BLM would take appropriate measures to protect these species, as described for the No Action Alternative, and populations would be preserved.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Virgin River and Vermilion MFPs. The 1,050 AUMs currently allocated in the WSA are controlled by 17 livestock permits. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to preserve wilderness values.

The proposed seven spring developments, one catchment, .25 mile of pipeline, 1.5 miles of livestock trail, and .75 mile of fence might not be constructed. Improvements would only be allowed if they would not impair wilderness values, and each project would have to be evaluated on a case-by-case basis. The four reservoirs and 1,200 acres of vegetation treatment or other improvements requiring heavy equipment would not be allowed.

VISUAL RESOURCES

A slight benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from Classes II and III to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities.

Even though mitigative measures would be applied to minimize visual contract created by sions, visual values in areas affected by the estimated 40 acres of surface disturbance from mineral exploration and development would be degraded, and VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values probably would not be significantly affected by 40 acres of disturbance.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation

could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would control increases in future recreation use, and the quality of the primitive recreation experience would not be negatively affected by the increased use. The limited visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Because there are other suitable ORV play areas in the WSA, ORV use would probably not experience an overall decline. The 4 miles of way would be closed to vehicle use. The potential for water-based recreation associated with the South Creek Reservoir would be lost. This would not be significant because of the small size of the proposed reservoir.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values. Recreation opportunities in Cottonwood Point Wilderness Area and the proposed wilderness area in Zion National Park would also be protected and enhanced by complementary management in this WSA.

WILDERNESS VALUES

Designation and management of all 47,170 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude. Solitude would be preserved on approximately 37,000 acres that meet and 10,170 acres that do not meet the standards for outstanding opportunities for solitude. Naturalness would be preserved on all 47,170 acres and primitive and unconfined recreation would be preserved on 28,000 acres that meet and 19,170 acres that do not meet the standards for outstanding opportunities. The special features in this WSA (scenic and historic values) would also be protected and preserved.

No development of leases is foreseen under this alternative. The anticipated mineral-related surface disturbance would, therefore, be reduced from 200 acres to 40 acres for development of valid mining claims. Mitigation to protect wilderness values would be considered during mining claim development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

Outstanding opportunities for eleven recreational activities (backpacking, hiking, hunting, horse-

back riding, photography, rock climbing, bird watching, and archaeological, geological, and botanical sightseeing) would be preserved. Although recreational use could increase (refer to Recreation section above), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Designation of this WSA as wilderness would benefit the values and uses of the contiguous BLM wilderness area (Cottonwood Point). These areas share a common watershed, canyon system, extended recreation travel trails (hiking and horse-back riding), and scenic values.

Thus, it is concluded that wilderness designation and management of all 47,170 acres of the Canaan Mountain WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 37,000 acres) and primitive recreation (outstanding on 28,000 acres) except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

This alternative would complement the NPS wilderness proposal for the adjacent BLM wilderness area and Zion National Park. The existing BLM Virgin River and Vermilion MFPs do not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to these MFPs.

This alternative would be in conflict with the *Kane County Master Plan* which recommends multiple use of public lands in the county. This alternative would not conflict totally with the multiple-use concept since many existing uses would continue although under more restrictive conditions.

It would partially conflict with Washington County plans, since they would support only a partial designation. If State lands within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Wilderness designation would conflict with private plans to develop water on South Creek.

SOCIOECONOMICS

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 would

be losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

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 oil and gas 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 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 Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims or to the proposed South Creek Reservoir would be lost.

Livestock use and ranchers' income would continue as at present with \$21,000 of livestock sales and \$5,250 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

The loss of 29,870 acres that could be leased under the No Action Alternative would cause an eventual loss of up to \$89,610 per year from lease fees to the Federal Treasury. In addition to these rental fees, any potential royalties from lease production could also be foregone.

**Partial Wilderness Alternative (32,800 Acres)
(Proposed Action)**

The major activities that would occur in the designated portion of the WSA for this alternative are the same as those described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 32,800-acre area designated as wilderness and the 14,370-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, mining claims would be staked before designation and would eventually be explored and developed, causing an estimated 30 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed.

It is assumed that, within the nondesignated area, 70 acres would be disturbed sometime in the future due to uranium (10 acres) and oil and gas (60 acres) exploration and development.

Overall, 100 acres of surface disturbance due to mineral activities would occur within the WSA, 100 acres less than under the No Action Alternative and 60 acres more than with the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) The 1,200 acres of vegetation manipulation could be allowed on the nondesignated area and the impacts would be the same as discussed in the No Action Alternative.

The analysis of the No Action Alternative, based on 200 acres of mineral-related surface disturbance, 1,200 acres of vegetation manipulation, and 100 acres of inundation by a reservoir, shows that surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative which assumes 100 acres of mineral-related surface disturbance, 1,200 acres of vegetation manipulation, and 100 acres inundated by a reservoir.

Restrictions on management and development methods within the WSA would result in essentially the same impacts on development of water sources, mineral and energy resources, wildlife, livestock grazing, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 29,800 acres of oil and gas leases in the area that would be designated wilderness. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 10 million barrels of in-place oil and less than 60 billion cubic feet of natural gas falls within the area that would be designated as wilderness under this alternative. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potential resource of up to 2 million barrels of oil and 13 billion cubic feet of natural gas could be foregone. This would allow recovery of 1 million more barrels of oil and 5 billion more cubic feet of natural gas than under the All Wilderness Alternative.

It is concluded that, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, this alternative is not expected to result in any significant loss in recovery of the oil and gas resource.

Locatable Minerals

There are presently no mining claims within the WSA. However, claims can be filed until the area is designated wilderness. If minerals are located prior to wilderness designation, it is estimated that up to 30 acres could be disturbed in the designated area and 10 acres in the nondesignated area due to exploration and development of locatable minerals (uranium). Development work, extraction, and patenting could occur on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981b). The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. Assuming that the minerals are evenly distributed, recovery of about 3,290 tons of uranium oxide could be foregone.

Because these metals are not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

LIVESTOCK

The effect of designation of 32,800 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wil-

derness Alternative. Of the 1,050 AUMs allocated, 735 would be within the designated portion of the WSA and 315 within the nondesignated portion. Development of future roads or other livestock management facilities for use with 735 AUMs in the designated portion could be restricted to preserve wilderness values. This alternative might not allow the proposed range improvements. Three spring developments, two reservoirs, and .5 mile of fence are proposed in the designated area. These projects would be considered on a case-by-case basis. The vegetation manipulations (1,200 acres) are in the nondesignated area and could be allowed.

VISUAL RESOURCES

Because mineral-related surface disturbance in the WSA would be 100 acres under this alternative as opposed to 200 acres under No Action and 40 acres under All Wilderness, the impact on visual resources would be less than under the No Action Alternative and slightly more than under the All Wilderness Alternative. In the portion recommended for designation, 30 acres of surface disturbance resulting from mineral exploration and development would cause localized long-term degradation of scenic values and exceed VRM Class I management objectives. An additional 70 acres in the nondesignated portion of the WSA would be disturbed by minerals and 1,200 acres would receive vegetation treatment. These activities would not meet VRM Class II objectives. The proposed reservoir on South Creek would alter visual quality on 100 acres during construction but could be designed to meet standards after rehabilitation. Disturbance of a total of 1,400 acres within the WSA would result in localized long-term impairment of visual values but might not significantly affect visual resources in the WSA as a whole. If roads and other disturbances were spread over a wide area, impacts could be significant.

RECREATION

Impacts on recreational values and opportunities for the 32,800-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to the lack of such activity in the area.

In the area that would not be designated (14,370 acres), little change in recreational use is expected. The proposed South Creek Reservoir would provide water-based recreation.

WILDERNESS VALUES

Impacts to wilderness values would be the same

as under the All Wilderness Alternative on the 32,800 acres that would be designated wilderness. Size, naturalness (all 32,800 acres affected are natural), outstanding opportunities for solitude (32,800 acres meet the standard) and primitive recreation (including 28,000 acres that meet and 4,800 acres that do not meet the standards), and special features would be preserved. Approximately 4,200 acres that meet the outstanding opportunities for solitude in the nondesignated area could be foregone under this alternative. Although recreational use could increase substantially (refer to Recreation section under the All Wilderness Alternative), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreation values would be expected from increased visitation. There would be some loss of wilderness values due to allowable surface disturbance from mineral exploration activities on up to 100 acres, 1,200 acres due to vegetation manipulation, and 100 acres that would be inundated by the South Creek Reservoir. Additionally, sights, sounds, and emissions of activities within and adjacent to the 14,370-acre area that would not be designated could result in a loss of solitude and primitive recreational values within the designated portion. Because the amount of disturbance in the designated portion would be reduced and most of the area with outstanding wilderness values would be protected, loss of naturalness, solitude, and primitive and unconfined recreational values would be less likely than with the No Action Alternative.

The portion that would be designated would be contiguous with the proposed wilderness in Zion National Park and Cottonwood Point Wilderness Area (refer to Map 3).

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use Plans and Controls section as described for the All Wilderness Alternative, with the exception of private plans to build the South Creek Reservoir and a policy statement by the Washington County Commission. The Commission (1982) has written "We concur wholeheartedly with your recommendation to delete all except the Canaan Mountain proposal from wilderness areas identified in this county." This alternative would complement the BLM's new wilderness area, Cottonwood Point, and the Zion National Park proposed wilderness area. The reservoir would be in the nondesignated area and would be allowed.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any changes in existing patterns and

trends of population, employment, and local income distributions. The 1,050 AUMs and associated income and revenue would remain available to the livestock industry and the Federal Government. The South Creek Reservoir could be built to provide sprinkler irrigation to 200 acres of potential farmland. Approximately \$46,500 per

year in Federal oil and gas leasing revenue, \$43,110 less than with the All Wilderness Alternative, would be lost as leases expire. This revenue would not be transferred to State programs. Overall, the local economic impact from this alternative would be considered insignificant as would economic impacts from the No Action and All Wilderness Alternatives.

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Moquith Mountain WSA



MOQUITH MOUNTAIN WSA

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MOQUITH MOUNTAIN WSA (UT-040-217)

INTRODUCTION

General Description of the Area

The Moquith Mountain Wilderness Study Area (WSA) is located in Kane County approximately 4 air miles west of Kanab, Utah. It is managed by the BLM Cedar City District, Kanab Resource Area Office. On the west the WSA is contiguous to Coral Pink Sand Dunes State Park. It is bounded on the north by the Hancock Road and private lands, on the east by Cottonwood Canyon, and on the south by Arizona and the Kaibab-Paiute Indian Reservation. There are 14,830 acres of public land, 640 acres of State land, and 40 acres of private land within the WSA boundary.

There are five distinct landscape types within the WSA: the Vermilion Cliffs, Coral Pink Sand Dunes, colorful canyons, an escarpment above the dunes, and a pine forest slickrock plateau. Elevations range from 7,000 feet above sea level on Moquith Mountain in the southwest corner of the WSA to 5,000 feet above sea level in the southeast corner of the WSA.

Average annual precipitation in the Moquith Mountain WSA is approximately 12 inches. Highest monthly precipitation occurs from July through December, during which time two-thirds of the yearly total falls. Intense thundersforms are common during summer months.

Temperatures vary greatly with aspect and altitude, but are generally indicative of warm summers and cold winters. July and January are the warmest and coldest months, respectively. July temperatures range from 50 degrees Fahrenheit (F) to 100 degrees F, while the January range is 0 to 60 degrees F.

The predominant vegetation is pinyon-juniper (approximately 70 percent of the WSA). The second major type of vegetation is mountain shrub (18 percent).

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. Issues identified during the study phase are the impacts of the adjacent Coral Pink Sand Dunes State Park and its associated off-road vehicle (ORV) activities on wilderness; potential of the WSA for intensive recreation development to complement the adjacent state park and the WSA's unique ecotype. Issues and concerns specific to Moquith Mountain WSA raised in

the spring of 1984 public scoping meetings (USDl, BLM, 1984) are responded to below.

1. *Comment:* The occurrence of the sensitive plant species *Asclepias welshii*, *Astragalus striatiflorus*, and *Astragalus ampullarius* in or near this WSA should be considered in the decisionmaking process.

Response: There are two plant species (*Asclepias welshii* and *Astragalus striatiflorus*) in the WSA that are presently under consideration by the Fish and Wildlife Service (FWS) for possible threatened or endangered status. These are discussed in the Affected Environment, Vegetation section. Wilderness designation would not have a significant impact on these species. *Astragalus ampullarius* has been found approximately 1 mile southeast of the WSA boundary. It is not discussed in this document because it is outside the boundary.

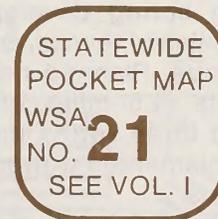
2. *Comment:* Land use conflicts as a result of wilderness designation should be discussed.

Response: The Affected Environment and Environmental Consequences sections identify and discuss conflicts that would result from wilderness designation.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, an alternative was suggested that would have included some lower canyon areas adjacent to the WSA which appear to have wilderness value. This alternative was considered but not analyzed due to difficulties in wilderness management. Inclusion of these lands in the WSA would conflict with BLM's long-range recreation planning goals for the area because developments such as roads and picnic areas are proposed.



Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (14,830 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 ALTERNATIVE (PROPOSED ACTION)

Under this alternative, none of the 14,830-acre Moquith Mountain WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Vermilion Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1981a) and *Kanab-Escalante Grazing Management Environmental Impact Statement (EIS)* (USDI, BLM, 1980a). The 640 acres of State land and 40 acres of private land within the area of the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase.

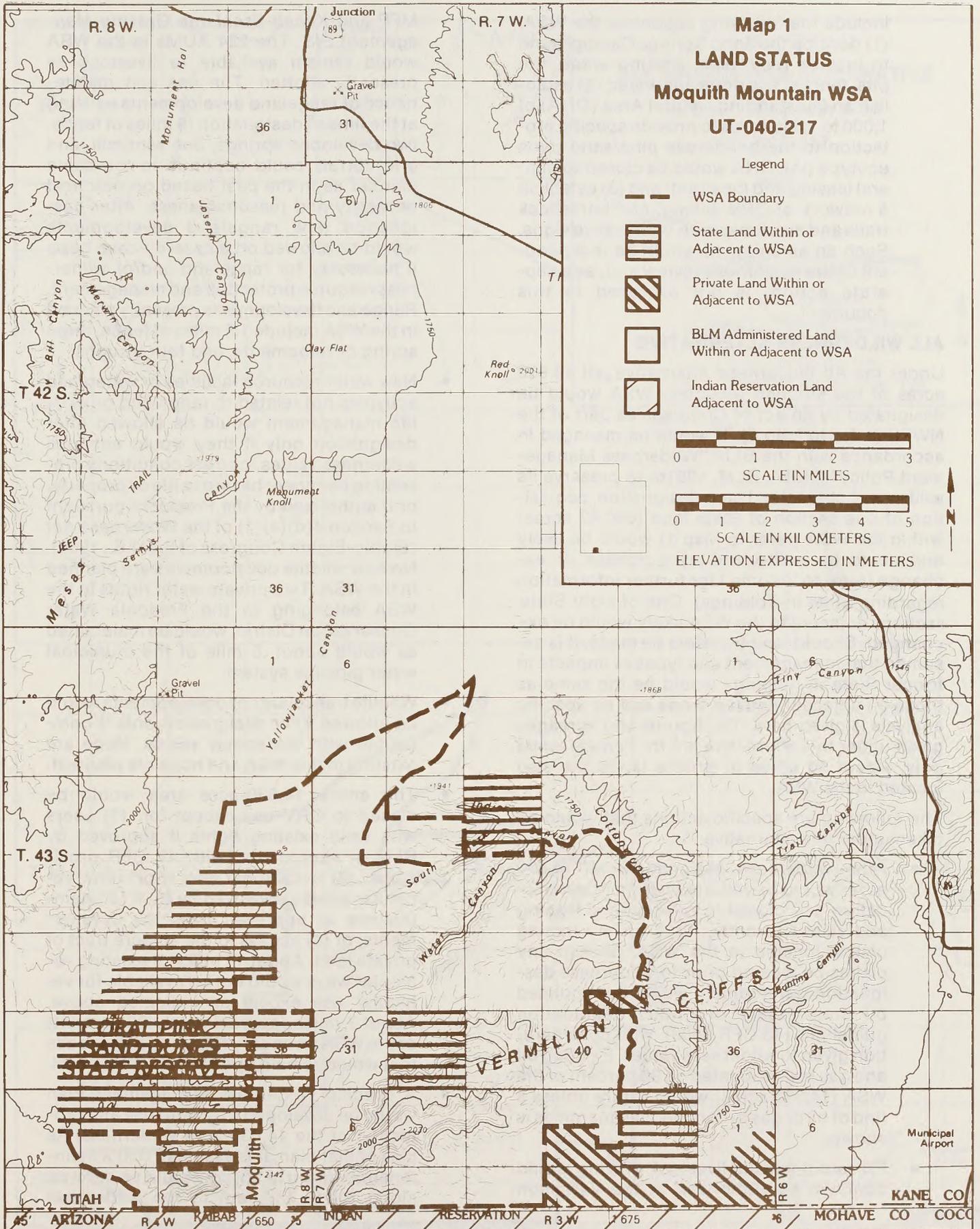
The following are specific actions that would take place under this alternative:

- All 14,830 acres would remain open to mineral location, leasing, and sale. There are no mining claims currently located in the WSA. Development work, extraction, and patenting would be allowed on any future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809) without concern for wilderness values. Existing oil and gas leases (on 14,590 acres) and future leases could be developed under Category 1 (standard stipulations) on about 13,550 acres and leasing Category 3 (no surface occupancy) on about 1,280 acres.
- The present domestic livestock grazing use of 224 Animal Unit Months (AUMs) in the WSA would continue as authorized in the MFP and *Kanab-Escalante Grazing Management EIS*. Use and maintenance of two existing spring developments, one windmill, 9 miles of fences, and one corral would continue. Planned new rangeland improvements (1.5 miles of fence, four troughs, and three spring developments) could be implemented without wilderness considerations.
- Use, maintenance, and development of facilities and improvements for wildlife, water

resources, etc., could be allowed if in conformance with the MFP. No new wildlife developments are planned in the WSA. Two private water rights belonging to the Fredonia Water Conservation District are found in the WSA. About .5 mile of pipeline associated with municipal water development would continue to be maintained.

- Approximately 11,130 acres would be open to ORV use. On 2,100 acres, ORV use would be limited to existing roads and trails to protect riparian lands in Water Canyon and the South Fork of Indian Canyon. ORV use would be prohibited on the remaining 1,600 acres to protect the Fredonia, Arizona municipal water system. The 11 miles of ways inside the WSA and the approximately 7 miles of roads that border the WSA would remain available for vehicular use. New access roads could be planned in the future.
- With the exception of the ponderosa pine resource and specific areas protected for recreational purposes, the area would be open to woodland product harvest. Harvest of forest products in the past has been about 50 cords per year. The unauthorized harvest of ponderosa pine for firewood is a continuing management problem.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (5,468 acres) and Class IV (9,362 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.
- A variation under the No Action Alternative would be to amend the Vermilion MFP to

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include the following actions in the WSA: (1) develop the Sand Springs Campground to include restrooms, parking areas, fire pits, fences, and domestic water; (2) establish an Outstanding Natural Area (ONA) of 1,000 to 1,640 acres to provide specific protection to the ponderosa pine/sand dune ecotype (the ONA would be closed to mineral leasing and location); and (3) establish a network of ORV, hiking, and horseback trails and overlooks with interpretive signs. Such an amendment would be independent of the wilderness review and, as a separate action, is not analyzed in this document.

ALL WILDERNESS ALTERNATIVE

Under the All Wilderness Alternative, all 14,830 acres of the Moquith 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" (USDI, BLM, 1981b) to preserve its wilderness character. Upon designation, acquisition of one section of State land (680.42 acres) within the WSA (refer to Map 1) would be likely and could be authorized by purchase or exchange (refer to Volume I for further information regarding State in-holdings). One of eight State sections adjacent to the WSA likely would be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. About 40 acres of private lands are also located in the WSA.

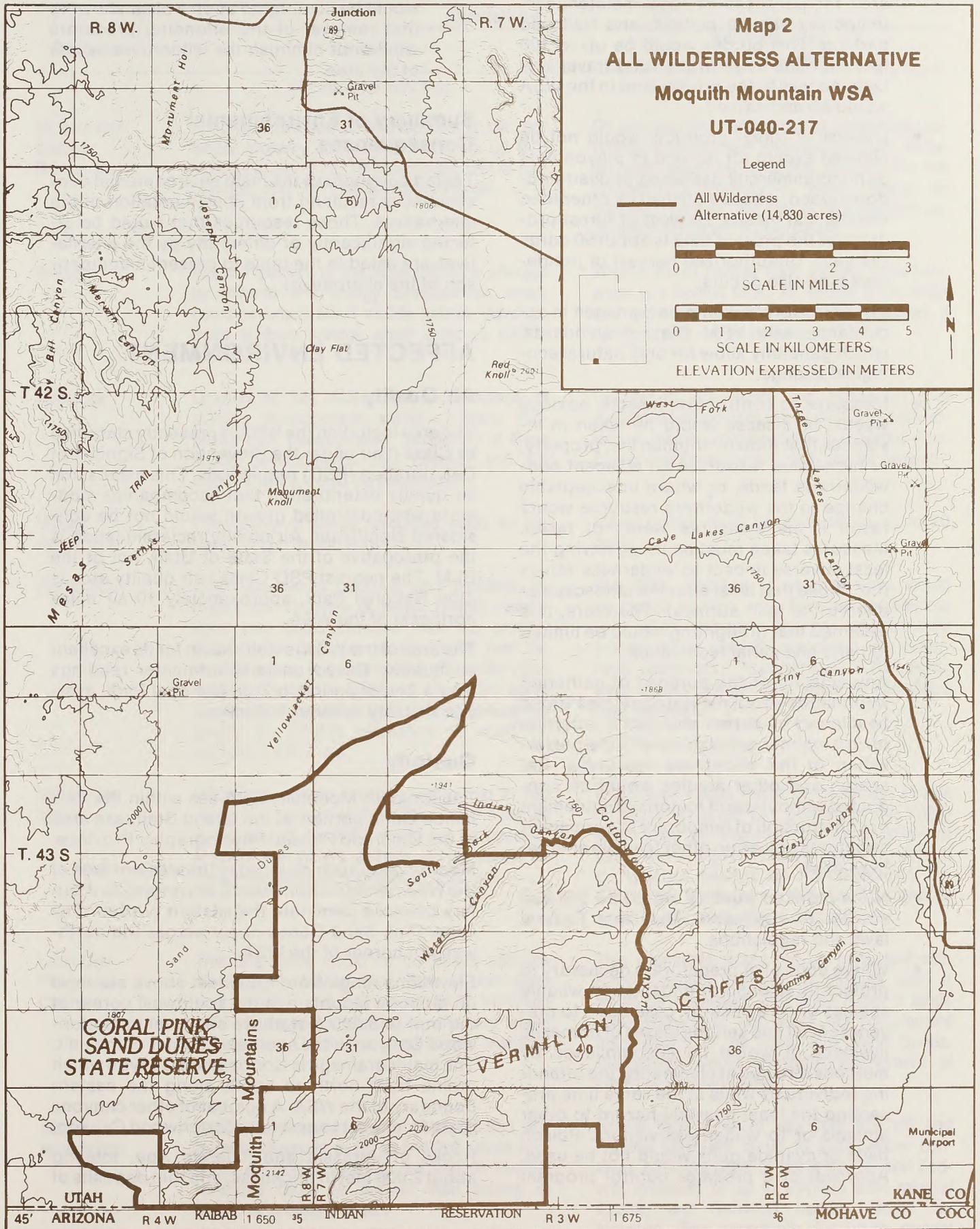
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 14,830 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Currently, there are no mining claims located in the WSA. Should any claims be located prior to wilderness designation development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), with consideration given to wilderness values. Existing oil and gas leases located on 98 percent of the WSA (14,590 acres) would expire unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would continue as authorized in the Vermilion

MFP and *Kanab-Escalante Grazing Management EIS*. The 224 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 (9 miles of fence, two developed springs, one windmill, and one corral) could continue in the same manner as in the past based on practical necessity and reasonableness. After designation new rangeland developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management. Rangeland developments presently planned in the WSA include 1.5 miles of fence, three spring developments, and four troughs.

- 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). No new wildlife developments are planned in the WSA. Two private water rights in the WSA belonging to the Fredonia Water Conservation District would be maintained as would about .5 mile of the municipal water pipeline system.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. None are existing in this WSA and none are planned.
- The entire 14,830-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 provisions; (2) occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments; or (3) access to the 40-acre tract of private land. About 11 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 7 miles (approximately 20 percent) of the WSA boundary follow existing roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 14,830-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness

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area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface. Access to the private land in the WSA would be maintained.

- 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. Harvest of forest products at the present time is about 50 cords per year. Unauthorized harvest of ponderosa pine also occurs.
- Visual resources would be managed in accordance with 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 instances that threaten human life, property, or high-value resources on adjacent non-wilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must 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 on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The area including the WSA is presently classified as Class II air under the Prevention of Significant Deterioration (PSD) regulations. This means that air quality deterioration that accompanies moderate well-controlled growth would not be considered significant. Air quality reclassification is the prerogative of the State of Utah, not of the BLM. The nearest PSD Class I air quality area is Zion National Park, approximately 10 air miles northeast of the WSA.

The area of the WSA is well known for its excellent air quality. Based on telephotometer readings over a 2-year period in Zion National Park, average visibility is about 120 miles.

Geology

The Moquith Mountain WSA lies within the Vermilion Cliffs portion of the Grand Staircase area of the Colorado Plateau Physiographic Province.

Moquith Mountain dominates the western side of the WSA, while Cottonwood Canyon and its tributary canyons dominate the eastern portion. The Coral Pink Sand Dunes occur across the northwestern corner of the WSA.

Elevations range from 7,000 feet above sea level on Moquith Mountain in the southwest corner of the unit to 5,000 feet above sea level in Cottonwood Canyon in the southeast corner of the unit. The major drainage is Cottonwood Canyon which drains from north to south along the eastern boundary of the WSA. A number of other canyons drain from west to east into Cottonwood Canyon.

Rocks of Jurassic and Triassic Age, totaling about 2,000 feet in thickness, and thin deposits of

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MOQUITH MOUNTAIN WSA

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (14,830 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery also would be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 1 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Development of three springs would enhance wildlife habitat.	Wildlife would benefit from solitude. However, water is a limiting factor for wildlife in the WSA and potential habitat would be reduced if springs could not be developed.
Livestock	Grazing of 224 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of three spring developments, four troughs, and 1.5 miles of fence, could be constructed.	Grazing of 224 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new development might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 180 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	ORV use would continue and probably increase on 11 miles of ways. Overall recreational use could increase from the present 6,000 visitor days per year to 8,900 over the next 20 years. Approximately 8,450 visitor days would be related to ORV use. Up to 180 acres of mineral-related disturbance could reduce the quality of primitive recreation as could increases in ORV use.	The WSA, including 11 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation. Approximately 5,700 visitor days of ORV use per year would be eliminated from the WSA.
Wilderness Values	Wilderness values could be lost on up to 180 acres (1.2 percent of the WSA), but the values in the rest of the WSA would not be affected. Most of the WSA's solitude values would diminish because of increases in ORV use.	Wilderness values would be protected, except on up to 20 acres (0.1 percent of the WSA) which may be disturbed by development of valid mineral rights. Solitude would be difficult to protect on areas of the WSA adjacent to the Coral Pink Sand Dunes where ORV trespass would create a management problem.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, and the current BLM Vermilion MFP. It would be consistent with and would complement Coral Pink Sand Dunes' Management.	This alternative would not be consistent with Kane County's concept of multiple use. It would be consistent with State policy if lands were exchanged, but would not complement management of the Coral Pink Sand Dunes. Designation would constitute amendment of the BLM Vermilion MFP.
Socio-economics	Annual local sales of less than \$32,830 and Federal revenues of up to \$44,209 would continue. An additional \$720 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$29,080 and Federal revenues of up to \$314 would continue, but local sales of about \$3,750 and Federal revenues of up to \$44,490 from mineral leasing and firewood harvest would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

MOQUITH MOUNTAIN WSA

Quaternary Age outcrop in the WSA. The Jurassic Navajo Formation forms the most extensive outcrop. The Jurassic-Triassic Kayenta Formation and the Triassic Moenave and Chinle Formations are exposed along Cottonwood Canyon. Underlying Mesozoic and Paleozoic rocks may be as much as 9,000 feet thick in this vicinity of the WSA.

At the west edge of the WSA lies the west-facing escarpment of the Moquith Mountain. This escarpment is the result of vertical movements (east side up) along the north-trending Sevier fault.

Soils

The majority of the WSA consists of rock outcrops, predominantly sandstone with some shale and siltstone. Eight percent of the WSA consists of rolling sand dunes.

The largest percentage of the WSA has soils in the critical or severe erosion class. Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	2,330	16	12,580
Critical	2.7	6,000	40	16,200
Moderate	1.3	2,500	17	3,250
Slight	0.6	4,000	27	2,400
Stable	0.3	0	0	0
Total		14,830	100	34,430

Sources: USDI, BLM, 1978b; Leifeste, 1978.

Vegetation

The existing vegetation consists of three major and four smaller vegetation types.

The pinyon-juniper type covers almost 70 percent (10,381 acres) of the WSA (approximately 13 percent of the total WSA is pinyon-juniper associated with sagebrush). This association has a sparse understory of shrubs, including mountain mahogany, serviceberry, Gambel's oak, cliffrose, and silver buffaloberry. The portion combined with sagebrush has big sagebrush, snakeweed, bitterbrush, rabbitbrush, green ephedra, and sandsage.

Approximately 18 percent (2,669 acres) of the

area is covered by a mountain shrub association. This grouping has oak, big sagebrush, serviceberry, pinyon-juniper, and manzanita, with some bitterbrush, rabbitbrush, and bunch grasses.

Slightly over 10 percent (1,483 acres) of the WSA is of the conifer association. It is located in the sandy area north and northeast of the Coral Pink Sand Dunes State Reserve. Ponderosa pine is the dominant overstory, with blowout grass, forbs, and rabbitbrush.

There are four small, unusual vegetation plant communities within the unit. These occur in conjunction with seep areas at the head of Water Canyon (Douglas fir), South Fork of Indian Canyon (a hanging garden), and at the heads of two unnamed canyons (aspen groves). These areas make up approximately 2 percent (297 acres) of the WSA.

The Moquith Mountain WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

There are two plant species in the WSA under consideration by the FWS for possible threatened or endangered status: Welsh's milkweed (*Asclepias welshii*) and a milkvetch (*Astragalus striatiflorus*). These plants occur primarily within the pine association. It is BLM policy to extend the same type of protection to these sensitive plants that is afforded to threatened or endangered plants.

Water Resources

Within the WSA are five undeveloped springs, three developed springs, and over 8 miles of perennial stream. One of the springs is located on top of the Moquith Mountains, east of the Coral Pink Sand Dunes State Reserve; three others (one developed) are in Water Canyon; one undeveloped and one developed spring in the side canyon tributary of the South Fork of Indian Canyon; and a developed spring in a side canyon tributary of Cottonwood Canyon.

There are two known private water rights found on public land within the WSA. Both of these belong to the Fredonia Water Conservation District. Water originating from these springs, along

with water from four additional springs and four wells, supplies all culinary water needs for the City of Fredonia, Arizona. The water is collected at spring and well sites and then routed approximately 12 miles through four 6-inch pipelines to Fredonia, Arizona. Approximately .25 mile of a 2-inch pipeline is located within the WSA along the tributary of the South Fork of Indian Canyon, and approximately .25 mile of 4-inch pipeline is located along Water Canyon within the WSA.

The area's water quality is presumed to be good since it is used for culinary purposes.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 1+ was assigned to the Moquith Mountain WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The energy and mineral resource rating summary is given in Table 3.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in

**TABLE 3
Mineral and Energy Resource Rating System**

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Uranium	f2	c2	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f1	c2	None
Hydroelectric	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

To date no exploratory wells have been drilled within the WSA and, as a result, no direct data exist to establish whether or not economic deposits of oil and gas occur. However, two wells have tested the oil and gas favorability along the Sevier fault outside the western boundary of the WSA. One well is located approximately 2 miles northwest of the WSA along the downthrown side of the fault, and the other is about 5 miles to the north along the upthrown side of the fault (SAI, 1982). The well on the downthrown side reached a total depth of 10,503 feet and terminated in pre-Cambrian rocks. Oil shows were reported from Cambrian, Mississippian, and Triassic rocks. The well on the upthrown side was dry and penetrated Cambrian rocks at a total depth of 9,119 feet.

According to SAI (1982), the WSA is considered to have a low favorability for oil and gas with a potential only for small, widely scattered oil and gas pools, similar perhaps to the Virgin and Anderson Junction Fields 30 and 35 miles to the west, respectively. The Virgin Field has produced small amounts of oil intermittently since 1907, although production costs have generally exceeded profits (SAI, 1982). Cumulative oil production in the Virgin Field has amounted to 201,127 barrels through 1970 (SAI, 1982). The

Anderson Junction Field produced only 1,380 barrels from 1968 to 1969 (SAI, 1982) and is now abandoned. The small size of these fields is due to the relatively thin stratigraphic sequence which generally limits the volume of both favorable source and reservoir rocks. There is also a tendency for medium size or larger oil and gas accumulation to have been destroyed or reduced in size by recent tectonic events, deep erosion, or water flushing. The size of recoverable hydrocarbons in such an environment is anticipated by SAI (1982) to be less than 10 million barrels of in-place oil or, if gas, no more than 60 billion cubic feet in-place. (Refer to Appendix 6 for estimates of recoverability.)

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases. Approximately 57 percent of the WSA leases are pre-FLPMA.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981b). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

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). Wilderness designation would not affect the termination of existing leases.

There are presently 14 oil and gas leases covering 14,590 acres (98 percent of WSA). Only 240 acres remain unleased. About 1,240 acres of the leased land are subject to a no surface occupancy stipulation. The remainder are under Category 1.

Coal

There are no known coal beds within the WSA. The coal-bearing Cretaceous geologic units typical of southwestern Utah do not occur in the WSA (SAI, 1982).

Geothermal

No geothermal resources are known to occur within or near the WSA. According to SAI (1982), the geothermal favorability of the WSA is low with a potential only for low-temperature geothermal resources.

The WSA lies within the Colorado Plateau which, in terms of geothermal resources, is characterized by a low heat flow, a long history of relative tectonic stability, and a general lack of thermal springs. The scarcity of hot springs may be due in part to a lowered regional water table caused by deep stream incision. If thermal waters do exist, they occur only at considerable depths (Muffler, 1978).

LOCATABLE MINERALS

Uranium

No uranium deposits are known to occur within the WSA. According to the U.S. DOE (1983) none of the WSA is located in either a potential resource area or an area favorable for uranium concentration. Accordingly, the WSA has been assigned a relatively low certainty (c2) to contain only small deposits of uranium (f2). The f2 rating indicates that any deposit, if it did exist, would not be expected to exceed 500 tons of recoverable uranium oxide.

The U.S. DOE (1979) reports that the closest uranium production is approximately 40 miles west of the WSA. Here, minor amounts of uranium were obtained from the Moenave Formation. This formation outcrops in the southeastern part of the WSA and underlies the remainder of the WSA at depths generally less than 1,000 feet (Hintze, 1973). It should be emphasized that the f2/c2 rating represents a low favorability with a low probability of a deposit being discovered and developed. There are no mining claims in the WSA.

SALABLE MINERALS

Minor deposits of stream gravel and other loose rock material that could be used for construction occur within the WSA. These deposits are not unique or economically significant due to the presence of ample similar materials nearby and outside the WSA.

Wildlife

The Moquith Mountain WSA provides one major habitat type and smaller amounts of five others. The major habitat is pinyon-juniper; the smaller types are ponderosa pine and sand dunes, riparian, mountain shrub, clifflines, and sagebrush. In

MOQUITH MOUNTAIN WSA

this area the habitat types present in the WSA could theoretically support 52 species of mammals, 158 species of birds, 23 species of reptiles, and seven species of amphibians.

There are no wildlife facilities or proposed vegetation treatments within the WSA. There are no crucial or critical wildlife habitats in the WSA.

Game species in the WSA include mule deer, cougar, cottontail rabbit, and mourning dove. Mule deer are common yearlong residents in the WSA. Small numbers of cougar are also yearlong residents of the WSA. Cottontail rabbit occur throughout the WSA, and mourning dove are fairly common throughout the WSA from May to September.

The Utah Division of Wildlife Resources (UDWR, 1982) has compiled a list of sensitive animal species. Three of those listed can be found within the WSA, at least on an occasional basis. These animals are roadrunners, Lewis woodpecker, and fox sparrow.

Two endangered species, the peregrine falcon and bald eagle, may occasionally be found within the WSA, although neither species is believed to nest in or utilize the area extensively. No other sensitive, threatened, or endangered species are known to occur within the WSA.

Forest Resources

Most of the WSA is composed of the pinyon-juniper ecotype. It is characterized by a dominant tree overstory of pinyon pine, Utah juniper, scattered Gambel's oak, and some ponderosa pine in

suitable habitat. About 10 percent of the WSA is of the conifer ecotype. This is the area northeast of the Coral Pink Sand Dunes State Reserve, and ponderosa pine is the dominant overstory. Vegetation here is sparse due to drifting sands.

None of the forest resources in the WSA are of commercial quality, although there is some potential for firewood and post cutting within the unit.

It is estimated that about 50 cords of wood were removed annually before interim management protection.

Livestock and Wild Horses/Burros

The Moquith Mountain WSA covers all or parts of seven grazing allotments. Eight operators graze cattle within these allotments. Many of the allotments contain little available forage within the WSA because of the unsuitable conditions for grazing (e.g., steep topography, lack of water, sparse forage, etc.). Table 4 shows the status of livestock grazing within the WSA. The following existing livestock facilities are located within the WSA boundary: (1) Approximately 9 miles of fence at eight different locations (boundary, gap, and drift) and an additional 5 miles of fence on the WSA/Arizona border on the south end of the WSA; (2) one corral; (3) two spring developments; and (4) one windmill.

The Moquith Mountain WSA also has the following proposed range improvements recommended for development: three springs, four troughs, and 1.5 miles of fence. These projects were identified to better distribute livestock grazing in the allot-

TABLE 4
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	Suitable ¹ Acres in WSA	Unsuitable ¹ Acres in WSA	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Art Canyon	9,092	8,880	5,120	3,760	148	1
Chris Spring	4,703	520	305	215	24	2
Cougar Canyon	1,546	1,546	0	1,546	13	1
Farm Canyon	3,363	450	450	0	12	1
Old Fort	2,151	1,475	432	1,043	10	1
Water Canyon	3,170	1,757	493	1,264	12	1
Yellow Jacket	10,036	202	178	24	5	1
Total		14,830	6,978	7,852	224	8

Source: USDI, BLM, 1979b.

¹The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

ments. No land treatments are proposed in the WSA.

There are no wild horses or burros within the WSA.

Visual Resources

The WSA possesses a variety of landscape characters and features. The BLM visual resource inventory classified approximately 7,300 acres as Class A and 7,530 acres as Class B scenery. Class A scenery is an area where features of landform, waterform, and/or vegetation pattern are of unusual or outstanding quality.

The unit is also divided into two VRM classes. There are 5,468 acres (39 percent of the WSA) in VRM Class II and 9,362 acres (63 percent) in Class IV. (Refer to Appendix 7 for a detailed description of BLM's VRM rating system.)

Cultural Resources

Based on archaeological surveys for the Southern Utah Coal Project (USDI, BLM, 1978a), the WSA is estimated to contain high site densities (over 50 sites per 23,000 acres). No known sites are on the National Register of Historic Places. The best known existing site is the South Fork Indian Canyon Pictographs, which is probably a potential National Register property, less than .25 acre in size.

Recreation

The Moquith Mountain WSA is part of the 50,632-acre Moquith Mountain Special Recreation Management Area (SRMA). With the exception of developed sites, the WSA exhibits a great diversity of recreational opportunities similar to that found in the larger SRMA.

The Moquith Mountain WSA offers opportunities for backcountry recreation activities such as hiking, backpacking, and sightseeing. In addition, portions of the WSA are suitable and open to use by ORVs. The South Fork Indian Canyon Pictograph site, the 1,471-acre ponderosa pine/sand dune area, the colorful red and orange cliffs, and several pockets of quaking aspen and Douglas fir add variety and are of special importance to sightseers.

The WSA has acreage in each of the three ORV categories. ORV use is prohibited on approximately 1,600 acres to protect the Fredonia, Arizona municipal water system and limited to existing roads and trails on approximately 2,100 acres to protect riparian lands in Water and Indian

Canyons. The remaining 11,130 acres, or about 75 percent of the WSA, are open to ORV use. Sightseeing by ORV constitutes the heaviest use of the WSA. Use is confined to the sand dunes and ways in the WSA.

The Moquith Mountain WSA is adjacent to several well used recreational facilities. Recreationists using these areas often extend their activities into the WSA. These areas are described below.

Current recreational use of the WSA is heavily influenced by the close proximity of Coral Pink Sand Dunes State Park. The State Park is adjacent to the western boundary of the WSA and includes a 19-unit campground and picnic area. The State of Utah maintains a permanent staff of two to manage the facility. Recreational use of the WSA closely approximates the visitor profile of the ORV user component at the State Park. Visitation at the Park has stabilized at just above 80,000 per year. Use peaks in May and then levels off during the June to September tourist season. The average visit to the Park campground is made by nonresident, single-family groups of three, with an average stay of 2.3 nights. Utah resident use increased during the 1982 to 1984 seasons. The major components of park visitation are motor vehicle tourists/sightseers and ORV users. One half of the visitors indicate that the Coral Pink Sand Dunes is their primary trip destination.

The major uses of the WSA are from State Park visitors who either cross the sand dunes in ORVs between Sand Springs and the State Park campground or sightsee for scenery adjacent to the way on Moquith Mountain. The South Fork Indian Canyon Pictograph is the only other area within the WSA receiving a substantial amount of use.

Because the way on Moquith Mountain and the "cherry-stemmed" South Fork Indian Canyon Pictograph access way are extremely sandy, recreational access and use of the WSA are almost exclusively by vehicles with off-road capabilities. Motor vehicle tourists staying at Kanab motels or camping at the State Park cannot gain vehicular access to the WSA.

Adjacent to the north boundary of the WSA is the BLM's Ponderosa Grove Campground. The campground contains rest rooms and group camping facilities. This area is used primarily for group day use by various local organizations. It also serves as an overflow area for the State Park. Visitor use is estimated to be 6,000 people per year. The BLM does not maintain a permanent staff at the facility. Use of this facility exceeds capacity during the spring and early summer months. The BLM Vermilion MFP recommends that, when overuse

occurs, Sand Springs be developed. The Sand Springs area is a primitive camping area located at the boundary of the WSA. The site is used primarily as a staging area for visits into the WSA.

Although deer numbers are generally low throughout the WSA, hunting pressure is relatively high. Some mourning dove wintering also occurs in the area south and east of the Vermilion Cliffs where the doves find abundant food, cover, and water in the riparian areas of Cottonwood Canyon.

Visitor use data for the WSA have not been developed. However, some indication of the possible use can be drawn from visitor use information on the adjacent recreation sites. Use is less than the 85,059 visits to the State Park recorded in 1982. It is estimated that past visitor use in the WSA would be about the same as Ponderosa Grove Campground use (i.e., 6,000 visitor days). Approximately 95 percent (5,700 visitor days) is associated with sightseeing or sand dunes use with ORVs. The remaining use is probably associated with deer hunting in the WSA.

The Sand Springs Campground is a primitive camping area located at the boundary of the WSA. The campground is used primarily as a staging area for visits into the WSA. Use of this site is primarily by those interested in the South Fork Indian Canyon Pictograph site.

Although deer numbers are generally low throughout the WSA, hunting pressure is relatively high. Mourning dove hunting also occurs in the area south and east of the Vermilion Cliffs where the doves find abundant food, cover, and water in the riparian areas of Cottonwood Canyon.

Wilderness Values

SIZE

The size of the WSA is 14,830 acres. It is over 6 miles long (north to south) and over 5 miles wide (east to west).

NATURALNESS

The unit is in a natural condition with minor exceptions. Imprints of man that remain in the WSA include two ways approximately 11 miles in length, one corral, 9 miles of fence, three spring developments, one windmill, about .5 mile of culinary water line, and numerous stumps left as a result of wood cutters.

In the Moquith Mountain WSA, the quality of naturalness has changed since the *BLM Intensive Wilderness Inventory* (USDl, BLM, 1980b) decision. Increased ORV use of several ways has increased the visibility of 11 miles of ways and

consequently impacted naturalness. These imprints are substantially noticeable on 47 acres along the ways. Consequently, naturalness is found on 14,783 acres within the WSA.

SOLITUDE

The factors contributing to this characteristic are the Coral Pink Sand Dunes with their uneven topography, the deep canyons in the eastern portion of the WSA, and the areas of broken, well-vegetated terrain on top of Moquith Mountain. The size and configuration of this WSA neither enhance nor detract from the outstanding opportunities for solitude present in the WSA.

The Coral Pink Sand Dunes offer excellent screening wherever they occur in the WSA. The portions of the sand dunes located within the WSA include about 1,500 acres.

The seven tributary canyons to Cottonwood Canyon possess abundant topographic and vegetation screening elements and thus exhibit outstanding opportunities for solitude. The eastern edge of the lower Coral Pink Sand Dunes abuts a series of cliffs that form the western edge of Moquith Mountain. These cliffs are cut by short, steep canyons. One such canyon exists above Sandy Canyon Wash in the extreme southwestern portion of the WSA, and it possesses outstanding opportunities for solitude. A total of approximately 5,200 acres of deep canyons exhibit this wilderness characteristic.

The top of Moquith Mountain displays a complex arrangement of various terrains and vegetation types. Scattered ponderosa pine, pinyon-juniper forest, and sandy soils are characteristic of the area north and west of Water Canyon. The elevation increases to a high point of over 7,000 feet on Ed Lamb Point at the Utah-Arizona state line. Accompanying the increase in elevation is a corresponding increase in the density of ponderosa pine and shrubby undergrowth. In this area, sandy ridges alternate with shallow canyons, rocky breaks, and other sandstone outcroppings. Where the ponderosa stands and sandstone exposures exist together, outstanding opportunities for solitude are present. Approximately 2,100 acres of the top of Moquith Mountain contain this wilderness characteristic.

The sights and sounds of human activities are not present from most places within the WSA. However, ORV activities within the State Park can be seen and heard from vantage points along the WSA's western boundary. These activities can be quite apparent and may detract from the unit's solitude. Vehicles can also be seen along the "cherry-stemmed" road to the South Fork Indian

Canyon Pictograph and along the Hancock Road.

In summary, approximately 8,800 acres or 59 percent of the WSA present outstanding opportunities for solitude. The topographic and vegetation screening enables visitors to find a secluded spot in the majority of the WSA. The opportunity is uniformly present in the southern portion of the WSA. In the eastern half, the characteristic is distributed in an uneven broken pattern. A large portion of the northwestern section is devoid of solitude. In the extreme northwest, the Coral Pink Sand Dunes exhibit solitude, but only as an area detached from the remainder of the WSA. Approximately 6,030 acres (41 percent) do not contain outstanding opportunities for solitude.

PRIMITIVE AND UNCONFINED RECREATION

The major source for outstanding opportunities for primitive recreation in the Moquith Mountain WSA is the variety of available recreational activities. Hiking, backpacking, horseback riding, hunting, photography, and sightseeing for geological, botanical, and archaeological features are the eight activities cited by the *BLM Intensive Wilderness Inventory* as contributing to this diversity. Certain activities, such as sightseeing for archaeological features and horseback riding, are limited in location. Others, such as hunting and photography, occur throughout most of the WSA. The opportunity is considered outstanding in those locations exhibiting this diversity. The other source of outstanding opportunities is the superior quality of the sightseeing for geology and botanical features and hiking activities.

Because of the diversity of landscapes within the WSA, scenic photographic opportunities are present throughout. Similarly, hunting occurs in all but the Coral Pink Sand Dunes portion of the WSA. Sightseeing for archaeological features is limited to the pictograph site in the South Fork of Indian Canyon. Opportunities for sightseeing for botanical features are more widespread. They are present in upper Water Canyon (relict area, Douglas fir), a branch of the South Fork of Indian Canyon (relict area, hanging gardens), Coral Pink Sand Dunes (unusual plant community), and the upper ends of the two southernmost and unnamed canyons in the WSA (aspen pockets). Sightseeing for a geological feature is an obvious opportunity on the Coral Pink Sand Dunes.

The WSA is better suited for hiking than for backpacking because of its relatively small size. It is possible to backpack the top of Moquith Mountain by extending the trip to Ed Lamb Point in Arizona and to each of the points and canyon rims. On the other hand, hiking opportunities are

abundant. Each canyon represents a hiking opportunity. On the top of Moquith Mountain, the hiking alternatives are also numerous. Hikes on the points between canyons are possible. In the southern portion, many hiking routes are available in the more scenic ponderosa pine and sandstone areas. Although they are difficult to traverse, the sand dunes also are a hiking objective. Horseback opportunities are limited to the hiking areas on Moquith Mountain and lower Water Canyon.

It is felt that the primitive recreation opportunities exist on 7,300 acres (49 percent of the WSA), while 7,530 acres (51 percent) do not meet the criterion.

Perhaps no other WSA in the Cedar City District exhibits as much topographic and vegetation variety in a limited area as does the Moquith Mountain unit. The variety enhances the WSA's wilderness qualities. It is responsible for several areas of extremely high quality wilderness. Each of these areas offers a distinct type of wilderness character, yet none of the tracts exceed 5,000 acres in size. The WSA lacks a large contiguous block of uniformly high quality wilderness lands.

SPECIAL FEATURES

Almost all of the Moquith Mountain WSA possesses scientific values. Geological, ecological, and archaeological features all contribute to the scientific values. The WSA is an ecologically complex segment of the Vermilion Cliffs of southern Utah. Elevations range from 5,000 to over 7,000 feet. The WSA contains active sand dunes, riparian communities, an upland ponderosa pine forest, isolated stands of aspen, and a perennial stream. Canyons, large alcoves, and hanging gardens are also present. Relict areas are found in Water Canyon and a branch of the South Fork of Indian Canyon. The WSA has a very high potential for archaeological resources. Although no scientific investigations have been conducted, the WSA obviously is a good candidate for future scientific study. The scientific value of the area is enhanced because most features are closely located and of easy access from the perimeter of the unit.

The same features that possess scientific values also contribute to a significant but unrealized educational value for the WSA. Because of the proximity of the WSA to Coral Pink Sand Dunes State Park and the heavily traveled U.S. Highway 89 tourist route, there is a large potential audience for environmental education and natural history interpretation. The educational values are particularly significant because they are diverse, conveniently concentrated in a small area, and accessible.

The WSA possesses five distinctive landscapes. These include the Vermilion Cliffs, Coral Pink Sand Dunes, the densely vegetated and colorful canyons, the escarpment above the sand dunes, and the slickrock and pine forest on top of Moquith Mountain. The variety of scenery present is considered an important and unusual scenic asset of the WSA. Approximately 8,800 acres possess scenic values.

Archaeological features constitute the historical values of this WSA. The South Fork Indian Canyon Pictograph alcove site is the only identified site in the WSA. However, the area along the Vermilion Cliffs both within and outside the WSA has a very high potential for archaeological resources.

Land Use Plans and Controls

There are no rights-of-way within the WSA. There are 40 acres of private land in Section 3, Township 44 South, Range 7 West, but no legal access to this land.

The WSA lies within the BLM's Vermilion Planning Unit which is being managed under the land use decisions of the Vermilion MFP (USDI, BLM, 1981a). The present principal uses within the WSA are livestock grazing, ORV use, and wood cutting.

The WSA encloses 640 acres of State land within its boundaries. State lands are managed by the State Land Board to generate revenues for the public school system. The Utah State Division of Parks and Recreation (1985) plan for the Coral Pink Sand Dunes State Park is generally directed to accommodation of ORV recreational uses.

The 40 acres of private land found in the southeast corner of the WSA are used for livestock grazing. There is no physical or legal access to the tract.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept." The WSA is within the county's multiple-use zone. Approximately 2,800 acres are zoned agriculture. The WSA is directly north of and adjacent to the Kaibab-Paiute Indian Reservation. Tribal plans at this time include possible oil and gas exploration near the boundary of the WSA (Savala, 1985).

Socioeconomics

DEMOGRAPHICS

The WSA is located in Kane County, Utah where most of the economic impacts are expected to occur. Kane is a rural county having an average population density of approximately one person per square mile. This density is very low when compared to the statewide average of 17 persons per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Much of the population in this county (4,024 in Kane County) is concentrated in small communities rather than being evenly distributed throughout the area.

The major population center in the county is the City of Kanab, the county seat. The 1980 population of Kanab and adjacent areas was 3,116 persons (USDC, Bureau of the Census, 1981). Kanab lies along the major access route to the WSA—State Highway 89. Kanab, located approximately 20 highway miles from the WSA, is the main service and gateway for visitors to the Moquith Mountain area.

EMPLOYMENT

The economy of Kane County is dominated by the government and service sectors in terms of employment (USDC, Bureau of Economic Analysis, 1982). The three most important sectors of the Kane County economy in terms of 1980 employment are: government and retail trade (each providing 17 percent of the total employment) and services (14 percent). Table 5 presents the estimated 1980 employment and personal income for Kane County.

Possible impacts from wilderness designation are expected to be more obvious at the community level than the county level. Therefore, a description of the economies of communities in the region is necessary.

It is difficult to estimate current employment and income in the small communities of the area due to the lack of information at the municipality level and restricted disclosure of the available data. It is assumed that most of the nongovernment employment and income in the area is based in the agriculture and services sectors. This is based on the available county-wide data (Five County Association of Governments, 1982) and the low number of retail trade outlets, government offices, and major industries in the area. The services sector is expected to be a dominant sector because of the importance of services in the community of Kanab, one community for which there are data.

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TABLE 5
Employment and Personal Income
Kane County, Utah

Industrial Sector	Employment	Personal Income (\$1,000)
Total	1,452	12,595
Proprietors	382	2,623
Farm Proprietors	122	136
Nonfarm Proprietors	260	2,487
By Industry Source	-	-
Farm	27	382
Nonfarm	1,043	12,213
Private	798	9,614
Ag. Serv., For., Fish., and Other	(L)	0
Mining	17	196
Construction	51	1,544
Manufacturing	70	566
Non-Durable Goods	(D)	(D)
Durable Goods	(D)	(D)
Transportation and Public Utilities	150	1,875
Wholesale Trade	12	230
Retail Trade	252	2,364
Finance, Insurance, and Real Estate Services	39	392
202	2,427	
Government and Government Enterprises	245	2,599
Federal, Civilian	18	252
Federal, Military	30	78
State and Local	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral leasing, livestock production, woodland production, and recreation. Table 6 summarizes local income (sales) and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

No oil and gas or mineral has been produced from the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Eight livestock operators have a total grazing privilege of 224 AUMs within the WSA. If all this forage were utilized, it would account for \$4,480 of livestock sales and \$1,120 of ranchers' returns to labor and investment.

Approximately 50 cords of woodland products have been harvested from the WSA and have generated an annual income of about \$3,750.

The WSA's nonmotorized recreational use and related local expenditures are low. These expenditures are insignificant to both the local economy

TABLE 6
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$43,770
Mineral Production	None	None
Livestock Grazing	\$4,480	\$314
Woodland Products	\$3,750	\$125
Recreational Use	Less than \$24,600	None
Total	Less than \$32,830	Up to \$44,209

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

and individual businesses. The WSA's motorized recreational use is high. However, related local expenditures are low due to expenditures outside the area. They have little impact 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 from 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 Moquith Mountain WSA is estimated as about 6,000 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane County.

The WSA generates Federal revenues from oil and gas leases, livestock grazing, and woodland products (refer to Table 6).

Mineral leases in the WSA cover approximately 14,590 acres. At up to \$3 per acre, lease rental fees generate up to \$43,770 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 224 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$314 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements. Harvest of fuelwood from the WSA has generated an estimated \$125 of Federal revenues annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be partially open to ORV use, mining, grazing, motorized hunting, predator control, and fire, insect, and noxious weed control. The degree of future development is unknown but would

probably be low due to the unit's physical features and low resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; and uranium, 20 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If oil and gas and uranium were developed, air quality could be reduced up to the PSD Class II limitations. Disturbance of 180 acres would result in only minor increases in fugitive dust emissions. The amount of emissions and their significance would depend upon the location and duration of the disturbance.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium and oil and gas exploration and development activities would probably not exceed 180 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 180 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with critical erosion class and that erosion condition would increase one class, soil loss on the entire 180 acres would increase from 486 cubic yards/year to 972 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 486 cubic yards (1.4 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 180 acres disturbed would not significantly impact the WSA's sparse vegetation. Two sensitive species of plants are found within the WSA. Before authorizing surface-disturbing activities (180-acre potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate informal consultation with the FWS as required by BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably con-

cluded that the viability of populations of sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Since precipitation is low and existing perennial streams have poor water quality, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 486 cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Vermilion Planning Unit.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells and would not significantly alter ground water quantity or quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 10 million barrels of oil in-place (3 million barrels recoverable) and up to 60 billion cubic feet of natural gas (18 billion cubic feet recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 and 3 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected under this alternative.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the development of three springs. Spring developments would benefit wildlife by expanding their habitat. However, disturbance of an estimated 180 acres (1 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer, mountain lion, and mobile nongame animals would be dispersed from the area for the lifetime of these activities.

Less mobile wildlife would either perish or coexist with these disturbances at smaller and less viable population levels. The sensitive animal species road runner, Lewis woodpecker, and fox sparrow would avoid the area.

FOREST RESOURCES

Limited wood cutting would continue in the area for firewood. Approximately 50 cords per year would be harvested. Wood cutting would only be allowed in areas designated open under the Vermilion MFP.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Vermilion Planning Area MFP. The 224 AUMs currently allocated in the WSA are controlled by eight livestock permittees. Very little use of motorized vehicles is currently being made to manage livestock and few changes in livestock management technique are expected. The three proposed spring developments, four troughs, and 1.5 miles of fence could be developed and result in improved livestock distribution. Additional roads or other facilities could be developed without regard for wilderness values.

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 180 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class II management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected. If roads, vehicular ways, and drill pads are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole.

CULTURAL RESOURCES

The potential National Register sites in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 180 acres by mineral exploration and development under this alternative could affect potential National Register sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism

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would continue to be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 180 acres could be disturbed by mineral and energy activities. Primitive recreational opportunities could be diminished on the affected areas.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 6,000 current visitor days per year to 8,900 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 300 visitor days per year to about 450 visitor days per year over the next 20 years. Likewise, recreational activities utilizing ORVs would increase from 5,700 visitor days per year to 8,450.

Overflow from Coral Pink Sand Dunes State Park and Ponderosa Grove Campground could further increase use.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Vermilion Planning Unit MFP. Expected mineral and energy exploration and development could disturb an estimated 180 acres. The proposed recreation development would increase ORV use, visitor use, and other man-made intrusions in the area. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) would be lost or diminished in affected areas. Wilderness values in the proposed ONA would be preserved. However, the WSA's solitude values could diminish because of increased use and ORV activity.

LAND USE PLANS AND CONTROLS

Implementation of this alternative would be consistent with the *Kane County Master Plan* and with Kane County's wilderness policy statement, which recommends multiple use. It would also be consistent with and complement Coral Pink Sand Dune's management. The No Action Alternative is based on implementation of the current BLM Vermilion MFP and is, therefore, in conformance with it. This alternative would be consistent with

State of Utah plans and policies which emphasize economic return and would not conflict with Kaibab-Paiute tribal plans for oil and gas exploration near the boundary of the WSA.

SOCIOECONOMICS

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 mining claims were located, a portion of the \$100 per year assessment fee required for each mining claim would reach the local economy. If the uranium, oil, and gas in the WSA were developed, it would lead to an increase in employment and income for Kane County. However, the probability of economic development of minerals within the WSA is low.

There would be no livestock-related economic losses because the existing grazing use (244 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The forage use in the allotment would continue to produce \$4,480 annually in livestock sales and \$1,120 of ranchers' return to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase 2,900 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 240 acres in the WSA open to leases that are currently not leased. If leased, they would bring up to \$720 additional Federal lease fee revenues per year in addition to new royalties from lease production (and bonus bids from new leases in Known Geologic Structures [KGSs]). Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$314 per year) would continue. The woodland income (\$3,750) and revenue (\$125) would continue. Overall, there could be an increase in Federal fee revenues of \$720 under this alternative.

All Wilderness Alternative (14,830 Acres)

As cited in the Description of the Alternatives

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section, the major changes that could occur in the 14,830-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 11 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as noted in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that mining claims would be staked before wilderness designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. (Appendix 10 lists surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (20 vs. 180 acres), the impacts from development and surface disturbance on air quality, water resources, geology, and vegetation would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection to these resources. Other effects on resources due to changes in management are discussed below.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Assuming that all disturbance would occur in areas with critical erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 20 acres would increase from 54 cubic yards/year to 108 cubic yards/year from the present situation. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 54 cubic yards (0.15 percent), which is 432 cubic yards less than the No Action Alternative.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur unless they could be developed in a manner nonimpairing to wilderness values. The likelihood that all springs could be developed is

low. Three proposed springs might not be developed if not compatible with wilderness values.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 14,590 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration date, and expired leases would not be reissued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas, with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable, could be foregone under this alternative. However, due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of recoverable oil and gas.

Locatable Minerals

There are presently no mining claims in the WSA; however, claims can be located up to the time of designation. Approximately 500 tons of recoverable uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. It is estimated that, if uranium deposits are located prior to designation, up to 20 acres could be disturbed due to exploration and development of the resource. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed by the time of wilderness designation (the last date for mineral location within the WSAs). In that case the potential for recovery of up to 500 tons of recoverable uranium oxide would be foregone. After that date, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981b).

Because production of these metals is not currently occurring and because economic considera-

tions (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, water is a limiting factor for wildlife in this WSA. If future water improvements were curtailed, potential habitat for deer and other nongame species would be reduced.

In addition, disturbance due to exploration of locatable mineral resources could disrupt wildlife populations and result in a few of these species leaving the area.

FOREST RESOURCES

The 50 cords of historical fuel wood harvest would be foregone.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Vermilion Planning Area MFP. The 224 AUMs currently allocated in the WSA are controlled by eight livestock permits. Since very little use of motorized vehicles is currently taking place to manage livestock and most historical uses will continue, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New range improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, development of the future roads or other livestock management facilities for use with the 224 AUMs in the WSA could be restricted to preserve wilderness values. Because few improvements have been proposed in the WSA and motorized vehicles are used very little in livestock management, little effect on the management of livestock grazing is expected.

VISUAL RESOURCES

A slight benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from Classes II and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities to about 20 acres. Thus, there could be localized long-term degradation of values in some areas. However, no significant impact in the area as a whole would be expected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Although management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, the close proximity of Coral Pink Sand Dunes could negatively affect the quality of the primitive recreation experience.

The annual 5,700 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. A significant impact on ORV recreational use would be expected due to the historical use of the area. Closure of the 11 miles of ways within the WSA would result in a significant decrease in ORV use and loss of a major use area for ORV enthusiasts.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values.

It is concluded that this alternative would benefit primitive recreation use, but ORV use and intensive recreation development would be restricted.

WILDERNESS VALUES

Designation and management of all 14,830 acres as wilderness would contribute to the preservation of the wilderness characteristics of naturalness (14,783 acres) and outstanding opportunities for solitude (8,800 acres) and primitive and unconfined recreation (7,300 acres). The special features in this WSA would also be protected and preserved.

Outstanding opportunities for seven recreational activities (hiking, backpacking, horseback riding, hunting, photography, and sightseeing for archaeological, geological, and botanical features) would be preserved. Although recreational use would be less than under the No Action Alternative, wilderness-type uses would increase. No

significant effect on solitude and primitive recreational values would be expected from the change in recreational use.

Opportunities for primitive recreation, solitude, and special features could be degraded in localized areas where an estimated 20 acres of surface disturbance could result from allowable mineral exploration activities. These disturbances could have long-term effects on primitive recreation values and special features, but would not be expected to significantly affect wilderness values in the area as a whole. Providing access to the 40 acres of private land could impact wilderness values in the southeast portion of the WSA.

Designation of this WSA as wilderness would not benefit the ORV recreational uses of the contiguous State Park. In fact, management problems would result because it would be difficult to restrict ORV use from the wilderness area.

It is concluded that wilderness designation and management of the Moquith Mountain WSA would contribute to the protection and preservation of the wilderness values of naturalness, special features, and opportunities for solitude and primitive recreation on most of the area except in localized areas affected by the surface disturbance related to mineral exploration and in the sand dune area adjacent to the State Park where ORV trespass would be a problem.

LAND USE PLANS AND CONTROLS

Immediately adjacent to this WSA, the Coral Pink Sand Dune State Park is primarily managed for ORV use. Closure of the WSA to ORV use under this alternative would not complement ORV use in the State Park, and ORV trespass from the Park into the WSA would be difficult to control.

The existing BLM Vermilion MFP does not provide for wilderness designation and designation of the WSA as wilderness would be an amendment to the MFP.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, designation would conflict with the County's plans because oil and gas leases would expire and future leasing and location of minerals would not be allowed. This alternative would conflict with the County's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would be phased out. If State lands within the WSA are

exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Wilderness designation would complement the Kaibab-Paiute tribal plans for oil and gas exploration near the boundary of the WSA. The tribal council opposes wilderness designation of the Moquith Mountain WSA.

SOCIOECONOMICS

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 some losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

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 oil and gas leases could be developed but designation would preclude new leases and mining claims 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 under the No Action Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local 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 \$4,480 of livestock sales and \$1,120 of ranchers' returns to labor and investment. Future improvements for livestock would be foregone along with any resulting increase in ranchers' income. No such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use but related local expenditures would be small. The loss of motorized recreational use of the WSA would be heavy (5,700 visitor days per year), but because equipment and other purchases are made in other locations the decrease in related local expenditures would probably be small and insignificant to both the local economy and individual businesses.

MOQUITH MOUNTAIN WSA

The loss of 14,590 acres now leased for oil and gas would cause an eventual loss of up to \$43,770 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$720.00 annually in Federal revenues from the 240 acres that could be leased without designation. In addition to these rental fees, any potential royalties from oil

and gas production could also be foregone.

Wilderness designation would eliminate most woodland product harvesting and related Federal revenues. Present harvest from the WSA has generated about \$125 annually in Federal revenues.

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The Blues
WSA



THE BLUES WSA

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THE BLUES WSA

(UT-040-268)

INTRODUCTION

General Description of the Area

The Blues Wilderness Study Area (WSA) lies north and east of Henrieville, Utah and directly south and below Powell Point in Garfield County, Utah. The southern portion and portions of the eastern boundary border Utah State Highway 12 approximately 5 miles from Henrieville. Tropic Valley lies to the west. There are 19,030 acres of public land and 640 acres of State land enclosed within the WSA. The WSA is managed by the Kanab Resource Area of the BLM Cedar City District.

The WSA is characterized by pinyon-juniper vegetation, cliffs, escarpments, rolling hills, and blue-gray badlands. Elevations range from 8,200 feet near the National Forest to 6,400 feet near the western boundary bordering Tropic Valley.

Precipitation records from the National Weather Station in Henrieville reveal the average yearly precipitation expected in The Blues WSA to be approximately 10.30 inches. Highest monthly precipitation occurs during the months of July through December when approximately two-thirds of the yearly precipitation falls. Highly intensive summer thunderstorms are common during the summer months and are triggered by southerly winds carrying moisture from the Gulfs of Mexico and California. Several damaging flash floods have occurred during the past 30 years in the Cannonville-Henrieville area due to these summer convection storm patterns. Winter and spring precipitation is associated with storm systems moving in from the Pacific. These systems continue through early summer causing the Pacific storm tracks to move in a more northerly position which bypasses the area and results in less precipitation. July and January are the warmest and coldest months, respectively. Average daily maximum temperatures range from 41 degrees Fahrenheit (F) in January to 86 degrees F in July, while the average daily minimum ranges from 15 to 51 degrees F during the same months.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. The major issues of The Blues WSA are the potential for coal development within the unit and the large amount of land that does not meet the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964) definition for wilder-

ness quality. Other issues include the potential for land treatment within the WSA, changing the air quality standards, and the proposed transportation corridor in the unit.

One additional issue was raised for this WSA during scoping meetings held in the spring of 1984 (USDI, BLM, 1984).

1. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least high. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

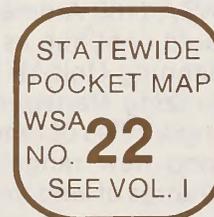
DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA other than those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (19,030 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 ALTERNATIVE

(PROPOSED ACTION)

Under this alternative, none of the 19,030 acres of The Blues WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Paria Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1981b) and *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a). The 640 acres of State land within the area of the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase.

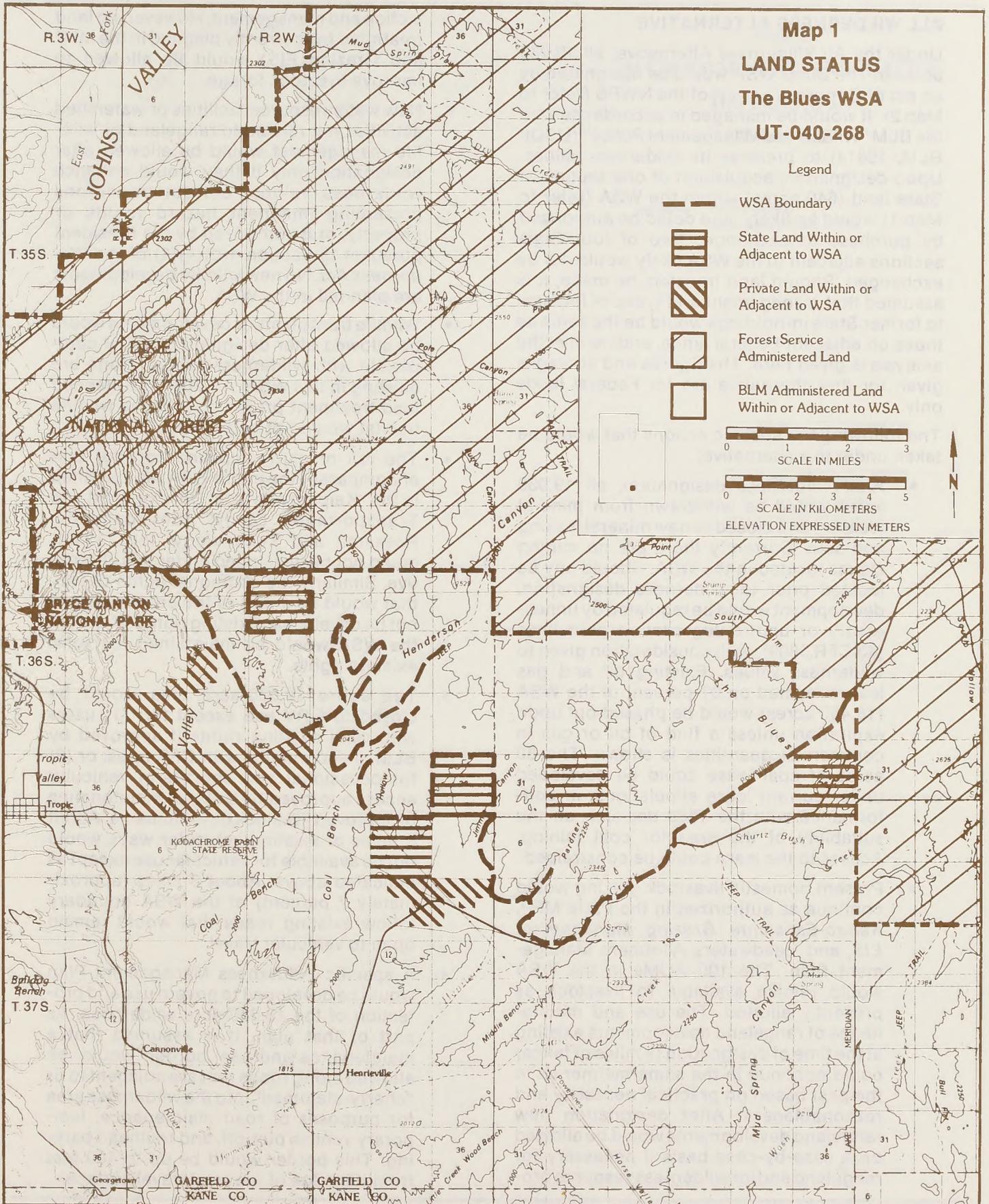
The following are specific actions that would take place under this alternative:

- All 19,030 acres would remain open to mineral location, leasing, and sale. There are no mining claims currently located in the WSA. Development work, extraction, and patenting would be allowed on any future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809) without concern for wilderness values. Existing oil and gas leases on 18,450 acres and future leases could be developed under Category 1 (standard stipulations). Coal leasing and development, including an existing 80-acre lease, could occur without regard for wilderness considerations. However, development in Township 36 South, Range 2 West, would be constrained by a 1980 decision by the Secretary of the Interior concerning suitability of the area for coal mining (USDI, 1980). That area (a portion of which is in the WSA) has been designated as suitable for underground mining only.
- The present domestic livestock grazing use in the WSA (100 Animal Unit Months [AUMs]) would continue as authorized in the Paria Planning Unit MFP and *Kanab-Escalante Grazing Management EIS*. Use of the existing 4 miles of fence would continue. Planned new rangeland improvements (2,200 acres of land treatment) could be implemented without wilderness considerations. At the present time, the WSA is used for livestock grazing only on an emergency basis (e.g., during drought

years).

- Use, maintenance, and development of facilities and improvements for wildlife, water resources, etc., could be allowed if in conformance with the MFP without regard for wilderness values. A 1,200-acre land treatment for wildlife habitat improvement is planned in the WSA. Three private water applications are pending in the WSA and could be processed without concern for wilderness values.
- The Paria Planning Unit MFP identified the entire WSA as a rail or slurry pipeline corridor. A portion of this corridor could be available for additional rights-of-way if energy developments were to occur. Should the need arise, this corridor and the rights-of-way could be developed without concern for wilderness values.
- Approximately 16,530 acres would be open to off-road vehicle (ORV) use. On 2,500 acres, ORV use would be limited to existing roads and trails to protect riparian lands. The 5 miles of ways inside the WSA and the approximately 3 miles of roads that border the WSA would remain available for vehicular use. New access roads could be planned in the future.
- The entire area would be open to woodland product harvest. Harvest of forest products at the present time is thought to be low.
- The area would continue to be managed under Visual Resource Management (VRM) Class III (4,730 acres) and Class IV (14,300 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

THE BLUES WSA



ALL WILDERNESS ALTERNATIVE

Under the All Wilderness Alternative, all 19,030 acres of The Blues 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" (USDI, BLM, 1981a) to preserve its wilderness values. Upon designation, acquisition of one section of State land (640 acres) within the WSA (refer to Map 1) would be likely, and could be authorized by purchase or exchange. Two of four State sections adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only.

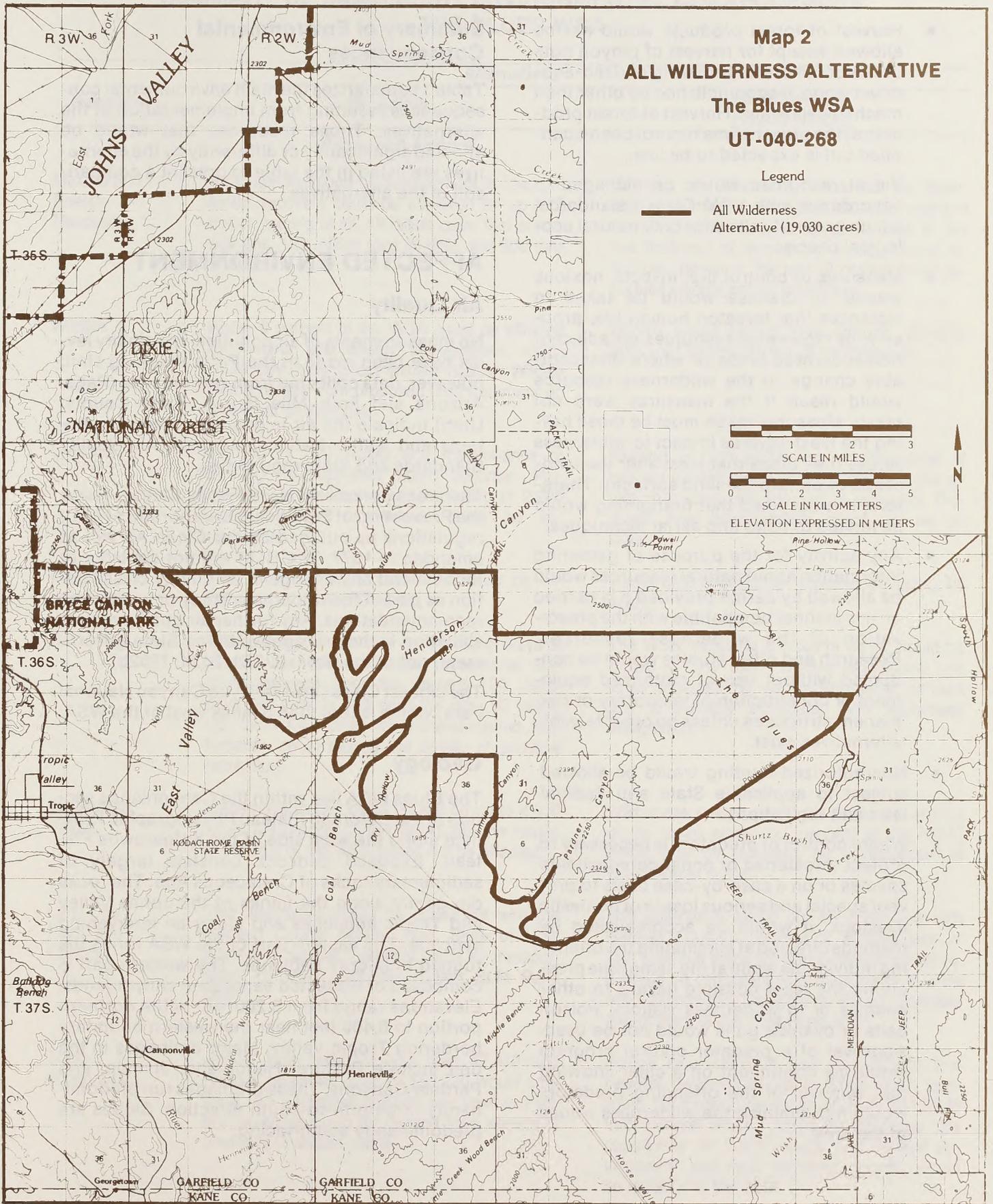
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 19,030 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Currently there are no mining claims located in the WSA. Should any be located prior to wilderness designation, development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809), with consideration given to wilderness values. Existing oil and gas leases located on 97 percent of the WSA (18,450 acres) would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. The 80 acres of coal lease could be developed under current lease stipulations, in conformance with the 1980 decision on the suitability of the area for coal mining. Access to the lease could be constrained.
- Present domestic livestock grazing would continue as authorized in the Paria MFP, *Kanab-Escalante Grazing Management EIS*, and Headwaters Allotment Management Plan. The 100 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 (4 miles of fence) could continue in the same manner as in the past based on practical necessity and reasonableness. After designation new rangeland developments would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource pro-

tection and management. However, no land treatment (as currently planned in the MFP and Grazing EIS) would be allowed to improve livestock forage.

- 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*. No new wildlife developments are planned in the WSA.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. None are existing in this WSA. A 1,200-acre planned land treatment project to improve wildlife habitat would not be allowed.
- The rail or slurry pipeline corridor that encompasses the entire WSA (as identified in the "Kaiparowits Coal Development and Transportation Study" [Environmental Research and Technology, Inc., 1980]) could not be developed under this alternative. Similarly the additional rights-of-way that would be a part of the corridor could not be developed. Existing rights-of-way in the WSA would be maintained per valid existing rights.
- The entire 19,030-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with CFR rules; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. About 5 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 3 miles (approximately 7 percent) of the WSA boundary follow existing roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 19,030-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or "cherry-stemmed" into the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

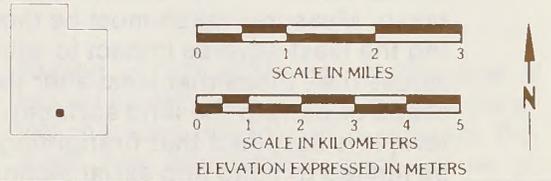
THE BLUES WSA



Map 2 ALL WILDERNESS ALTERNATIVE The Blues WSA UT-040-268

Legend

-  All Wilderness Alternative (19,030 acres)



- 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. Harvest of forest products at the present time has not been quantified but is expected to be low.
- Visual resources would be managed in accordance with 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 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 must 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 on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. Approval of a predator control program would be contingent on a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

No measurements of air pollution or visibility levels have been made in the Paria Planning Unit; however, data collected from various sites (Page, Arizona and Four Mile Bench, Kane County, Utah) indicate the air is generally free of pollutants and within National Ambient Air Quality Standards and State regulations.

The area is presently classified as Class II under the Prevention of Significant Deterioration (PSD) regulations as outlined by the Clean Air Act as amended in 1977. The BLM will not consider or recommend any change in air quality classification as part of the wilderness study or wilderness recommendations. Any further air quality reclassification is the prerogative of the State government, not of the BLM. (USDI, BLM, 1982b).

The closest Class I area is Bryce Canyon National Park, which is less than 5 miles west of the WSA.

Geology

The Blues WSA lies within the Canyonlands section of the Colorado Plateau Physiographic Province along the west side of the Kaiparowits Plateau. Exposed bedrock consists largely of sedimentary rocks of Cretaceous Age. The rocks dip gently along the flanks of the Johns Valley and Tropic anticlines and along an intervening syncline. The eastern part of the WSA forms the rugged blue-gray badlands. The western part is composed of dissected sandstone canyonlands. Elevations range from 8,200 feet in the northern portion to 6,400 feet near the western boundary bordering Tropic Valley. Major drainages in the unit include Pasture, Henderson, Jimmie, and Pardner Canyons. These drainages run predominantly in a north-to-south direction. Slopes are predominantly south-facing.

THE BLUES WSA
TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
THE BLUES WSA

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (19,030 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 122 million tons of coal, and 500 tons of uranium oxide.	Oil, gas, and coal likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 6 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Wildlife would benefit from proposed land treatment on 6 percent of the WSA.	Wildlife would benefit from solitude. Benefits from land treatments would be foregone.
Livestock	Grazing of 100 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of 2,200 acres of land treatments, could be implemented.	Grazing of 100 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 4,530 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	ORV use would continue on 5 miles of ways at current low levels. Overall recreational use could increase from the present 100 visitor days per year to 149 over the next 20 years. Up to 1,130 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 5 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 4,530 acres (24 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 20 acres (0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Garfield County Master Plan</i> , State of Utah plans and policies, potential plans for transportation corridors, and the current BLM Paria MFP.	This alternative would not be consistent with Garfield County's concept of multiple use or with potential plans for transportation corridors. It would be consistent with State policy if lands were exchanged. Designation would constitute amendment of the BLM Paria MFP.
Socio-economics	Annual local sales of less than \$2,410 and Federal revenues of up to \$55,730 would continue. An additional \$58,590 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$2,410 and Federal revenues of up to \$140 would continue, but Federal revenues of up to \$113,940 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

Soils

Approximately 75 percent of the WSA is made up of the Badland-Rock Outcrop and the Ustic Torriorthents-Rock Outcrop associations that produce high sediment yields. Also, about 75 percent of the area is from moderately steep (13-percent to 25-percent slope) to very steep (25-percent to 55-percent slope). Approximately 90 percent of the area is in the moderate or critical erosion susceptibility classes. The soil associations (land types) have natural erosion problems and have medium to high sediment yields. Also, approximately 90 percent of the soils have an effective rooting depth of 12 inches or less. Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	11,830	62	31,940
Moderate	1.3	5,300	28	6,890
Slight	0.6	1,900	10	1,140
Stable	0.3	0	0	0
Total		19,030	100	39,970

Sources: USDI, BLM, 1979a; Leifeste, 1978.

Vegetation

Existing vegetation in the WSA consists of four vegetation types. They are as follows: (1) pinyon-juniper: this is the most dominant vegetation type. It occurs over approximately 90 percent of the area and has a sparse understory of mountain shrubs and small stands of ponderosa pine; (2) black greasewood: this type appears on about 5 percent of the area. It is dominated principally by greasewood, which is a salt-tolerant species, occupying saline-alkali soils; (3) big sagebrush: this type occurs on approximately 4 percent of the area. It is characterized by a brush mixture canopy, predominantly sagebrush, and a sparse grass/forb understory; and (4) shadscale: this brush type occurs on about 1 percent of the area and has very little understory. There is less than 1 percent (less than 190 acres) of riparian vegetation within the area.

Only about 10 percent of the total vegetation

community is presently suitable for grazing. No threatened, endangered, or sensitive plants are found within the WSA.

The Blues WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

Henrieville Creek and Henderson Canyon both run water during most of the year, but are generally not potable. Parts of other drainages have intermittent water. There is a developed spring and pipeline in Pasture Canyon immediately outside the unit. There are no reservoirs, lakes, or ponds within the WSA. There are three undeveloped springs in the WSA. Two are located in Section 15, west and north of Pasture Canyon, while the other is located on the southern WSA boundary in Section 9 just north of the highway. Three private water applications are pending in The Blues WSA.

Mineral and Energy Resources

The main mineral and energy studies pertaining to The Blues WSA are: (1) the SAI (1982) mineral and energy resource summary completed for all WSAs in Utah; (2) the "Southwestern Utah Coal Fields: Alton, Kaiparowits Plateau and Kolob Harmony" monogram series (Doelling and Graham, 1972); and (3) the U.S. Department of Energy's (1979) "National Uranium Resource Evaluation, Interim Report." Appendix 5 gives a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3+ was assigned to The Blues WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wil-

derness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The mineral and energy resource rating summary is given in Table 3.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Uranium	f2	c1	Less than 500 tons of uranium oxide
Coal	f4	c4	245 million tons
Geothermal	f1	c3	None
Hydroelectric	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

The second most important potential energy source of The Blues WSA is oil and gas. Approximately 97 percent of the WSA is leased for oil and gas (18,450 acres). Approximately 580 acres (3 percent of the WSA) are presently unleased. The Blues WSA is currently in oil and gas leasing Category 1 (open to leasing with standard stipulations). Pre-FLPMA leases cover approximately

8,179 acres (43 percent of WSA) and post-FLPMA leases cover 10,271 acres (54 percent of WSA).

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Most oil and gas production in southern Utah is from the Paradox Basin, about 125 miles east of The Blues WSA. The only current oil production from south-central Utah comes from the Upper Valley Field located about 6 miles east of the WSA. In addition, minor amounts of oil have been produced intermittently from two fields in southwestern Utah.

Oil and gas exploration in southern Utah has been centered in the Paradox Basin and peaked in the late 1950s and early 1960s with the discovery of the giant Aneth Field in 1956 and the Lisbon Field in 1960. Since then, sporadic wildcat drilling (which has recently increased) has located some small fields, but no major discoveries have been made. The Upper Valley Field, a short distance (6 miles) to the east, was discovered in 1964 after 17 years of intermittent drilling. This find stimulated mild drilling activity in similar anticlinal structures in south-central Utah, but to date no other commercial oil and gas potential has been identified. Because of the proximity of the Upper Valley Field to The Blues WSA, a detailed description of this field relates directly to the oil and gas favorability of the WSA.

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Cumulative production through December 1975 at the Upper Valley Field was almost 15 million barrels of oil. Production is from four distinct zones within the Timpoweap Formation of Triassic Age and the Kaibab Formation of Permian Age (Sharp, 1976). The oil reservoir is located along the prominent Upper Valley anticline, but production is offset from the crest of the anticline to the west flank and the southern-plunging nose. Sharp (1976) attributes this offset to a regional, southwest-directed hydrodynamic drive in the Kaibab Formation. If correct, oil accumulations in other anticlines within the region may also be displaced to the south.

The main structural features in and near The Blues WSA from east to west are the Table Cliffs syncline, the Johns Valley anticline, an unnamed syncline, and the Tropic anticline. The Johns Valley anticline was tested in 1952 (Kunkel, 1965) and again in 1965 approximately 5 miles north of The Blues WSA. The 1952 well penetrated the Redwall Limestone of Mississippian Age and oil shows were reported from the Moenkopi Formation (Triassic), the Kaibab Limestone, Toroweap Formation, and Queantoweap Formation (all of Permian Age), and the Hermosa and Molas Formations (Pennsylvanian). The 1965 well bottomed in the Cedar Mesa Sandstone of Permian Age and no oil shows were reported. The Tropic anticline west of the WSA was tested in 1964 by Tenneco (Kunkel, 1965). The Queantoweap Formation of Permian Age was the deepest formation penetrated and oil staining was reported from the Organ Rock Shale and Cedar Mesa Sandstone, each of Permian Age.

Major stratigraphic traps within the vicinity of The Blues are possible, especially along the unconformity separating Mississippian and Permian rocks. According to SAI (1982) Pennsylvanian rocks thin rapidly to the west across south-central Utah and are absent about 10 miles west and south of the WSA. The likelihood that a large oil field exists along this unconformity or within stratigraphic pinchouts in Pennsylvanian rocks, however, is low because potential source rocks would be of pre-Permian, and probably pre-Pennsylvanian Age. To date, exploration results from rocks of pre-Pennsylvanian Age in south-central Utah have not been encouraging.

Based on the discussion above, the oil and gas favorability of the WSA is considered low. Small oil fields, however, could be contained within combination stratigraphic-structural traps, especially in the Kaibab Limestone (Permian). In addition, small oil and gas fields could be contained

within stratigraphic pinchouts in rocks of Pennsylvanian Age (SAI, 1982)

Coal (f4/c4)

The primary energy resource of The Blues WSA is coal, almost all of which lies within the Kaiparowits Known Recoverable Coal Resource Area (KRCRA) as delineated by the U.S. Geological Survey.

The Blues WSA lies on the west side of the Kaiparowits Coal Field. Most of the WSA is underlain by the Kaiparowits, Wahweap, Straight Cliffs, Dakota, and Tropic Formations, all of Cretaceous Age. All the coal within the WSA is in the upper part of the Straight Cliffs Formation (the Henderson coal zone in the John Henry Member). In the area near The Blues WSA, the cumulative thickness of coal is as much as 23 feet, and in some places within the WSA individual coal beds up to 12.2 feet thick have been measured (Doelling and Graham, 1972). The Henderson coal zone incorporates the youngest (uppermost) coal-bearing rocks in this part of the Kaiparowits Coal Field (Doelling and Graham, 1972). The maximum depth to the Henderson coal zone is estimated to be about 3,000 feet in the northeastern part of the WSA. Deeper coal-bearing rocks occur in the lower part of the Straight Cliffs Formation, the Tropic Shale, and the Dakota Sandstone (SAI, 1982).

The entire WSA is underlain by an estimated 245 million tons of in-place minable coal (Doelling and Graham, 1972). The amount of overburden increases from less than 1,000 feet along the western edge of the WSA to over 3,000 feet along the eastern edge. The coal resources in the central and western portions of the WSA may have an economic advantage over more deeply buried deposits in the eastern portions of the WSA. Almost all of this would be mined by underground methods.

According to Doelling and Graham (1972), less than 25,000 tons of coal have been removed from the Kaiparowits Coal Field, and no mines are currently active. A number of mines were active in and near The Blues WSA, but the cumulative tonnage extracted was probably very small (SAI, 1982). These mines are the Davies, Shakespear and Pollock. From the largest of these, the Shakespear mine, production probably totalled a few tens of thousands of tons (Doelling and Graham, 1972). The Shakespear mine lies within the only existing coal lease in the WSA. The coal lease is 80 acres in size and encompasses the West ½ Northwest ½ of Section 23, Township 36 South,

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Range 2 West. In 1980, a plan of operations was submitted to the USDI, Office of Surface Mining by Shakespear Coal Corporation. Mining was to commence in November 1980 according to the plan; however, no mining has taken place to date. Access to the mine and the mine portal are not within the WSA. It is estimated that approximately .50 million tons of minable coal lies within this lease tract. The Davies Mine lies outside the WSA in the Northeast $\frac{1}{4}$ Northeast $\frac{1}{4}$, Section 36 (State Section). Only the East $\frac{1}{2}$ Northeast $\frac{1}{4}$ and the Northeast $\frac{1}{4}$ Southeast $\frac{1}{4}$ of Section 36 is underlain by the Henderson coal zone (Doelling and Graham, 1972).

On December 16, 1980, the Secretary of the Interior (USDI, 1980) designated a portion of the Alton and Kaiparowits Coal Fields, including a portion of this WSA, as unsuitable for coal mining because of the close proximity to Bryce Canyon National Park. The Secretarial Decision designated as unsuitable for surface coal mining operations, including surface impacts incident to underground mining that would be visible from Bryce Canyon National Park, all Federal lands in Township 40 South, Range 4 West; Township 39 South, Range 4 West; Township 38 South, Range 4 West; Township 38 South, Range 3 West; Township 37 South, Range 4 West; Township 37 South, Range 3 West; and Township 36 South, Range 3 West. The land in Township 36 South, Range 2 West was designated as unsuitable for mining by surface methods only. Consequently, underground mining operations within the WSA would not be precluded by this decision.

In general, the quality of coal from the Kaiparowits Coal Field is poor to moderate. In the immediate area of The Blues WSA, the coal has an average moisture content of 18.3 percent, an average ash content of 13.6 percent, an average sulfur content of 1.09 percent, and an average heat value of 11,683 British thermal units (Btu) per pound (Doelling and Graham, 1972).

From SAI's (1982) report the coal within The Blues WSA would be considered of moderate quality in general and of average quality when compared with just the coal within the Kaiparowits Coal Field.

Doelling and Graham (1972) estimate that coal reserves within the entire Kaiparowits Field total 15.2 billion short tons, of which one-third to one-half can be mined by underground methods. However, because of problems related to remoteness, accessibility, water availability, high mining and transportation costs, and competition

from nearby coal fields (central Utah, Black Mesa Basin, Arizona and San Juan Basin, New Mexico), the Kaiparowits Coal Field will face complex and expensive development problems for years to come.

LOCATABLE MINERALS

No mining claims have been located within the WSA.

Uranium (f2/c1)

The WSA is considered to have a low favorability for economic deposits of uranium (SAI, 1982).

The Colorado Plateau is one of the major uranium-producing regions in the United States. The most important deposits occur in conglomerates, sandstones, and mudstones within the Morrison Formation of Jurassic Age and in the basal part of the Chinle Formation of Triassic Age. Minor production has also been obtained locally from rocks of Permian, Cretaceous, and Eocene Age. By far the most productive areas of the plateau are in northern New Mexico and southeastern Utah (U.S. DOE, 1979 and Doelling, 1975).

The following rock units are considered favorable for uranium in south-central Utah: the basal members and the Petrified Forest Member of the Chinle Formation (Triassic) and the Salt Wash Member of the Morrison Formation (Jurassic) (U.S. DOE, 1979). The Morrison Formation thickens to the east from the vicinity of south-central Utah and, according to SAI (1982), the Morrison Formation has been removed by Pre-Dakota erosion in the immediate area of The Blues WSA. However, small erosional remnants of the Morrison may be preserved at depth along the east side of the WSA. The depth to the favorable part of the Chinle Formation varies from at least 7,000 feet along the east side of the WSA to about 3,500 feet along the west side of the WSA (Hintze, 1973).

Based on the discussion above, the only favorable host rocks for uranium in the vicinity of The Blues WSA are in the Chinle Formation. In south-central Utah, the Chinle Formation (Shinarump and Petrified Forest Members) contains small deposits such as those in the Circle Cliffs area east of The Blues WSA. The costs of exploring for uranium at depths of at least 3,500 feet in an area where the anticipated payoffs are small make the WSA a relatively unappealing target area (SAI, 1982).

Wildlife

Due to the many different habitat types within the

area, it is assumed that a diversity of vertebrate species are present. The population level of most species, however, would most likely be low because of the poor habitat condition. The six habitat types are pinyon-juniper, sagebrush, mountain shrub, desert shrub, ponderosa pine, and riparian. The riparian type is located along Henrieville Creek and would produce the greatest diversity of species. These habitat types may support up to 45 species of mammals, 160 species of birds, 26 species of reptiles, and eight species of amphibians. However, no inventory has been completed to determine if these species actually exist. No sport fish are found within the WSA.

Game species known to be present in the unit include mule deer, black bear, cougar, cottontail rabbits, blue grouse, Gambel's quail, mourning doves, and band-tailed pigeons. No sensitive, threatened, or endangered species are known to inhabit the WSA. No critical wildlife habitat has been identified in the WSA.

There are 1,200 acres of land treatment (pinyon-juniper chaining and seeding) identified for wildlife (deer) habitat improvement within the WSA.

Forest Resources

The vast majority of the WSA is composed of the pinyon-juniper ecotype (approximately 90 percent). Most of this ecotype has a crown cover of less than 17 percent. Some of the WSA, however, is quite dense with this woodland type and has a canopy cover of more than 17 percent. This latter area is found in a .50-mile swath along a major portion of the Henderson Creek Canyon drainage and north and east of the head of Jimmie Canyon.

There are some ponderosa pine stands scattered throughout the pinyon-juniper community but none are of commercial value. These stands are located primarily in Section 14 north of the Shakespear Mine and in Sections 19, 20, 21, 28, 29, 30, and 31 north and east of Pardner Canyon.

Although commercial timber is not recognized within the WSA, the area is suitable for firewood, post cutting, and Christmas tree cutting. A small amount of these resources has been utilized.

Livestock and Wild Horses/Burros

The Blues WSA is within the Headwaters (Upper Paria) Allotment. Twenty operators are licensed to graze cattle within this allotment. At the present time the WSA is used for livestock grazing only on an emergency basis (e.g. during drought years) because the large majority of the area is

unsuitable for livestock grazing. The unsuitability determination is based on steep slopes, poor forage availability, and inadequate water distribution. However, the following areas are used on occasion: Walt Bench, Pasture Canyon, Henderson Canyon, Pardner Canyon, Henrieville Creek, and near the northwest corner of the allotment (East Valley area). There are approximately 100 AUMs within the WSA boundary. Cattle are normally trailed down Henderson Canyon and Henrieville Creek each year to travel from one grazing unit to another. There are approximately 4 miles of fences within the WSA. The Paria Planning Unit MFP identified 2,200 acres of potential land treatment (chaining, plowing, and seeding) to improve livestock forage in the allotment. This land treatment would provide approximately 350 AUMs of additional livestock forage. No other livestock facilities have been proposed within the WSA.

There are no wild horses or burros in the WSA.

Visual Resources

The BLM visual resource inventory classified approximately 12,600 acres as Class B and 6,400 acres as Class C scenery. VRM is rated as Class III for 4,700 acres and Class IV for 14,300 acres. (Refer to Appendix 7 for a description of BLM's VRM rating system.)

Cultural Resources

According to District data, the WSA does not have any archaeological or historical values of any significance. No formal archaeological inventory, however, has been conducted for this WSA.

Recreation

Although The Blues WSA offers some opportunities for both primitive and nonprimitive types of recreation use, reliable data on existing visitor use are not available. There are probably less than 100 visitor use days actually made within the interior of the WSA. Most (90 percent) of this is motorized use being made by hunters and sightseers. Primitive recreation use would account for only 10 percent of the current use. The most important recreational use of the WSA is presently the general sightseeing use from tourists on Highway 12. The highway borders the WSA on the south, and the current land use plan has identified the potential to develop an overlook near the badlands portion of the WSA. The overlook

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would identify physiographic features such as the badlands and the Table Cliffs in the Dixie National Forest. At the present time, however, development of this facility has been deferred until public demand is evident.

No data are available concerning the number of hiking or backpacking visitor days within the WSA. However, it is estimated that the WSA receives only 10 primitive visitor days per year. The Kanab Resource Area Office has not received any inquiries concerning the hiking possibilities within the WSA. The WSA is adjacent to the 19,620-acre Table Cliff-Henderson Canyon RARE II unit released until further FS land management planning by the Utah Wilderness Act of 1984. Since the former RARE II unit contains the Table Cliffs Plateau, the Table Cliffs, and the Henderson Canyon amphitheater beneath the cliffs, it is assumed that most existing hiking or backpacking use is occurring in these Forest Service areas.

The WSA is open to ORV use on 16,530 acres. Approximately 2,500 acres are designated as "limited to existing roads and trails" to protect riparian values. Present ORV use is very light because of the limitations posed by topographic features and the steepness of terrain.

Wilderness Values

SIZE

The Blues WSA is 6 miles long (north to south) and 11 miles wide (east to west) and encompasses 19,030 acres.

NATURALNESS

Imprints of man that remain in the WSA are a portion of way in Henderson Canyon and 4 miles of fence. These imprints involve less than 1 percent of the WSA and are substantially unnoticeable.

In The Blues WSA, the high quality of naturalness has not changed since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the BLM's *Interim Management Policy* (USDI, BLM, 1979b).

SOLITUDE

The WSA affords outstanding opportunities for solitude due to vegetation and topographic screening situations. The size and configuration of the WSA neither enhances nor detracts from the outstanding opportunities present.

Outstanding opportunities for solitude exist where elements of vegetation and topographic screening combine to create a superior opportunity for visitors to avoid the sights, sounds, and evidence of other visitors. In the western portion of the WSA, the area of the 7,950-foot point between Henderson and Pasture Canyons, a small area on the Dixie National Forest boundary west of Pasture Canyon, and a portion of the east wall of Henderson Canyon all possess this attribute. In the central portion of the WSA, the upper reaches of Pardner Canyon and the cliff area to the southeast in Section 4 also possess superior natural screening. In The Blues, one area below the South Rim at the National Forest boundary is sufficiently forested to offer an excellent opportunity to avoid other visitors.

Sites and sounds of human activities are not present from most places within the WSA. From the elevated South Rim of The Blues amphitheater, the sights and sounds of truck traffic on the steep grades of Highway 12 and the activities at the nearby oil docking facility would probably detract from the opportunity to experience solitude. However, most of these South Rim vantage points are on the Dixie National Forest, and the impact would not be felt from within the WSA.

It would be easy for a visitor to find seclusion in limited areas of the Henderson, Pasture and Pardner Canyon drainages. However, in much of the WSA, seclusion would be difficult to find.

In summary, it is felt that 1,600 acres (8 percent) of the WSA have outstanding opportunities for solitude. Topographic and vegetation screening enables visitors to find a secluded spot in a few selected areas of the WSA. Ninety-two percent (17,430 acres) do not meet the solitude standards. There are no significant outside sights and sounds that would detract from the solitude found in the WSA. Certain vistas from the WSA are sufficient to give a feeling of vastness.

PRIMITIVE AND UNCONFINED RECREATION

The opportunity for primitive and unconfined recreation within the WSA is considered outstanding in areas where the number of primitive recreational activities are diverse. The opportunity is also considered outstanding where the exploring activity is of excellent quality.

The *BLM Intensive Wilderness Inventory* identified hiking, backpacking, rock climbing, hunting, geological sightseeing, and botanical sightseeing as the six activity opportunities existing within the WSA. In areas where these activities exist together, the opportunity is outstanding.

The opportunities for hiking and hunting exist throughout the WSA. By their very nature, these would be area-extensive in this WSA, and it would be difficult to identify any specific areas where hikers and hunters would not pursue these activities.

The rock-climbing activity is very localized. It is dependent upon high sheer cliffs of the Wahweap or Straight Cliffs Sandstones. Cliffs suitable for this activity are found along Henrieville Creek above the gravel pit, on the east wall of lower Pardner Canyon in Section 5, and on the 7,950-foot monolith east of Pasture Canyon on the Pasture Canyon-Henderson Canyon divide.

The botanical sightseeing activity is limited to the plant life in The Blues badlands. Observations of the plant associations in the badlands constitute a sightseeing objective in the WSA.

Some of the recreation activities are enhanced by the variation in vegetation and topography within the WSA. The backpacking and geological sightseeing opportunities are influenced by this variety. In fact, geological sightseeing is one of the objectives of backpacking in the WSA and these two activities are considered to exist in identical locations. The backpacking opportunity exists where a full traverse of the WSA's geological variety (landform, stratigraphy, and elevational diversity) can be accomplished. The WSA configuration is such that it would be difficult, if not impossible, to experience the variation in vegetation and topography by hiking. Overnight stays are required. Some of the backpacking and geological sightseeing activities must occur on adjacent National Forest lands and in a State section if the range of topographic and vegetation variation is to be observed.

Excellent opportunities for exploration are found in some of the remote and dissected locations of the WSA. These areas do not necessarily exhibit a diversity in landform types nor do they necessarily represent areas of outstanding solitude. Rather, they are rarely visited locations in difficult and confusing topography which would invite exploration. These areas include the upper reaches of Pardner and Jimmie Canyons, a tributary canyon to Henderson Canyon beneath Powell Point, and the area along the Dixie National Forest boundary west of Henderson Canyon which includes the Pasture Canyon drainage.

It is felt that the outstanding primitive opportunities for recreation are found on 3,000 acres or 16 percent of the WSA, while 16,030 or 84 percent do not meet the criterion.

Approximately 3,300 acres of the WSA possess outstanding opportunities for either solitude or primitive recreation. Approximately 15,730 acres lack outstanding opportunities for primitive recreation. Thus, the overall quality of the mandatory values is considered low in this WSA. The best wilderness quality is concentrated in the Upper Pardner Canyon area and the Pasture Canyon area along the National Forest boundary.

SPECIAL FEATURES

The WSA is not considered to have any special features as defined in the *Wilderness Act*.

Land Use Plans and Controls

The WSA lies within the BLM Paria Planning Unit which is being managed under the land use decisions of the Paria MFP. The present principal uses within the WSA are incidental livestock grazing and woodcutting. The WSA encloses 640 acres of State land within its boundaries. State lands are managed by the State Land Board for the purpose of generating revenues for the public school system.

The *Garfield County Master Plan* (Five County Association of Governments, 1984) recognizes that the County possesses "... Some of the most spectacular scenery in the United States The County is sparsely populated and most of it is in its original pristine condition." Garfield County has proposed to the Utah Congressional Delegation that 111,053 acres of BLM lands in three WSAs and 31,600 acres in one Forest Service unit be recommended for wilderness. The County Plan recommends that the remaining lands within the County, including The Blues WSA, be retained for multiple use. The Plan's concept of multiple use includes forestry, livestock grazing, wildlife, and recreation.

Under its RARE II Study the Forest Service found the Table Cliff-Henderson Canyon unit, which adjoins the WSA on the north, to be unsuitable for wilderness designation. The 1984 Utah Wilderness Act (P.L. 98-428) released the unit from further review by the Forest Service until the next revision of land management plans.

The "Kaiparowits Coal Development and Transportation Study for Southern Utah" (Environmental Research and Technology, Inc., 1980) identified a number of transportation corridors and truck haul routes. The objective of the study was to identify possible areas for construction and operation of future coal transportation systems within the restrictions of general environmental and engineering constraints. Corridor segments

were required to contain at least one potential route for a railroad or coal slurry pipeline. Specific routes, however, were not identified. By selecting corridors between 2 and 15 miles in width, maximum flexibility for future locations of specific routes were maintained. Corridor route C13 would encompass the entire WSA. However, the WSA does not extend across the entire width of the corridor. The study stated that natural topographic features, such as The Blues Formation, would be avoided by the proposed coal slurry line or railroad lines.

Socioeconomics

The Blues WSA is located in Garfield County, Utah. Most economic impacts are expected to be restricted to Garfield and Kane Counties.

DEMOGRAPHICS

Garfield and Kane are rural counties having average population densities of less than one person per square mile. This density is very low when compared to the Statewide average of 17 persons per square mile (U.S. Department of Commerce [USDI], Bureau of Census, 1981). Much of the population in these counties is concentrated in small communities rather than being evenly distributed throughout the area. The 1980 population of Garfield and Kane Counties was 3,673 and 4,024 persons, respectively (USDC, Bureau of the Census, 1981).

EMPLOYMENT

The economies of Kane and Garfield Counties are somewhat similar in structure, both being dominated by the government sector and having strong services sectors in terms of employment (USDC, Bureau of Economic Analysis, 1982). The three major sectors of the Garfield County economy in terms of 1980 employment are: government (20 percent), construction (18 percent), and services (13 percent). The three most important sectors of the Kane County economy in terms of 1980 employment (USDC, Bureau of Economic Analysis, 1982) are: government (17 percent), retail trade (17 percent), and services (14 percent).

Table 4 presents 1980 employment and income figures for the two counties.

Possible impacts from wilderness designation are expected to be more obvious at the community level than the county level. Three communities lie near the WSA: Cannonville, Henrieville, and Tropic. The total population for these three communities is estimated to be 639 (USDC,

TABLE 4
1980 County Employment and Personal Income
Garfield and Kane Counties, Utah

Industrial Sector	Garfield County		Kane County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	2,143	24,792	1,452	12,595
Proprietors	349	2,637	382	2,823
Farm				
Proprietors	209	807	122	138
Nonfarm				
Proprietors	140	1,830	280	2,487
By Industry				
Source				
Farm	27	949	27	382
Nonfarm	1,787	23,843	1,043	12,213
Private	1,332	19,049	798	9,814
Ag. Serv., For., Fish and				
Other (L)	79	(L)	0	
Mining	208	4,222	17	196
Construction	379	5,536	51	1,544
Manufacturing	247	3,294	70	566
Nondurable				
Goods	(D)	(D)	(D)	(D)
Durable				
Goods	(D)	(D)	(D)	(D)
Transportation and Public				
Utilities	84	1,545	150	1,875
Wholesale				
Trade	(L)	96	12	230
Retail Trade	128	1,302	252	2,364
Finance, Insurance and				
Real Estate	16	189	39	392
Services	270	2,788	202	2,427
Government and Government				
Enterprises	435	4,794	245	2,599
Federal, Civilian				
Federal, Military	140	1,658	18	252
State and Local	24	64	30	78
	271	3,074	197	2,289

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

Bureau of the Census, 1981). These three small communities are expected to receive most of the direct impacts.

It is difficult to estimate current employment and income in the communities of Cannonville, Henrieville, and Tropic due to the lack of information at the municipal level and restricted disclosure of available data. It is assumed that most of the employment and income in the area is based in the agricultural and services sectors. This is based on the low number of retail trade outlets in the area. Most of the persons employed by the

services sector probably work within the local school system.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral leasing, livestock production, woodland production, and recreation. Table 5 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

Coal has been produced from the WSA in the past. However, none is currently being produced.

**TABLE 5
Local Sales And Federal Revenues**

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$55,350
Coal Leases	0	\$240
Livestock Grazing	\$2,000	\$140
Woodland Products	0	0
Recreational Use	Less than \$410	0
Total	Less than \$2,410	Up to \$55,730

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

² Currently there is no production from the Shakespear Coal Mine.

³ During years when the forage is grazed.

No oil and gas production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Twenty livestock operators have a total grazing privilege of 100 AUMs within the WSA. If all this forage were utilized, it would account for \$2,000 of livestock sales and \$500 of ranchers' returns to labor and investment.

Some woodland products have been harvested from the WSA; however, the harvests were small and insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use and related local expenditures are low. The WSA's motorized recreational use is low and, consequently, 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 Statewide average expenditures per

recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for The Blues WSA is estimated as about 100 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane and Garfield Counties.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 5).

Oil and gas and coal leases in the WSA cover approximately 18,530 acres. At \$3 per acre, lease rental fees generate up to \$55,590 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 100 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$140 of grazing fee revenues during the years the forage is grazed, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

**ENVIRONMENTAL
CONSEQUENCES OF
ALTERNATIVES**

**Analysis Assumptions and Guidelines
for all Alternatives**

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.

4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

(Proposed Action)

The major changes that could occur in the area would be related to oil and gas, locatable mineral, and coal exploration and development. The area would be open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be low in the near future due to the WSA's rough terrain and present economic conditions. However, SAI (1982) indicates the area has a moderate to high potential for development sometime in the future. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: coal, 950 acres; oil and gas, 160 acres and uranium, 20 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.) Within the WSA there are also 3,400 acres of land treatment proposed for livestock grazing and wildlife purposes. The 3,400 acre figure is used for analysis purposes but the probability of treatment of such a large area is low.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If the unit's minerals are developed, air quality could be reduced up to the PSD Class II limitations; however, the proximity of the WSA to Bryce Canyon National Park may result in restriction of mineral

development to meet PSD Class I limitations. Mineral-related disturbance of 1,130 acres could result in increases in fugitive dust emissions. Development plans would have to be designed to meet existing Class I and II limitations. There would be slight increases in fugitive dust during the chaining, plowing, and reseeded of 3,400 acres of pinyon-juniper woodland and sagebrush, but this is not expected to exceed air quality limitations.

GEOLOGY

No impacts to geology are expected from 180 acres of surface disturbances associated with uranium and oil and gas exploration. Vegetation manipulation would affect only the ground surface. Some subsidence and fracturing of geologic formations could occur with coal development; however, the extent and nature cannot be determined.

SOILS

It is estimated that up to 1,130 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with critical erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 1,130 acres would increase from 3,051 cubic yards/year to 6,102 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA due to mineral development would increase by approximately 3,051 cubic yards (7.6 percent) over current annual soil loss. The soil loss increase and the effects would likely be imperceptible because of current high erosion rates in the area.

The proposed rangeland improvements could reduce soil loss. The 3,400 acres of chaining, plowing, and reseeded of 3,400 acres would cause a temporary (2 to 3 years) increase in soil loss. However, once the new seedings are established, reductions from the current rate of soil loss could be expected.

VEGETATION

The anticipated maximum of 1,130 acres disturbed for mineral exploration and development and the 3,400 acres of land treatment would significantly impact the WSA's vegetation. The land treatment proposals and the rehabilitation practices associated with mining activities would increase grass and brush vegetation types.

WATER RESOURCES

Since 75 percent of the WSA is made up of badland and rock outcrop and precipitation is low, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur from the 3,051 cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Paria Planning Unit.

The chaining, plowing, and reseeded of 3,400 acres of pinyon-juniper and sagebrush could cause a temporary (2 to 3 year) increase in TDS. However, after the new seedings are established, water quality could be expected to improve.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water. The impacts of coal mining on ground water would be partially mitigated by constraints on development required by State laws.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The potential for up to 10 million barrels of oil in-place (3 million estimated recoverable) and up to 60 billion cubic feet of natural gas (18 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 stipulations, and would not be affected by the adoption of this alternative. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. However, due to the small size of these deposits, no development is expected under this alternative.

Coal

An estimated coal resource of 122 million tons of recoverable coal is found in the WSA. Only 80 acres of the WSA are under lease (0.2 percent of the recoverable coal). This resource, including the unleased coal, could be explored and potentially developed in the future and would not be affected by this alternative. It is estimated that up to 950 acres of surface disturbance would occur from coal development. The likelihood for production of coal is thought to be low in the near future because of remoteness from markets, high production costs, and competition from other coal fields. In the long term the potential for development is high.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife would be affected by an increase in forage due to the proposed 1,200 acres of wildlife land treatment and 2,200 acres of livestock land treatment. The new forage could increase wildlife numbers and the condition of the existing animals. However, disturbance of an estimated 1,130 acres (6 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Nonmobile wildlife would either perish or coexist with these disturbances at smaller and less viable population levels.

FOREST RESOURCES

The major vegetation cover is pinyon and juniper, none of which is presently utilized (except by occasional campers or hikers). Disturbance of 1,130 acres from mineral exploration and development and 3,400 acres from land treatment would change the areas impacted from a pinyon-juniper vegetation type to a grassland vegetation type.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Paria Planning Unit MFP. The 100 AUMs currently allocated in the WSA are controlled by 20 livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected. The proposed land treatments could be developed and would result in improved livestock management and carrying capacity (350 AUMs).

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intru-

THE BLUES WSA

sions, visual values in the WSA would be affected. Under this alternative 3,400 acres of vegetation manipulation and 1,130 acres of mineral-related exploration and development are possible. Even though mitigative measures would reduce visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity. VRM objectives would probably be met because the WSA is a VRM Class III and IV area. After rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area (worst-case analysis), visual quality could be significantly reduced on the 12,600 acres of Class B scenery in the WSA.

CULTURAL RESOURCES

Cultural values in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 1,130 acres by mineral exploration and development and 3,400 acres of land treatment could affect cultural sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 1,130 acres could be disturbed by mineral and energy activities and 3,400 acres by land treatment practices. Primitive recreational opportunities could be diminished on the affected areas. Hunting and ORV recreational use could increase because of increased deer numbers and improved access.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 100 current visitor days per year to 149 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 10 visitor days per year to about 15 visitor days per

year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing, etc.) would increase from 90 visitor days per year to 134 visitor days.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Paria Planning Unit MFP. Expected mineral and energy exploration and development could disturb an estimated 1,130 acres and land treatments could disturb 3,400 acres. Wilderness values in this WSA (i.e., naturalness and opportunities for solitude and primitive recreation) would be lost or diminished in affected areas. These surface-disturbing activities would result in a significant loss of naturalness, primitive recreation, and solitude throughout the WSA as a whole, particularly if roads, vehicular ways, and drill pads are located throughout the area.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Garfield County Master Plan* which recommends multiple use. This alternative is based on implementation of the current BLM Paria Planning Unit MFP and is, therefore, in conformance with it. It would also be consistent with State of Utah plans and policies which emphasize economic return. The No Action Alternative would also be consistent with the FS "No Wilderness" recommendation on the adjacent Table Cliff-Henderson RARE II Study Unit. The RARE II unit was not designated in the Utah Wilderness Act of 1984 and was released from further review until the next revision of FS land management planning. No action would allow for establishment of coal transportation systems to transport Kaiparowits coal through the WSA.

SOCIOECONOMICS

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 coal, oil and gas, and uranium in the WSA were developed, it would lead to a significant increase in employment and income for Kane and Garfield Counties. The probability of economic development of minerals within the WSA is low at present but could be moderate to high in the future.

There would be no livestock-related economic losses because the existing grazing use (100 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed land treatments that would produce 350 AUMs of new allocated forage could

lead to \$7,000 of livestock sales and \$1,750 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 49 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy) recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Surface-impacting activities that would be allowed without designation would reduce the demand for primitive recreation activities, but hunting and ORV recreation activities could increase.

Federal and State revenues would not be reduced by this alternative. There are 580 acres in the WSA open to oil and gas leases that are currently not leased and 18,450 acres open to coal leasing that are not leased. If leased, they would bring up to \$58,590 additional Federal lease fee revenues per year in addition to royalties from lease production (and bonus bids from new coal leases). Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$140 each year the forage is grazed) would continue. The additional 350 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by \$490 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (19,030 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 19,030-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The 3,400 acres of land treatment would not be allowed. The entire area would be placed in leasing Category 4 (closed to leasing). About 5 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that mining claims would be staked before wilderness

designation and the 80-acre coal lease would eventually be explored and developed, causing an estimated 25 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas or coal would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas for this alternative would be smaller than under the No Action Alternative (25 vs. 1,130 acres for mineral and energy activities plus 3,400 acres for land treatment), the impacts from development and surface disturbance on air quality, geology, soils, vegetation, water, forest, and cultural resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur. The three proposed private water developments would be denied.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water. Coal mining would have to comply with State and Federal water laws; therefore, it would not significantly impact the area's ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 18,450 acres (8,179 acres pre-FLPMA and 10,271 acres post-FLPMA) are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be re-issued.

Exploration for and development of a potential resource of up to 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas with 3 million barrels of oil and 18 billion cubic feet of natural gas that is recoverable could be foregone under this alternative. However, due to

the small size of the potential deposits, the low certainty that these exist, and the low likelihood for exploration and development activities, it is concluded that this alternative would not result in any significant loss of potential oil and gas recovery.

Coal

The WSA has an estimated coal reserve of 245 million tons of which 122 million tons are recoverable. Only a small part of the coal resource is presently leased (less than 1 percent). Therefore, wilderness designation would preclude development of 99 percent of the WSA's coal resource, an estimated 122 million tons of recoverable coal. The 80-acre coal lease could be developed and disturb approximately 5 acres of the WSA's surface.

Locatable Minerals

There are presently no mining claims in the WSA. Up to 500 tons of uranium oxide that are recoverable could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disrupted due to exploration and development of locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case the potential for recovery of up to 500 tons of uranium oxide would be foregone. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable it is unlikely that exploration or development fore, this alternative would not result in any significant will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, the 1,200-acre wildlife land treatment proposal would be foregone. Loss of the land treatment proposal would reduce the likelihood of expanding and improving the deer herd in the WSA.

In addition, disturbance of 25 acres due to exploration and development of coal and locatable mineral resources could disrupt wildlife populations and result in these species leaving the disturbed area.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Paria Planning Unit MFP. The 100 AUMs currently allocated in the WSA are controlled by 20 livestock permittees. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected. The proposed 2,200-acre land treatment would not be allowed. Therefore, an additional 350 AUMs of livestock forage would be foregone.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to wilderness values.

VISUAL RESOURCES

A slight benefit would occur to the visual resources of the WSA because the VRM class would change from Classes III and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 25 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although use is currently low (about 100 visitor days a year), the WSA has opportunity for outstanding primitive and unconfined recreation. If designated, those recreational opportunities would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 134 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA, and approximately 5 miles of ways within the WSA would be closed to ORV use. Because there are other similar areas in the vicinity of the WSA, this type of recreation use would probably not experience an overall decline in the vicinity of the WSA.

Mineral-related surface disturbance on up to 25 acres could cause localized impairment of values.

It is concluded that this alternative could benefit primitive recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values. However, hunting and ORV recreation use would decline, resulting in an overall negative impact to recreation.

WILDERNESS VALUES

Designation and management of all 19,030 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive recreation. Solitude would be preserved on approximately 1,600 acres that meet and 17,430 acres that do not meet the standards for outstanding solitude. Naturalness would be preserved on all 19,023 acres, and primitive and unconfined recreation would be preserved on 3,000 acres that meet and 16,030 acres that do not meet the standards for outstanding opportunities.

The anticipated mineral-related surface disturbance would be reduced from 1,130 acres to 25 acres for development of valid mining claims and the existing coal lease. Mitigation to protect wilderness values would be considered during mineral development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

Outstanding opportunities for six recreational activities (backpacking, hiking, rock climbing, hunting, and botanical and geological sightseeing) would be preserved. Although recreational use could increase (refer to the Recreation section), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Thus, it is concluded that wilderness designation and management of all 19,030 acres of The Blues WSA would protect and preserve the wilderness values of naturalness and opportunities for solitude (outstanding on 1,600 acres) and primitive recreation (outstanding on 3,000 acres) except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

The existing BLM Paria Planning Unit MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would amend the Paria MFP.

The *Garfield County Master Plan* recommends multiple use for public lands in this WSA. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would not be reissued. If State lands within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Designating the WSA as wilderness would also conflict with the Kaiparowits coal transportation plans and would not be consistent with the FS recommendation of "No Wilderness" on the adjacent Table Cliff-Henderson Canyon RARE II Study Unit which was released from wilderness study until revision of FS land use plans by the Utah Wilderness Act of 1984.

SOCIOECONOMICS

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 local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 5) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate to high (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is moderate to high, it is estimated that potential mineral-related local income would be significantly reduced by wilderness designation.

Livestock use and ranchers' income would continue as at present with \$2,000 of livestock sales and \$500 of ranchers' return to labor and investment during the years the forage is grazed. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. Two thousand two hundred acres of land treatments have been proposed. If this project were to be implemented and the additional forage used, ranchers' returns to labor and investment would increase by \$1,750.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would not be significant. Motorized recreational use of the WSA is light (90 visitor days per year). The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 18,450 acres now leased would cause an eventual loss of up to \$55,350 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$58,590 annually in Federal revenues from the 19,530 acres (580 for oil and gas and 18,950 for coal) that could be leased for coal and oil and gas without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

If the proposed range improvements are not developed and used, an estimated annual \$490 of Federal grazing revenues from 350 increased AUMs would be foregone.

Wilderness designation would eliminate most woodland product harvesting and related Federal revenues.

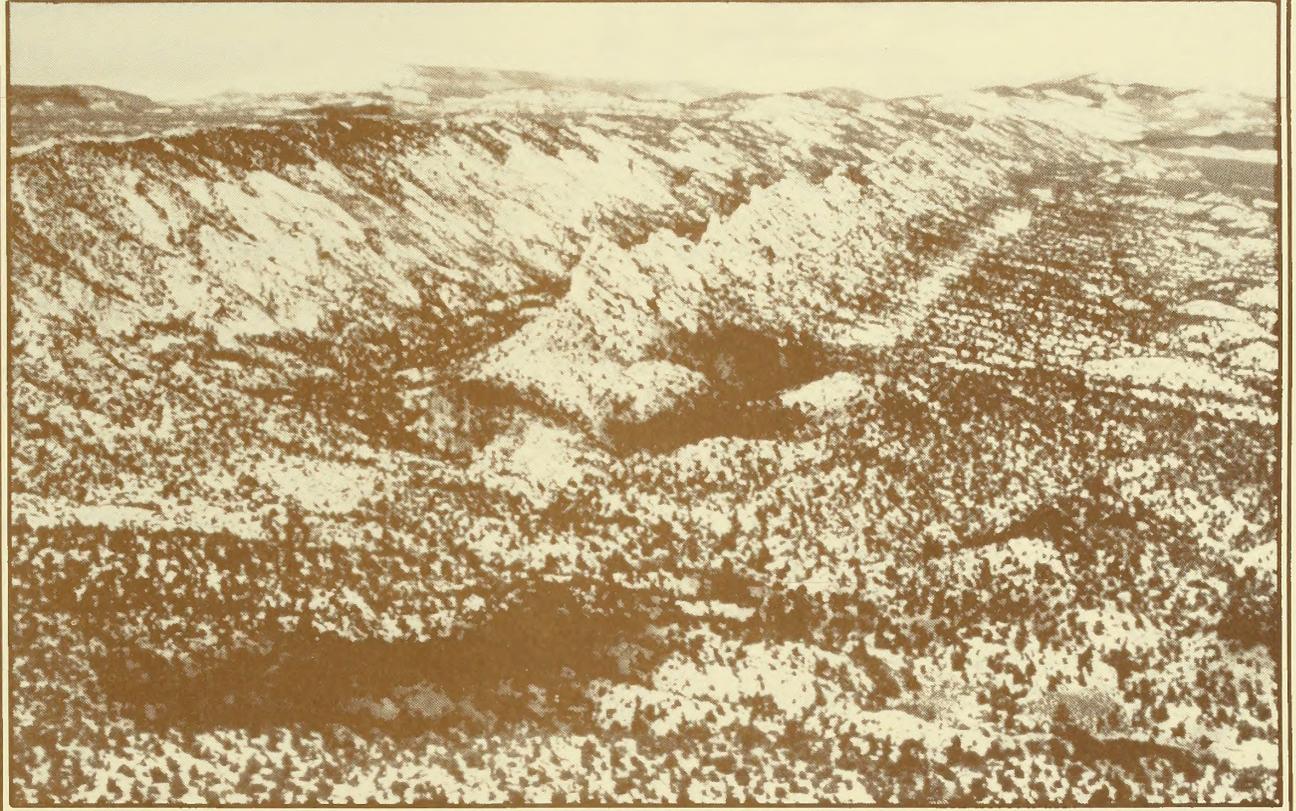
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MUD SPRING CANYON WSA

(UT-040-077)

INTRODUCTION

General Description of the Area

The Mud Spring Canyon Wilderness Study Area (WSA) lies south of Utah State Highway 12 and approximately 6 highway miles east of Henrieville, Utah. The unit is located south of Canaan Peak, north of the Butler Valley road, and west of the Horse Mountain road. The unit is divided between Garfield and Kane Counties. There are 38,075 acres of public land (15,575 acres in Kane County and 22,500 acres in Garfield County) within the WSA. There are 3,041 acres of State land within the WSA.

The WSA is managed by the BLM, Kanab and Escalante Resource Area offices of the Cedar City District.

The WSA includes The Cockscomb, a prominent geologic feature in southern Utah. It consists of two parallel knifelike ridges.

Precipitation records from the National Weather Service Station in Henrieville (approximately 9 miles west of the WSA and from 200 to 2,100 feet lower in elevation) show the average yearly precipitation expected in the Mud Spring Canyon WSA to be approximately 12 inches. Highest monthly precipitation occurs from July through December, during which time approximately two-thirds of the yearly precipitation falls. Highly intensive thunderstorms are common during the summer months and are triggered by southerly winds carrying moisture from the Gulfs of Mexico and California. Several damaging flash floods have occurred during the past 30 years in the Cannonville/Henrieville area because of summer convection storm patterns. Several areas in the Mud Spring Canyon WSA are major source areas for flood waters (e.g., the Henrieville Creek and Wahweap Creek drainages). Winter/spring precipitation is mainly associated with storm patterns moving from the Pacific Ocean. These systems continue through early summer and move in a more northerly direction which usually bypasses the area and results in less precipitation.

July and January are the warmest and coldest months, respectively. Average daily maximum temperatures at Tropic (10 miles northwest of Henrieville) range from 41 degrees Fahrenheit (F) in January to 86 degrees F in July, while average daily minimums vary from 15 degrees F to 51 degrees F during the same months. The WSA's

higher elevations (ranging up to 1,800 feet higher than the recording station) could be expected to be several degrees cooler than Tropic.

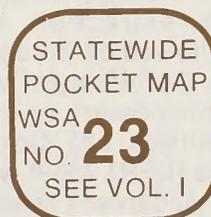
Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. The major issues in the Mud Spring Canyon WSA are the potential for coal, oil, and gas development within its boundaries and the large amount of land that does not meet the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964) criteria and standards. Also of issue is the large amount of acreage recommended in the Paria and Escalante Management Framework Plans (MFPs) (USDI, BLM, 1981b and 1981c) for land treatment (chaining, seeding, burning, etc.) to curtail erosion within the unit and to provide additional wildlife and livestock forage. Other issues include access to State lands having mineral value and changing the air quality standards.

Issues and concerns raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* The WSA has a high erosion hazard and areas that could receive erosion control measures, and should not be designated wilderness.

Response: Over 15,000 acres in the WSA are in a critical erosion class. Various erosion control measures have been proposed in the Escalante and Paria Planning Unit MFPs. Impacts of wilderness designation on these projects are discussed in the Environmental Consequences, All Wilderness Alternative section.



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DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping it was suggested that a partial alternative be formulated to eliminate resource conflicts. On examination it was found that major resource conflicts could not be resolved with a boundary adjustment; therefore, the concept of a partial wilderness alternative in the Mud Spring Canyon WSA was eliminated from detailed study.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (38,075 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.

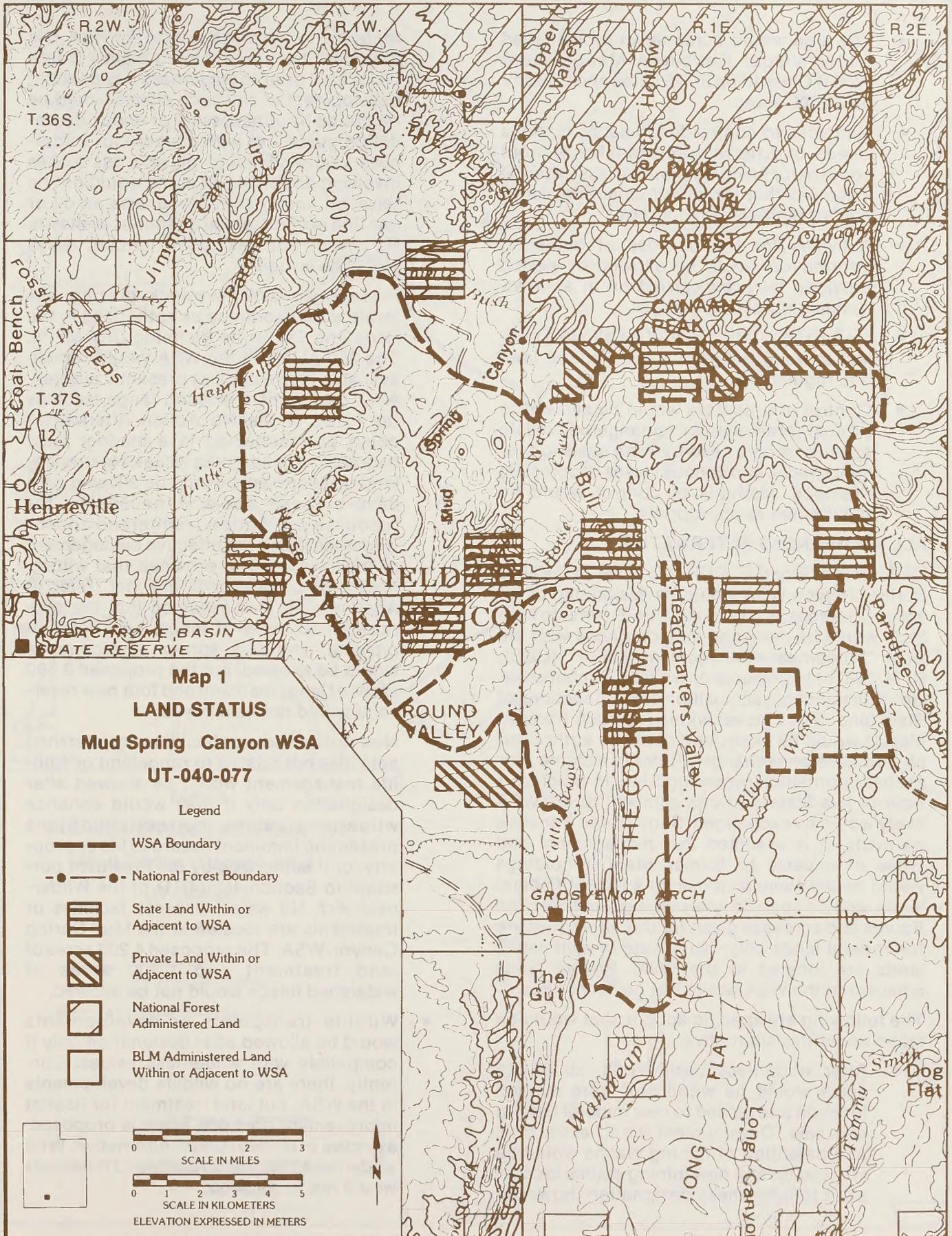
NO ACTION ALTERNATIVE (PROPOSED ACTION)

Under this alternative, none of the 38,075-acre Mud Spring Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Paria and Escalante Planning Unit MFPs (USDI, BLM, 1981b and 1981c). The 3,041 acres (4-2/3 sections) 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.

The following are specific actions that would take place under this alternative:

- All 38,075 acres would remain open to mineral location and to mineral sale. Development work, extraction, and patenting would be allowed on potential future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without consideration for wilderness values. At the present time, no mining claims exist within the WSA. Existing oil and gas leases (54 leases totalling 34,540 acres) could be developed under Category 1 (standard stipulations) without concern for wilderness values. The balance of the WSA (3,535 acres) could be offered for new oil and gas leases under Category 1. Future coal leases could be issued and developed without wilderness considerations. There are presently no coal leases in the Mud Spring Canyon WSA.
- Domestic livestock grazing use of the WSA would continue as now authorized (currently 250 Animal Unit Months [AUMs]). Existing developments for livestock, including seven reservoirs and 2.50 miles of fence identified in the MFPs, would continue to be maintained. The proposed range improvements (four reservoirs, two spring developments with water troughs, 1.50 miles of pipeline, .50 mile of fence, and 2,600 acres of land treatment [burning, chaining, plowing, and seeding]) would be allowed without consideration for wilderness values.
- Use, maintenance, and development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the MFPs. About 1,000 acres of land treatment are currently planned for wildlife habitat improvement and could be initiated without wilderness considerations. About 800 acres of this total are also included in the land treatment noted above for livestock.
- Watershed improvements would be allowed. The Paria and Escalante MFPs call for land treatments on 4,200 acres (2,600 acres are included in the livestock land treatments) and 1,300 acres of watershed tillage practices.
- Approximately 37,975 acres would continue to be open to off-road vehicle (ORV) use. Vehicle use on about 100 acres would be limited to existing roads and trails along Dry Valley Creek, Little Creek, and Henrieville Creek. Present ORV use is low.
- The "Kaiparowits Coal Development and Transportation Study for Southern Utah" (Environmental Research and Technology, Inc., 1980) identified a corridor that encompasses the total WSA. A portion of this corridor could be subject to future rights-of-way, including access roads, if energy development were to occur. Also, two existing rights-of-way would continue to be allowed.
- The entire 38,075-acre would be open to woodland product harvest. There has been some commercial and noncommercial harvest of forest products (firewood, posts, and Christmas trees) in the past.

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- The area would continue to be managed under Visual Resource Management (VRM) Class III on 3,775 acres and Class IV on 34,300 acres.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Motorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

Under this alternative, all 38,075 acres of the Mud Spring 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" (USDI, BLM, 1981b) to preserve its wilderness character. Upon designation, acquisition of 4-2/3 sections of State land (3,041 acres) within the WSA (refer to Map 1) would be likely, and could be authorized by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) Four of five State sections adjacent to the WSA likely would be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only. No private or split estate lands are located in the WSA. Private lands adjacent to the WSA would not be exchanged.

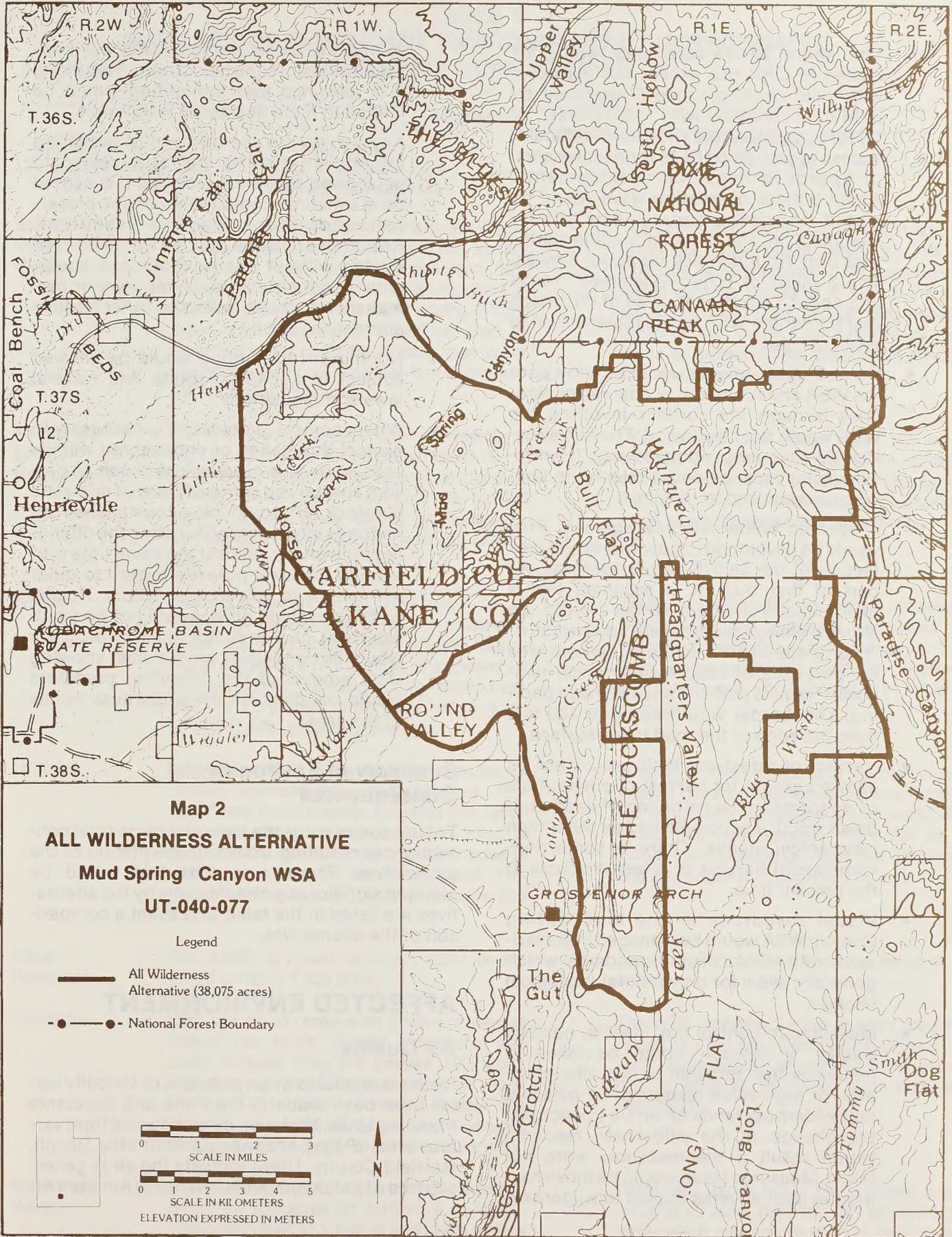
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 38,075 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting of mining claims would be allowed on any new mining claims located prior to wilderness designation; however,

there are no existing claims in the WSA. It is assumed that some mining claims would be located prior to wilderness designation; development of any such claims would be regulated by unnecessary or undue degradation guidelines with concern for wilderness values. Existing oil and gas leases involving about 34,540 acres would not be reissued upon expiration unless an oil or gas find in commercial quantities is shown. No new oil and gas leases nor coal leases would be issued.

- Present domestic livestock grazing use levels would continue as authorized in the Paria and Escalante Planning Unit MFPs. The 250 AUMs in the WSA would remain available to livestock as presently allotted. After designation, existing range facilities (as listed in the No Action Alternative) could be maintained in a manner least degrading to wilderness values. 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 criteria are met (refer to Appendix 1). It is assumed that the proposed 1.50 miles of fence, 1.50 miles of pipeline, and two spring developments would be allowed, but the proposed 2,600 acres of land treatment and four new reservoirs 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*. No water resource facilities or treatments are located in the Mud Spring Canyon WSA. The proposed 4,200 acres of land treatment and 1,300 acres of watershed tillage would not be allowed.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA, but land treatment for habitat improvement on 1,000 acres is proposed, as noted in the No Action Alternative. With wilderness designation, this land treatment would not be allowed.

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- The entire 38,075-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with CFR rules ; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. About 3 miles of existing ways would be closed. An existing road would be “cherry-stemmed” in one location leading northeast from Round Valley for about 3 miles. The 3 miles of “cherry-stemmed” roads and about 4 additional miles of dirt roads that border the WSA would remain open to vehicular use.
- No new rights-of-way would be allowed in the WSA and future rail or coal slurry pipelines through the corridor involving the WSA would not be allowed. The two existing .25-mile-long rights-of-way (Henrieville water pipeline and a telephone line) would be allowed to remain.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 38,075-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to or “cherry-stemmed” into the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- 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. There is some non-commercial harvest of forest products at the present time.
- Visual resources in the Mud Spring Canyon WSA would be managed in accordance with 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 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 landscape). 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 on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

No measurements of air pollution or visibility levels have been made in the Paria and Escalante Planning Units; however, data collected from various sites (Page, Arizona and Four Mile Bench, Garfield County, Utah) indicate the air is generally free of pollutants, within National Ambient Air

MUD SPRING CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MUD SPRING CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (38,075 Acres)
Soil and Water Resources	Erosion and degradation of surface water quality would result from 7,930 acres of surface disturbance. However, after 2 to 3 years, land treatments on 5,700 acres would reduce erosion and improve surface water quality. Ground water quality and flows of springs used for municipal water could be reduced due to underground mining of coal that is possible with the No Action Alternative.	The potential for increases in erosion and loss of surface water quality would be reduced. However, watershed would be negatively affected because the ability to reduce the present high erosion rates through land treatment would be lost. Ground water quality and flows would be protected from the adverse effects of coal development.
Mineral and Energy Resources	The likelihood of development is moderate to high for up to 3 to 15 million barrels of oil, 18 to 90 billion cubic feet of natural gas, and up to 125 million tons of coal, and low for 500 tons of uranium oxide. Mineral and energy resources could be developed under this alternative.	Oil, gas, and coal likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. In the future, the loss of development opportunity could be significant for oil, gas and coal.
Wildlife	About 5.9 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. About 15 percent of the WSA is proposed for land treatments, including wildlife habitat treatment on 2.6 percent of the WSA, which would benefit wildlife, especially deer.	Wildlife would benefit from solitude. Benefits to wildlife from the proposed vegetation and watershed treatments would not occur, however, as the treatments would not be allowed and the overall effect on wildlife would be negative.
Livestock	Grazing of 250 AUMs and maintenance of existing developments would continue. Proposed new developments, including four reservoirs, two spring developments, 1.5 miles of pipelines, 0.5 mile of fence, and 2,600 acres of land treatment, could be implemented. Proposed treatments could provide another 250 AUMs.	Grazing of 250 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new developments might not be allowed. Land treatments would not be allowed and 250 potential AUMs would be lost.
Visual Resources	The quality of visual resources could be impaired on up to 7,930 acres.	Visual quality could be impaired on up to 20 acres.
Recreation	ORV use would continue on 3 miles of ways at current low levels. Overall recreational use could increase from the present 100 visitor days per year to 149 over the next 20 years. Up to 2,230 acres of mineral-related disturbance and 5,700 acres of land treatments could reduce the quality of primitive recreation.	The WSA, including 3 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be directly disturbed on up to 7,930 acres (21 percent of the WSA). This could result in a loss of wilderness values throughout the WSA.	Wilderness values would be protected, except on up to 20 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.

MUD SPRING CANYON WSA

**TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MUD SPRING CANYON WSA**

Resource	Alternatives	
	No Action	All Wilderness (38,075 Acres)
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane and Garfield County Master Plans</i> , State of Utah plans and policies, and the current BLM Paria and Escalante MFPs. It would complement the Forest Service proposal for nonwilderness nearby and the consideration for transportation corridors in the Kaiparowits Plateau area.	This alternative would not be consistent with Kane and Garfield Counties' concepts of multiple use and would not complement the Forest Service recommendation for nearby nonwilderness or potential proposals for transportation corridors. It would be consistent with State policy if lands were exchanged. Designation would constitute amendment of the BLM Paria and Escalante MFPs.
Socio-economics	Annual local sales of less than \$5,410 and Federal revenues of up to \$103,970 would continue. An additional \$124,830 per year in Federal revenues could be derived from leasing of presently unleased areas. Proposed rangeland improvements could provide an additional local benefit of up to \$5,000 annually and Federal grazing revenues of \$350.	Annual local sales of less than \$5,410 and Federal revenues of up to \$350 would continue, but Federal revenues of up to \$228,450 from mineral leasing would be foregone. Local benefits of up to \$5,000 and Federal grazing revenues of up to \$350 from rangeland developments would also be lost. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

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Quality Standards and State regulations, and visibility is good.

The area is presently classified as Class II air under the Prevention of Significant Deterioration (PSD) regulations as outlined by the Clean Air Act as amended in 1977. The BLM has no authority to change air quality classification as part of the wilderness study or any other study. Any further air quality reclassification is the prerogative of the State government, not of the BLM (USDI, BLM, 1982b). The closest Class I air quality area is 10 miles to the west in Bryce Canyon National Park.

Geology

Mud Spring Canyon WSA lies at the interface of the Canyonlands and High Plateaus sections of the Colorado Plateau Physiographic Province. The WSA is situated along the west side of the Kaiparowits Plateau. Exposed bedrock in the WSA consists largely of sedimentary rock of Cretaceous Age.

The eastern part of the Mud Spring Canyon WSA is predominantly rugged badlands of blue-gray shale and weakly cemented sandstone of the Kaiparowits Formation. The southern part of the unit is dominated by The Cockscomb which is a sharp, double-ribbed, north-south ridge. It is formed of steeply, eastward-tilted, resistant sandstone of the Wahweap and Straight Cliffs Formations. The Cockscomb is a major topographic feature in south-central Utah which begins within this tract and runs south along the East Kaibab Monocline to near the Arizona-Utah border. Within the WSA The Cockscomb has an average relief of 400 feet. The valley which dissects The Cockscomb is roughly 400 feet deep and forms the double ridges.

The western part of the unit is dominated by southwest-facing escarpments of resistant Wahweap and Straight Cliffs Sandstone and gently northeast-tilted benches. The benches have been dissected by southwest-trending drainages. The northwestern part of the WSA is the gently forested slopes of Canaan Peak. Right Hand Collet and Wahweap Creek head in the highly dissected Kaiparowits Formation on the south slope of Canaan Peak in the north-central part of the unit. Wahweap Creek then runs southward through Headquarters Valley where it leaves the WSA.

Soils

About 70 percent of the WSA consists of rock outcrop and badlands with intermixed undulat-

ing, very shallow to deep loam and sandy loam soils. These are highly dissected, and slopes are undulating to steep. Over one-third of the soils in the WSA are in the deteriorating, erosive or otherwise unstable condition due to steep slopes or soil properties that promote erosion. About 20 percent is undulating, very shallow to moderately deep, fine sandy loam and loam soils. These occur on the plateaus.

Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

The Paria and Escalante MFPs have identified a number of watershed treatment potentials for this WSA to mitigate erosion problems. These land treatment opportunities include 2,400 acres of pinyon-juniper chaining, 1,800 acres of sagebrush control, and 1,300 acres of watershed tillage practices.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	15,675	41	42,320
Moderate	1.3	18,500	49	24,050
Slight	0.6	3,900	10	2,340
Stable	0.3	0	0	0
Total		38,075	100	68,710

Sources: USDI, BLM, 1979a and 1979b; Leifeste, 1978.

Vegetation

The existing vegetation on the WSA is composed almost entirely of pinyon-juniper, with very small amounts of six other associations: sagebrush, saltbush, winterfat, greasewood, grassland, and ponderosa pine in small isolated areas. Limited riparian habitat is found along a few streams.

The pinyon-juniper type covers over 90 percent (34,268 acres) of the WSA and has a sparse understory of shrubs, including mountain mahogany, serviceberry, Gambel's oak, cliffrose and silver buffaloberry. In the north-central portion of the WSA, small stands of ponderosa pine are also found, with some Douglas fir, Englemann spruce, and white fir. Also within this area, below Canaan Peak, a mountain shrub understory occurs with bitterbrush in addition to the above species.

Sagebrush is the most dominant of the five minor associations. It occurs on flat areas in the central and northern areas and along the western slope of The Cockscomb. These areas are dominated by

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big sagebrush, associated with Mormon tea, globemallow, snakeweed, and various grasses.

No known threatened, endangered, or sensitive plants occur within the WSA.

The Mud Springs WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

Henrieville Creek and Little Creek are perennial streams totalling approximately 2 miles in the WSA. Water in these streams is not potable. Dry Valley Creek is a perennial water source and is probably potable near its headwaters. Horse Creek is an intermittent stream. There are six undeveloped springs known in the unit, all but one located on the WSA's periphery. There are seven BLM livestock water reservoirs in the WSA. Two existing private water rights, both held by the Town of Henrieville, are found on public land within the WSA. These claims are found in Sections 8 and 9 of Township 37 South, Range 1 West. Four reservoirs and two spring developments are proposed within the WSA.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3+ was assigned to the Mud Spring Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The

OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act [FLPMA]. BLM and the Secretary of the Interior will also consider available reports prior to making final wilderness recommendations.

The energy and mineral resource rating summary is given in Table 3.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c1	10 to 50 million barrels of oil; 30 to 300 billion cubic feet of gas
Uranium	f2	c1	Less than 500 tons of uranium oxide
Coal	f4	c4	250 million tons
Geothermal	f1	c2	None
Hydroelectric	f1	c4	None

Source: SAI, 1982.

¹ Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

² Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas (f3/c1)

Under the current land use plans all of the acreage within the unit is open to oil and gas leasing subject to the standard use stipulations (Category 1). At the present time there are 54 oil and gas leases covering 34,540 acres. Expired leases account for the remaining 3,535 acres which cannot be leased under a noncompetitive offer. The BLM's current policy is there will be no leasing in wilderness areas or WSAs. Approximately one-half of the leases are pre-FLPMA and one-half are post-FLPMA.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981b). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

Most oil and gas production in southern Utah is from the Paradox Basin, about 125 miles east of Mud Spring Canyon WSA. The only current oil production from south-central Utah comes from the Upper Valley Field located about 1 mile north of the WSA. In addition, minor amounts of oil have been produced intermittently from two fields in southwestern Utah.

Oil and gas exploration in southern Utah has been centered in the Paradox Basin and peaked in the late 1950s and early 1960s with the discovery of

the giant Aneth Field in 1956 and the Lisbon Field in 1960. Since then, sporadic wildcat drilling (which has recently increased) has located some small fields, but no major discoveries have been made. The Upper Valley Field was discovered a short distance to the north in 1964 after activity in similar anticlinal structures in south-central Utah, but to date no commercial oil and gas potential has been identified in the WSA. Because of the proximity of the Upper Valley Field to the WSA, a detailed description of this field relates directly to the oil and gas favorability of the WSA.

Cumulative production through December 1975 at the Upper Valley Field was almost 15 million barrels of oil. Production is from four distinct zones within the Timpoweap Formation of Triassic Age and the Kaibab Formation of Permian Age (Sharp, 1976). The oil reservoir is located along the prominent Upper Valley anticline, but the producing area is offset from the crest of the anticline to the west flank and the southern-plunging nose. Sharp (1976) attributes this offset to a regional, southwest-directed hydrodynamic drive in the Kaibab Formation. If correct, oil accumulations in other anticlines within the region may also be displaced to the south.

The axis of the Upper Valley anticline plunges to the south and lies approximately .25 mile northeast of the WSA. Producing wells occur less than a thousand feet from the WSA. In all likelihood, Tenneco (the current operator) has defined the limits of this field through their exploration activities in the 1950s and 1960s.

The eastern-most portion of this unit has a low certainty (c1) for the occurrence of medium-sized (f3) oil and gas fields. A medium-sized oil and gas field normally consists of 10 to 50 million barrels of oil or, if gas, over 60 billion cubic feet. This area has a higher favorability than the rest of the WSA due entirely to its proximity to the Upper Valley Oil Field. This portion of the WSA is situated on the west limb of the Upper Valley anticline. Other areas in the WSA further to the west are probably too far down structure to be considered very favorable. As a result the remainder of the unit has a low certainty (c1) for the occurrence of small-sized oil and gas fields (f2). A small-sized oil and gas field would contain less than 10 million barrels of oil or no more than 60 billion cubic feet of gas.

Coal (f4/c4)

The Mud Spring Canyon WSA lies on the western side of the Kaiparowits Coal Field. Most of the WSA is underlain by the Kaiparowits, Wahweap,

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Straight Cliffs, Dakota, and Tropic Formations, all of Cretaceous Age. The Straight Cliffs, Dakota, and Tropic Formation rocks are all coal-bearing. In the area near the WSA, coal beds as thick as 11 feet have been measured (Doelling and Graham, 1972), and beds at least 4 feet thick crop out in the western part of the WSA in the upper part of the Straight Cliffs Formation (the Henderson coal zone in the John Henry Member). The Henderson coal zone incorporates the youngest (uppermost) coal-bearing rocks in this part of the Kaiparowits Coal Field (Doelling and Graham, 1972). It is estimated that the maximum depth to the Henderson coal zone is about 3,000 feet in the north-central part of the WSA. Deeper coal-bearing rocks occur in the lower part of the Straight Cliffs Formation, the Tropic Shale, and the Dakota Sandstone. There are no existing coal leases within the WSA.

With the exception of about 3,600 acres in the northwest portion, the entire WSA is underlain by minable coal (Doelling and Graham, 1972). Estimates of minable coal are available for only about one-third of the WSA. If the distribution of coal is assumed to be similar throughout the minable coal area, the WSA would contain an estimated 250 million tons of coal reserves, of which one-third to one-half would be minable (83-125 million tons).

The amount of overburden increases from less than 1,000 feet to over 3,000 feet from west to east across the WSA. As a result, only the coal reserves with less than 1,000 feet of overburden in the western portion of the WSA are considered to have a significant potential for development.

One underground mine complex would probably be sufficient for development of the coal reserves in the WSA. Such a complex would require an estimated 500 acres for developmental facilities (USDI, BLM, 1976). No constraints were placed upon the area through application of the coal unsuitability criteria (USDI, BLM, 1980c).

Developmental drilling, such as a closely spaced drilling program, could require more surface area than actual mine development. The extent of such a drilling program would depend largely on the lenticular nature of the coal beds.

LOCATABLE MINERALS

Uranium (f2/cl)

The favorability for economic uranium occurrence within the WSA is low (SAI, 1982). The Colorado Plateau is one of the major uranium-producing regions in the United States. The most

important deposits occur in conglomerates, sandstones, and mudstones within the Morrison Formation of Jurassic Age and in the basal part of the Chinle Formation of Triassic Age. Minor production has also been obtained locally from rocks of Permian, Cretaceous, and Eocene Age. By far the most productive areas of the plateau are in northern New Mexico and southeastern Utah (U.S. DOE, 1979; Doelling, 1975).

The following rock units are considered favorable for uranium in south-central Utah (U.S. DOE, 1979): the basal members and the Petrified Forest Member of the Chinle Formation (Triassic) and the Salt Wash Member of the Morrison Formation (Jurassic). The Morrison Formation thickens to the east from the vicinity of south-central Utah and, according to SAI (1982), the Morrison Formation has been removed by pre-Dakota erosion in the immediate area of the Mud Spring Canyon WSA. However, small erosional remnants of the Morrison may be preserved at depth along the east side of the WSA. The depth to the favorable part of the Chinle Formation varies from over 6,000 feet along the east side of the WSA to about 3,000 feet along the west side of the WSA (Hintze, 1973).

Based on the above discussion, the entire WSA would have a low certainty (c1) to contain only small deposits (f2) of uranium oxide (less than 500 tons). The Chinle host rock lies at depths ranging from 3,000 to 6,000 feet throughout the WSA with the shallower depths occurring in the western-most areas. As a result, if deposits of this size were to occur within the WSA, they would be much more likely to be economic in the shallower or western-most portions of the WSA. Although surface requirements for underground deposits of this size are difficult to estimate they would probably be somewhat less than the areal extent of the deposit. No mining claims are found in the WSA.

WILDLIFE

Due to the many different habitat types within the area it is assumed that a diversity of vertebrate species are present. The habitat types are: ponderosa pine, pinyon-juniper, sagebrush, desert shrub, cliffs, riparian, and a very small area of mountain shrub. Riparian habitat is located along Henrieville Creek, Little Creek, Dry Valley Creek, and Upper Wahweap Creek. These habitat types may support up to 50 species of mammals, 168 species of birds, 26 species of reptiles, and 8 species of amphibians. However, no inventory has

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been done to determine if these species actually exist. No sport fish are found within the WSA. No crucial habitat nor management facilities have been identified.

Game species known to be present in the unit include mule deer, black bear, cougar, cottontail rabbits, blue grouse, Gambel's quail, mourning doves, and bandtailed pigeons. No threatened, endangered, or sensitive species are known to inhabit the WSA. No critical wildlife habitat has been identified in the WSA.

There are 1,000 acres of land treatment identified for wildlife habitat improvement within the WSA. Approximately 800 acres of this total were also identified for treatment by other resources (range and/or watershed). These treatments consist of both pinyon-juniper chaining and seeding and sagebrush treatment and seeding.

Forest Resources

In the Mud Spring Canyon drainage, ponderosa pine, Douglas fir, Englemann spruce, and white fir, are associated with the pinyon pine and Utah juniper. There was commercial ponderosa cutting in this area in the early 1960s. However, this area is currently identified as noncommercial.

The largest part of the WSA, approximately 90 percent, is composed of the pinyon-juniper ecotype. It is characterized by a dominant overstory of pinyon pine, Utah juniper, and scattered Gambel's oak. Slightly over half of this area is sparse, having a crown cover of 17 percent or less. The remainder of this woodland type, comprising some 30 percent of the entire unit, is quite dense, with a canopy cover exceeding 17 percent. This portion of the unit lies west of The Cockscomb and south of the area of ponderosa pine stands centered on the Mud Spring drainage.

Although there are currently no recognized stands of commercial timber in the WSA, the area is suitable for firewood, post cutting and Christmas tree cutting. A small amount of these resources has been utilized in the past.

Livestock and Wild Horses/Burros

Twenty-nine operators graze cattle within the five allotments within the WSA. Approximately eight percent of the total vegetative community is suitable for livestock grazing while five percent is potentially suitable. (Refer to Table 4 for livestock grazing use data.) Although the majority of the WSA is unsuitable for grazing, all the allotments are grazed annually during allotted time periods.

There are approximately 250 AUMs within the WSA boundary. Two gap fences totaling .50 mile presently exist within the Headwaters Allotment. Mud Spring Allotment contains 2 miles of fence and seven reservoirs.

The Mud Spring Canyon WSA has a number of proposed range improvements recommended for development. They are as follows: 2,600 acres of land treatment (burnings, chaining, plowing and seeding), four reservoirs, two spring developments with water troughs, 1.50 miles of pipeline, and two fences totaling .50 mile. These projects would aid livestock management and double carrying capacity within the WSA.

There are no wild horses or burros in the WSA.

TABLE 4
Livestock Grazing Use Data

Allotment	Acres in WSA	Percent of WSA	AUMs in WSA	Season of Use
Headwaters	16,950	45	113	Yearlong
Mud Spring	12,525	33	82	Summer-Fall
Round Valley	5,425	14	35	Winter
Last Chance	2,600	7	17	Yearlong
Cottonwood	575	1	3	Fall-Winter-Spring
	38,075	100	250	

Sources: USDI, BLM, 1979a and 1979b.

Visual Resources

The BLM visual resource inventory classified approximately 34,300 acres as Class B and 3,775 acres as Class C scenery. Visual management is rated as Class III for 3,775 acres and Class IV for 34,300 acres. Refer to Appendix 7 for a description of BLM's VRM rating system.

Cultural Resources

A 1-percent area inventory has been completed in the area of the WSA. No significant cultural resources or potential for these resources are known to exist in the WSA at this time.

Recreation

Although the Mud Spring Canyon WSA offers some opportunities for both primitive and non-primitive types of recreation use, reliable data on existing visitor use are not available. The recreational use of the WSA is currently estimated at 100 visitor days annually. Approximately 5 percent of the use is attributed to primitive activities and

approximately 95 percent is attributed to recreational activities such as hunting and sightseeing that currently utilize vehicular access on existing ways.

All except 100 acres in the WSA are open to ORV use. On 100 acres, vehicles are restricted to existing roads and trails.

Big game hunting opportunities in the WSA are among the best in the Paria and Escalante Planning Units. However, big game populations are rated as moderated and shooting opportunities are poor. The overall success rate in the planning units is approximately 30 percent. Small game populations are generally low, with the area's quality lower than much of southwestern Utah. The hunting that does take place is primarily by local residents. The poor quality of the hunting experiences here would draw few, if any, outside hunters to the area. Upland game hunting, primarily for mourning doves, is generally similar to the rest of southwestern Utah. The opportunity for quail hunting is poor because of limited huntable populations.

The sightseeing attractions are primarily geologic. One area of interest is a fold in Henrieville Creek along the northwest boundary of the WSA. The major geologic sightseeing attraction in the unit is the East Kaibab monocline or The Cockscomb. A portion of these sightseeing attractions is visible to motor vehicle tourists from adjacent boundary roads.

Wilderness Values

SIZE

The size of the WSA is 38,075 acres. It is approximately 12 miles long (north to south) and 11 miles wide (east to west).

NATURALNESS

All 38,075 acres are natural. Substantially unnoticeable imprints include several fences and reservoirs and ways (3 miles).

The WSA's high quality of naturalness has not changed since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the BLM's *Interim Management Policy* (USDI, BLM, 1979b).

SOLITUDE

The WSA affords outstanding opportunities for solitude that are most closely identified with both

topographic and vegetative screening situations. The size or configuration of this WSA neither enhances nor detracts from the outstanding opportunities for solitude present in the WSA.

Opportunities for solitude due to topographic screening are associated with three discrete terrain types in the WSA: the badlands of the Kaiparowits Formation, The Cockscomb, and the canyon dissected cliffline extending from Henrieville Creek to Horse Creek. In the badlands area, topographic screening is the only factor that contributes to the solitude opportunity.

The upper Cottonwood Canyon drainage immediately west of The Cockscomb possesses both topographic and vegetative screening situations that, in combination, offer a superior opportunity for solitude.

The sites and sounds of human activities are not present from most places within the WSA. From the top of The Cockscomb, vehicular activity on the Cottonwood Wash road can be observed.

It would be easy for a visitor to find seclusion in The Cockscomb, badlands, and clifflines of the WSA. In the remainder of the WSA, seclusion would be much more difficult to find.

Solitude is thus located in three discrete sections of the WSA. The badlands area possesses 7,300 acres of this characteristic. The Cockscomb-Cottonwood Wash section includes 4,100 acres. The cliffline sections exhibit 6,600 acres. Thus, solitude is found on a total of 18,000 acres of the WSA. The remaining 20,075 acres do not meet this criterion.

PRIMITIVE AND UNCONFINED RECREATION

It is the array of five distinct potential activities (hiking, backpacking, horseback riding, hunting, and rock climbing) that contributes to the area's diversity and, consequently, the outstanding opportunities for primitive and unconfined recreation. The opportunity for primitive recreation within the WSA is outstanding in those areas where this diversity occurs.

The opportunity for backpacking is enhanced by the variety of terrain. These terrain features include the badlands in the eastern portion of the WSA, The Cockscomb, the escarpments and benches northwest of Horse Creek, canyons (particularly Wiggler Wash Canyon, Mud Spring Canyon, an unnamed canyon west of Mud Spring Canyon, an unnamed canyon southeast of Henrieville Creek, and Upper Little Creek Canyon), the waterfall and relict areas in Dry Valley Creek

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Canyon, and the forested upper Mud Spring Canyon and Wiggler Wash Valleys.

The opportunities for hiking and hunting exist throughout the WSA. By their very nature, these activities would be area extensive in this WSA, and it would be difficult to identify any specific areas where some form of hunting or hiking could not occur.

The rock climbing activity is localized within the WSA and is found in the west and central areas of the WSA. Some of the more impressive cliff faces in the WSA are found above Henrieville Creek, on the escarpment between Henrieville Creek and Dry Valley Creek, and on the walls of Dry Valley Creek Canyon. The east ridge of The Cockscomb also presents rock climbing opportunities.

Horseback riding is limited in the WSA. Much of the terrain that offers good photographic, botanical, or geological sightseeing opportunities cannot be negotiated on horseback. Several areas that do contain horseback riding opportunities under primitive conditions include Little Creek, the upper reaches of Mud Spring Canyon and Wiggler Wash, and the bench above these canyons.

Primitive recreation opportunities on 14,600 acres of the WSA meet the outstanding criterion for lands under wilderness review, while the remaining 23,475 acres do not meet the standards.

SPECIAL FEATURES

The WSA possesses both scientific and scenic special features. A waterfall blocks the entrance to Dry Valley Creek Canyon and, consequently, the canyon remains in its natural condition. The canyon exhibits a perennial stream which cuts through alluvial benches. Although no ecological studies have been made of this canyon, it is relict and probably possesses important scientific values. The canyon bottom is small and embraces approximately 200 acres.

The portion of The Cockscomb within the WSA is considered to possess exceptional scenic values. In the WSA, The Cockscomb forms two parallel knife-edged ridges with a bisecting V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. Approximately 4,100 acres of The Cockscomb Formation possess these scenic values.

Land Use Plans and Controls

The WSA lies within the BLM Escalante and Paria Planning Units which are being managed under

the land use decisions of the Escalante and Paria MFPs (USDI, BLM, 1981a and 1981c). The present principal use within the WSA is livestock grazing. The WSA encloses 3,041 acres of State land within its boundaries. State lands are managed by the State Land Board for the purpose of generating revenues for the public school system.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

The *Garfield County Master Plan* (Five County Association of Governments, 1984) recognizes the need for designating outstanding wilderness areas and has recommended that 142,653 acres in the County be designated by Congress. However, none of the Mud Spring Canyon WSA was recommended. The Master Plan recommends all other Federal lands be managed for multiple use.

The "Kaiparowits Coal Development and Transportation Study for Southern Utah" (Environmental Research and Technology, Inc., 1980) identified a number of transportation corridors and truck haul routes. The objective of the study was to identify possible areas for construction and operation of future coal transportation systems within the restrictions of general environmental and engineering constraints. Corridor segments were required to contain at least one potential route for a railroad or coal slurry pipeline. Specific routes, however, were not identified. By selecting corridors between 2 and 15 miles in width, maximum flexibility for future location of specific routes was maintained. Corridor C13 would encompass the entire WSA. However, the WSA does not extend across the entire width of this corridor. The study stated that natural topographic features, such as The Cockscomb, would be avoided by the proposed coal slurry or railroad lines. The Union Pacific Railroad (1980) has identified a specific route that is needed for a spur line into the Kaiparowits Coal Field. According to their engineer's report this line would cross through the WSA just east of "The Gut" in the southern portion of the unit. This route has been delineated by their engineering reports and is on file with the BLM.

Although the Forest Service does not border the WSA, it comes within .25 mile of its boundary.

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Under its RARE II Study, the Forest Service found the Canaan Peak unit to be unsuitable for wilderness designation.

SOCIOECONOMICS

The Mud Spring Canyon WSA is located in both Garfield (22,500 acres) and Kane (15,575 acres) Counties, Utah.

DEMOGRAPHICS

Garfield and Kane are rural counties having average population densities of less than one person per square mile. This density is very low when compared to the Statewide average of 17 persons per square mile (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Much of the population in these counties is concentrated in small communities rather than being evenly distributed throughout the area.

EMPLOYMENT

The economies of Kane and Garfield Counties are somewhat similar in structure, both being dominated by the government sector and having strong service sectors in terms of employment (USDC, Bureau of Economic Analysis, 1982). The three major sectors of the Garfield County economy in terms of 1980 employment are: government (20 percent), construction (18 percent), and services (13 percent). The three most important sectors of the Kane County economy in terms of 1980 employment are: government (17 percent), retail trade (17 percent), and services (14 percent) (USDC, Bureau of Economic Analysis, 1982). Table 5 presents employment and personal income estimates for the two counties.

Three communities, Cannonville, Henrieville, and Tropic, are all located within 17 highway miles of the WSA. The total population for these three communities is estimated at 640 (USDC, Bureau of the Census, 1981). It is difficult to estimate current employment and income in the communities of Cannonville, Henrieville, and Tropic due to the lack of information at the municipality level and restricted disclosure nature of the available data. It is assumed that most of the employment and income in the area are based in the agriculture and services sectors. This is based on the available countywide data (Five County Association of Governments, 1982) and the low number of retail trade outlets, government offices, and major industries in the area. The services sector is expected to be a dominant sector because of the importance of services in the nearby community

TABLE 5
1980 Employment and Personal Income
Garfield and Kane Counties, Utah

Industrial Sector	Garfield County		Kane County	
	Employment	Personal Income (\$1,000)	Employment	Personal Income (\$1,000)
Total	2,143	24,792	1,452	12,595
Proprietors	349	2,637	382	2,623
Farm Proprietors	209	807	122	2,487
Nonfarm Proprietors	140	1,830	260	2,487
By Industry Source				
Farm	27	949	27	382
Nonfarm	1,767	23,843	1,043	12,213
Private	1,332	19,049	798	9,614
Ag. Serv., For., Fish., and Other	(L)	79	(L)	0
Mining	208	4,222	17	196
Construction	379	5,536	51	1,544
Manufacturing	247	3,294	70	566
Nondurable Goods	(D)	(D)	(D)	(D)
Durable Goods	(D)	(D)	(D)	(D)
Transportation and Public Utilities	84	1,545	150	1,875
Wholesale Trade	(L)	96	12	230
Retail Trade	126	1,302	252	2,364
Finance, Insurance, and Real Estate Services	16	189	39	392
Government and Government Enterprises	270	2,786	202	2,427
Federal, Civilian	435	4,794	245	2,599
Federal, Military	140	1,656	18	252
State and Local	24	64	30	78
	271	3,074	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

of Escalante. The local school system dominates services employment in Escalante and is expected to do so in the communities of Cannonville, Henrieville, and Tropic. Recreation use that does occur probably has little impact on the local economies. It is, however, likely that recreationists in the WSA occasionally purchase supplies such as groceries and gasoline in the nearby communities.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, mineral leasing, livestock production, and recreation. Table 6 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The geophysical exploration which has been conducted in the WSA has generated some temporary local employment and income.

TABLE 6
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$103,620
Mineral Production	0	0
Livestock Grazing	\$5,000	\$350
Woodland Products	0	0
Recreational Use	Less than \$410	0
Total	Less than \$5,410	Up to \$103,970

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

No mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed significantly to local employment or income.

Twenty-nine livestock operators have a total grazing privilege of 250 AUMs within the WSA. If all this forage were utilized, it would account for \$5,000 of livestock sales and \$1,250 of ranchers' returns to labor and investment.

Some woodland products have been harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use is very low and related local expenditures are minimal. The WSA's motorized recreational use and related local expenditures are also 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 statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Mud Spring Canyon WSA is estimated as about 100 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane and Garfield Counties.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 6).

Fifty-four leases in the WSA cover approximately 34,540 acres. At \$3 per acre, lease rental fees generate up to \$103,620 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 250 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$350 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment,

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qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to coal, oil and gas, and locatable mineral exploration and development. Even though the area would be open to resource use and development without control for wilderness protection, no major changes are foreseen in the near future. This is due to the WSA's rough terrain and access to markets. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: coal, 1,900 acres; oil and gas, 310 acres; and uranium, 20 acres. (Appendix 10 lists surface disturbance assumptions and estimates.)

The BLM has also proposed in its land use plans to treat 5,700 acres for wildlife, watershed, and livestock purposes. The 5,700 acre figure is used for analysis purposes, but the probability of such extensive land treatment is low.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If coal is developed, air quality could be reduced up to the PSD Class II limitations. Disturbance from 2,230 acres due to mineral development would result in increases in fugitive dust emissions. The severity of the impact would depend on reclamation measures and the extent of area disturbed at one time. There would be slight increases in fugitive dust during the chaining, plowing, seeding, and watershed tillage work on 5,700 acres of pinyon-juniper and saltbrush, but these increases are not expected to exceed air quality standards.

GEOLOGY

No significant impacts to geology are expected from surface disturbances associated with uranium, and oil and gas exploration and development activities. Subsidence and fracturing of geologic formations due to coal development could occur, however the extent is unknown.

SOILS

It is estimated that up to 2,230 acres of soil could be disturbed by mineral exploration and devel-

opment. Assuming that all disturbance would occur in areas with critical erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 2,230 acres would increase from 6,021 cubic yards/year to 12,042 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA due to mineral development would increase by approximately 6,021 cubic yards (9 percent) over current annual soil loss. This increase could impact downstream facilities. The amount of damage that would occur is unknown. The 5,700 acres of vegetative manipulation would cause a temporary (2 to 3 year) increase in soil loss. However, once the new seedings were established, reductions from the current rate of soil loss would be expected.

VEGETATION

The anticipated maximum of 2,230 acres disturbed by mineral development would not significantly impact the area's vegetation. Approximately 90 percent of the WSA has a pinyon-juniper cover and most of the surrounding area also has the same cover. Loss of 2,230 acres of pinyon-juniper cover (5 percent of the WSA) would be insignificant due to the large areas of similar vegetation. The 5,700 acres of land treatment could alter the WSA's vegetation from a pinyon-juniper to a grassland type on the treated acres. No threatened, endangered, or sensitive plants occur in the WSA.

WATER RESOURCES

Sedimentation or change in total dissolved solids (TDS) is expected to occur from the 2,230 acres of surface disturbance due to mineral development. The amount of change is unknown, but all projects would have to meet State water quality standards. Subsidence from coal mining could disrupt surface flows and allow surface water to be injected into ground water reservoirs. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFPs for the Escalante and Paria Planning Units. The chaining, plowing, reseeding, and tillage of 5,700 acres of pinyon-juniper and sagebrush could cause a temporary (2 to 3 year) increase in TDS. However, after the new seedings were established, water quality would improve.

Coal exploration and development in the area could impact ground water currently used for

municipal water because coal mining would be by underground methods and could disrupt aquifer flow. The extent, however, is unknown. Other surface-disturbing activities would not impact ground water significantly.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The potential for up to 10 to 50 million barrels of oil in-place (3 to 15 million estimated recoverable) and up to 60 to 300 billion cubic feet of natural gas (18 to 90 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 stipulations, and would not be affected by the adoption of this alternative. Approximately 310 acres of surface disturbance would take place if exploration and development were to occur. Because oil production is occurring one mile north of the WSA and there is a potential for medium-sized deposits within the WSA, there is a moderate probability of oil and gas production (3-15 million barrels of oil and 18-90 billion cubic-feet of natural gas) from the WSA.

Coal

An estimated coal resource of 125 million tons of recoverable coal is found within the WSA. None of the coal is presently leased. This resource could be explored and potentially developed in the future and would not be affected by this alternative. It is estimated that up to 1,900 acres of surface disturbance would occur from coal development. The likelihood for production of coal in the near future is thought to be low because of accessibility and poor markets. However, SAI (1982) indicates that the probability of coal being developed here is high in the long term.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location and the potential deposit of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, and the depth of the potential resource).

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of reservoirs and the improvements and maintenance of springs. The 1,000-

acre proposed land treatment would improve wildlife habitat (primarily for deer). The livestock and watershed vegetation manipulations could have a beneficial impact to wildlife by opening up closed pinyon-juniper communities. However, disturbance of an estimated 2,230 acres (6 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer and mobile nongame animals would be dispersed from the area for the lifetime of these activities. Less mobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels.

FOREST RESOURCES

Since there are no commercial forests and only pinyon and juniper, none of which is utilized (except by occasional campers or hikers), no significant impacts to forest resources are expected. The areas disturbed by mineral exploration and development would be rehabilitated and, consequently, have only a minor impact. The land treatments proposed would eliminate some of the WSA's pinyon-juniper and replace it with grass.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Escalante and Paria Planning Unit MFPs. The 250 AUMs currently allocated in the WSA are controlled by 29 livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected. The four proposed reservoirs, two spring developments, 1.50 miles of pipeline, .50 mile of fence, and 2,600 acres of land treatment could be developed. This would result in improved livestock distribution and would double the WSA's carrying capacity.

VISUAL RESOURCES

Under this alternative 5,700 acres of vegetation manipulation or watershed tillage would occur and 2,230 acres of mineral-related exploration and development are possible. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity. VRM objectives would probably be met in VRM Class III areas. After rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole.

CULTURAL RESOURCES

Cultural resource values in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 2,230 acres from mineral exploration and development and 5,700 acres from land treatment and watershed tillage under this alternative could affect cultural resources. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

The quality of a user's primitive recreational experience would be reduced by surface-disturbing activities. Under this alternative, 5,700 acres of vegetation manipulation and watershed tillage would occur and mineral-related exploration and development are possible on 2,230 acres. If roads, vehicular ways, and drill pads are located throughout the WSA (worst-case analysis), primitive recreational opportunities could be lost in the area altogether. However, roads and ways created for energy and mineral exploration and development would improve access into the area for nonprimitive recreation.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 100 current visitor days per year to 149 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 5 visitor days per year to about 7 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing etc.) would increase from 95 visitor days per year to 142 visitor days.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing

Escalante and Paria Planning Unit MFPs. Expected mineral and energy exploration and development could disturb an estimated 2,230 acres and land treatments and watershed tillage would also disturb 5,700 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. The impacts to these values probably would be significant due to the large amount of surface disturbance anticipated. The 2,230 acres of mineral-related surface disturbance and 5,700 acres of proposed land treatments could result in a significant loss of naturalness and solitude throughout the WSA as a whole if roads, vehicular ways, and drill pads are located throughout the area.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane and Garfield County Master Plans* which recommend multiple use, and it would complement the nonwilderness designation for the adjacent Forest Service Canaan Peak area. This alternative is based on implementation of the current BLM Escalante and Paria Planning Unit MFPs and is, therefore, in conformance with them. The No Action Alternative would be consistent with State of Utah plans and policies which emphasize economic return.

SOCIOECONOMICS

Under this alternative, no changes are expected in existing patterns and trends of population, employment, and local income distributions in the near future. 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 coal, oil and gas, and uranium in the WSA were developed it would lead to a significant increase in employment and income for Garfield and Kane Counties. The probability of economic development of minerals within the WSA is moderate to high (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 (250 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed land treatments could double the WSA's carrying capacity and produce new allocated forage which could result in \$5,000 of livestock sales and \$1,250 of ranchers' returns to labor and investment.

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As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 49 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 3,535 acres in the WSA open to oil and gas leases that are currently not leased; the entire WSA could be leased for coal. If leased, up to \$124,830 additional Federal lease fee revenues per year would be realized, in addition to new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$350 per year) would continue. The additional 250 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by \$350 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (38,075 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 38,075-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 3 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I. The proposed vegetative manipulations on 5,700 acres would not be allowed.

For the following analysis, it is assumed that mining claims would be staked before wilderness designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities and that coal would not be leased. Oil and gas leases would not be renewed and future leasing of oil

and gas or coal would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas due to mineral exploration and development for this alternative would be smaller than under the No Action Alternative (20 vs. 2,230 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, forest, and cultural resources under the All Wilderness Alternative would be insignificant. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

Under this alternative, soil resources would benefit because of the reduction of potential surface-disturbing activities. Estimated surface disturbance would be reduced from 2,230 acres in the No Action Alternative to 20 acres, resulting in 11,930 cubic yards less soil loss. However, the proposed watershed land treatments on 4,200 acres and 1,300 acres of watershed tillage would not be allowed. The WSA's watershed would be negatively affected because the present erosion rate would continue. The potential for improvement of the watershed by tillage and vegetation treatment would be lost.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur. Disturbance to surface water from coal development would not occur.

The assumed mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells and would not significantly impact ground water. Disturbance to ground water aquifers from coal development would not occur.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 34,540 acres are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA. Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued.

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Exploration for and development of a potential resource of up to 10 to 50 million barrels of oil in-place and 30 to 300 billion cubic feet of natural gas (3 to 15 million barrels of oil and 18 to 90 billion cubic feet of natural gas that is recoverable) could be foregone under this alternative. The potential for development is moderate in this WSA.

Coal

The entire WSA has potential for coal development. There are no coal leases presently within the WSA and none would be issued before the time of designation. Wilderness designation would preclude development of 250 million tons of coal, of which 125 million tons would be recoverable.

The potential for this resource to be developed in the near future is low. However, if a transportation system is constructed to haul coal out of the Kaiparowits area, this coal resource would become much more valuable and have a high probability of development.

Locatable Minerals

There are presently no mining claims in the WSA. Up to 500 tons of recoverable uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 500 tons of uranium oxide would be foregone. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, water is a limiting factor for wildlife in this WSA. If

future water improvements were curtailed and the four proposed livestock reservoirs and two spring developments were not constructed, potential habitat for deer and nongame species would be reduced. If the proposed 1,000 acres of land treatment were not completed, wildlife would also be negatively impacted.

In addition, disturbance due to exploration of locatable mineral resources could disrupt wildlife populations and result in these species leaving the area. However, the estimated disturbance is much lower under this alternative than in the No Action Alternative. Overall, this alternative would have a negative impact on wildlife.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Escalante and Paria Planning Unit MFPs. The 250 AUMs currently allocated in the WSA are controlled by 29 livestock permittees. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on the management of livestock grazing is expected.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to preserve wilderness values. In the case of the four reservoirs, two spring developments and 1.50 miles of pipeline proposed, which of these would be allowed, if any, is unknown since each would be considered on a case-by-case basis. The proposed 2,600 acres of land treatment would not be allowed. Overall, this alternative would have a negative impact on livestock.

VISUAL RESOURCES

A benefit would occur to the visual resources of the WSA because the VRM classes would change from Classes III and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities.

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 20 acres of surface disturbance from mineral and energy exploration and development

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would be degraded, and VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control 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 95 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Approximately 3 miles of way would be closed. Because there are other similar areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the vicinity of the WSA.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values. If roads and drill pads are located in several locations within the WSA, impacts to primitive recreation would be greater.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of recreational values.

WILDERNESS VALUES

Designation and management of all 38,075 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive recreation. Solitude would be preserved on approximately 18,000 acres that meet and 20,075 acres that do not meet the standards for outstand-

ing solitude. Naturalness would be preserved on all 38,075 acres and primitive and unconfined recreation would be preserved on 14,600 acres that meet and 23,475 acres that do not meet the standards for outstanding opportunities. The scientific and scenic special features in this WSA would also be protected and preserved.

No development of leases is foreseen under this alternative. The anticipated mineral-related surface disturbance would, therefore, be reduced from 2,230 acres to 20 acres for development of valid mining claims. The 5,700 acres of land treatment would also not be allowed. Mitigation to protect wilderness values would be considered during mining claim development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of these values in the area as a whole.

Outstanding opportunities for five recreational activities (backpacking, hiking, horseback riding, hunting, and rock climbing) would be preserved. Although recreational use could increase (refer to Recreation section above), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Thus, it is concluded that wilderness designation and management of all 38,075 acres of the Mud Spring Canyon WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 18,000 acres) and primitive recreation (outstanding on 14,600 acres) except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

This alternative would not complement the non-wilderness designation for the Forest Service's Canaan Peak, RARE II study area located .25 mile north of the WSA. The existing BLM Escalante and Paria Planning Unit MFPs do not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Paria and Escalante MFPs.

The *Kane County Master Plan* recommends multiple use of public lands in the entire county, and the *Garfield County Master Plan* recommends multiple use in the portion of Garfield County encompassed by this WSA. This alternative would not totally conflict with the multiple-use concept

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since many existing resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development. Coal leasing would not be allowed and oil and gas leases would not be reissued. If State lands within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns.

Designation of Mud Spring Canyon WSA as a wilderness area would impact a portion of a proposed railroad or slurry pipeline corridor (C13) between the Alton and Kaiparowits Coal Fields (Environmental and Research Technology, Inc., 1980). According to railroad officials the route, because of rugged terrain, must pass through the southern portion of the WSA just east of the "The Gut." Thus, designation of the WSA would severely restrict the development of this rail line to Milford or Cedar City.

SOCIOECONOMICS

Overall there would be no immediate 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 6) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate to high (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas 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 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 Alternative. Because the potential for development is high for coal, it is estimated that potential mineral-related local income would be significantly reduced by wilderness designation. It would preclude coal development within the WSA and hinder transportation of coal resources from other points within the Kaiparowits Coal Field.

Livestock use and ranchers' income would continue as at present with \$5,000 of livestock sales and \$1,250 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. If these projects were to be implemented and the additional forage used, ranchers' returns to labor and investment would increase by \$5,000.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light (95 visitor days per year). The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 34,540 acres now leased would cause an eventual loss of up to \$103,620 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$124,830 annually in Federal revenues from the 41,610 acres that could be leased for oil and gas and coal without designation. In addition to these rental fees, any potential royalties from lease production and bonus bid revenues from new coal leases could also be foregone.

If the proposed range improvements are not developed and used, an estimated annual \$350 of Federal grazing revenues from 250 increased AUMs would be foregone.

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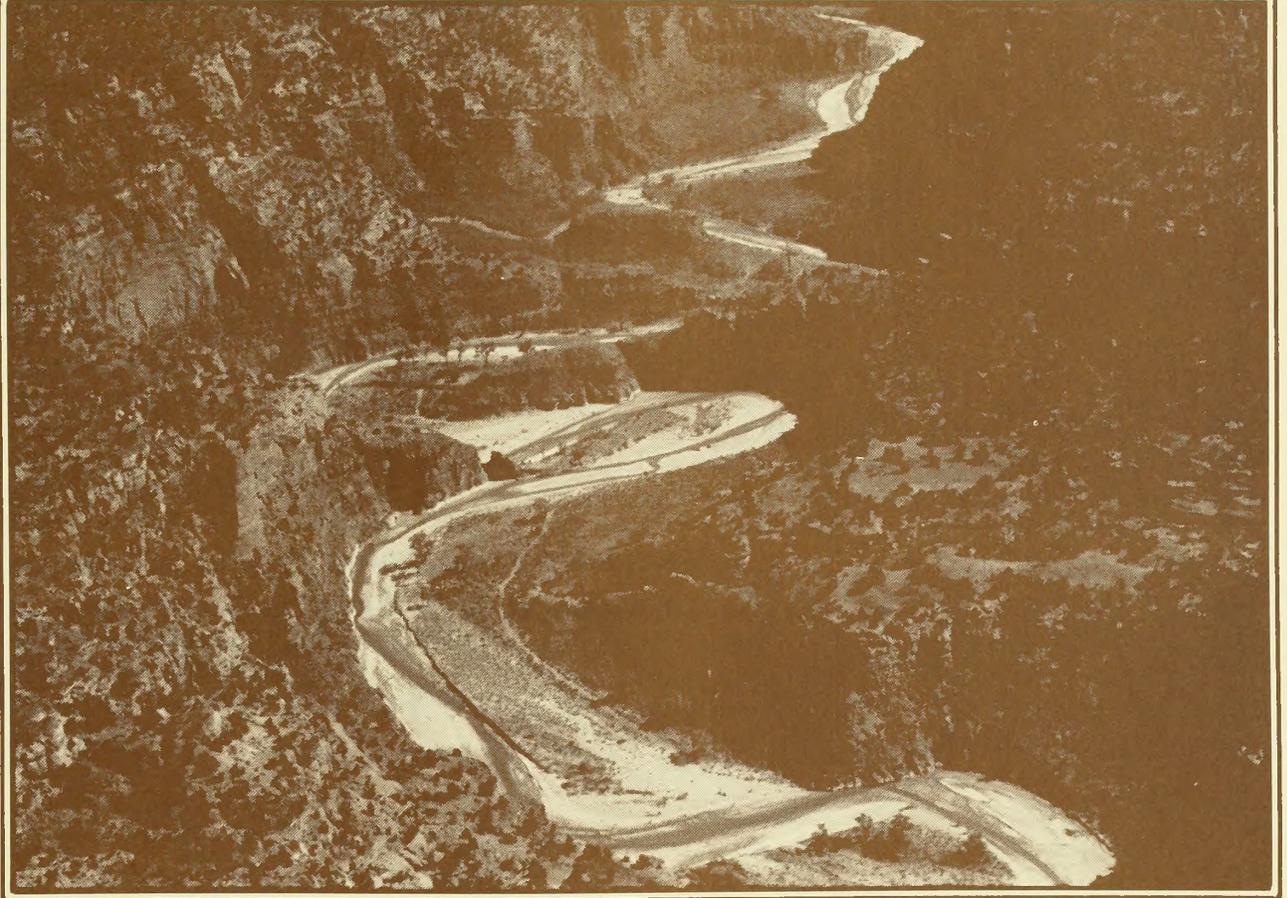
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Paria - Hackberry
WSA



PARIA-HACKBERRY WSA

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PARIA-HACKBERRY WSA

(UT-040-247)

INTRODUCTION

General Description of the Area

The Paria-Hackberry Wilderness Study Area (WSA) encompasses the Paria River and Hackberry Creek drainages between Highway 89 and Cannonville in Kane County, Utah. The WSA is located approximately 30 road miles northeast of Kanab, Utah. There are approximately 135,822 acres of public land, 8,371 acres of State land, and 40 acres of private land located within the WSA boundary.

A wide variety of topographic features are present, including plateaus and benches cut by the Paria River and its tributaries, the White Cliffs, the Vermilion Cliffs, The Cockscomb, and numerous unnamed arches. The dominant vegetation type is pinyon-juniper.

Average annual precipitation in the Paria-Hackberry WSA is 14 inches but varies somewhat from this figure throughout the unit due to its large size and variations in altitude. Highest monthly precipitation occurs from July through December, during which time two-thirds of the yearly total falls. Intensive thunderstorms are common during the summer months.

Temperatures vary greatly with aspect and altitude. July and January are the warmest and coldest months, respectively. July temperatures range from 50 degrees Fahrenheit (F) to over 100 degrees F, while the January range is from below 0 to 60 degrees F.

Specific Issues Identified in Scoping

The issues for the Paria-Hackberry WSA identified during the study phase center around the moderate potential for oil and gas discoveries within the unit, the proposed coal transportation corridor/rail line, and the large amount of land that does not meet the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964) definition. Other issues include the large amount of proposed land treatment, access to state lands having potential mineral value, off-road vehicle (ORV) use of the Paria River, and the potential for changing the air quality standards. Issues and concerns raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* There are serious water resource problems in this WSA related to salinity and sediment control.

Response: The Paria River is a major source of salinity to the Colorado River. The BLM has proposed various land treatments to reduce erosion from the WSA. These practices are described in the Affected Environment, Soils section and are analyzed in the Environmental Consequences section.

2. *Comment:* This area has valuable uranium potential.

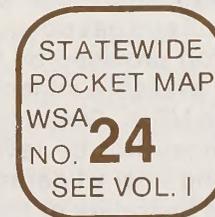
Response: The WSA has a low certainty for the occurrence of small uranium deposits (refer to Affected Environment, Mineral and Energy Resources section). There may be uranium claims within the WSA.

3. *Comment:* To maintain a viable deer population in this area, considerable range rehabilitation and water development are necessary. Water and land treatment will also be needed to satisfy livestock grazing demands when coal and other development takes place, even if it occurs in the distant future.

Response: A considerable amount of range rehabilitation is proposed in the Vermilion and Paria Management Framework Plans (MFPs) (USDI, BLM, 1981a and 1981b) for watershed, wildlife, and livestock grazing improvement. These proposals are described in the Affected Environment section and are analyzed in the Environmental Consequences section.

4. *Comment:* Developments for livestock grazing activities could conflict with wilderness designation in this WSA.

Response: Wilderness designation would preclude most land treatment proposals; however, development of facilities would be determined on an individual basis. Improvements would be allowed if they would not impair the WSA's wilderness values. Refer to Environmental Consequences, All Wilderness Alternative section.



5. *Comment:* The conflict with ORV use along the portion of the Paria River eligible for inclusion in the National Wild and Scenic Rivers system should be resolved in favor of wilderness.

Response: The BLM will consider the various land use conflicts during this study phase. At the conclusion of the Environmental Impact Statement (EIS) process, BLM will review and consider all of the information received and, at that time, will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy," (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

6. *Comment:* The description of recreational opportunities is inadequate. It fails to reflect that opportunities are complemented by those in the Cockscomb WSA, one powerline corridor away.

Response: The Paria-Hackberry WSA and The Cockscomb WSA are adjacent and only separated by a powerline. Recreation use, particularly ORV use along the Paria River bed, are complementary and the Cottonwood Canyon road provides access to both WSAs. Cumulative impact analysis of various wilderness proposals is discussed in Volume I.

7. *Comment:* The oil and gas potential of the WSA is ranked moderate by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be moderate to high. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

8. *Comment:* The remand decision found

outstanding opportunities for photography, yet the site-specific analysis (SSA) does not mention photography in the Recreation section. What does "optional scenic values" mean?

Response: This unit was not remanded. Photography is mentioned as an outstanding opportunity for primitive and unconfined recreation.

9. *Comment:* The beautiful area around the White Cliffs deserves protection from ORV intrusions.

Response: The impact of closing the area to ORV use is described in the Environmental Consequences, All Wilderness Alternative section.

10. *Comment:* The Glen Canyon National Recreation Area (NRA) 1972 Enabling Act (Lloyd Act) directed a study of proposed road alignment within and adjacent to the recreation area. If a road were constructed, it could impact this WSA.

Response: The National Park Service (NPS) study route D-3 follows the Cottonwood Wash Road and existing powerline. This road and powerline form the east boundary of the unit.

11. *Comment:* Land use conflicts would result from wilderness designation.

Response: The impacts of wilderness designation are described in the Environmental Consequences, All Wilderness Alternative section.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

During scoping, a second partial alternative was suggested to allow construction of a new road into Glen Canyon NRA. However, after reviewing the proposed route, it was determined that the road would not enter the WSA; therefore, consideration of another alternative was not necessary.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (135,822 acres); and (3) Partial Wilderness (59,270 acres). A description of each alternative follows. Where manage-

ment intentions have not been clearly identified, assumptions are made based on management projections under each alternative.

NO ACTION ALTERNATIVE

Under this alternative, none of the 135,822-acre Paria-Hackberry WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Paria and Vermilion Planning Area MFPs and the *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a).

The State lands within the WSA (refer to Map 1) have not been identified in the MFPs for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership. Refer to Volume I for further information on State in-holdings.

The following are specific actions that would take place under this alternative:

- All 135,822 acres would remain open to mineral location, leasing (with standard and special lease stipulations), and sale. Development work, extraction, and patenting would be allowed on the 39 existing (600 acres) and potential future mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809). The existing 92 oil and gas leases (91,422 acres) and future leases could be developed under leasing Category 1 (standard stipulations) on 73,578 acres and Category 3 (no surface occupancy) on 18,924 acres. Some 43,320 acres would be closed (Category 4) to oil and gas leasing. Unless an oil or gas find in commercial quantities is shown, approximately 2,650 acres of existing oil and gas leases would expire and would not be reissued in order to meet Category 4 restrictions. However, 3,370 acres presently unleased for oil and gas could be leased in the future.
- The present livestock grazing use of the 135,822-acre area in the WSA would continue as authorized in the MFPs and *Kanab-Escalante Grazing Management EIS* (1,695 Animal Unit Months [AUMs]). Planned new range developments, including 12,300 acres of land treatments, six fences totaling about 4 miles, eight slickrock catchments, eight spring developments with watering troughs, and 7 miles of pipeline

with watering troughs, could be implemented without wilderness considerations. Existing range developments would continue to be used and maintained as necessary without wilderness value considerations.

- Approximately 6,500 acres would be treated to improve the WSA's watershed condition. BLM planning recommends that 4,300 acres be improved through watershed tillage practices, 2,000 acres by chaining and seeding, and 200 acres by sagebrush control and seeding.
- The WSA would remain open to ORV use except on 66,200 acres where vehicle use is limited to existing roads and trails. This restricted area includes No Mans Mesa and the area from the Paria River east to Cottonwood Canyon. The 33 miles of existing ways would remain open to public use. New access could be developed. New water resource facilities or watershed activities would be allowed if in conformance with the MFPs. No facilities or activities are presently planned.
- Wildlife transplants and habitat improvements would be allowed if in conformance with the MFPs. Vegetation manipulation on 14,600 acres would be allowed. Approximately 8,700 acres of this total acreage are also recommended for livestock range improvement.
- Three undeveloped transportation corridors traverse the WSA and could be developed without concern for wilderness values. These corridors would mainly be used to transport coal from the Kaiparowits Coal Field.
- The entire 135,822-acre area would continue to be open to harvest of forest products; however, there is no harvest at the present time and none is planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (97,792 acres), Class III (13,582 acres), and Class IV (24,448 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on 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 to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

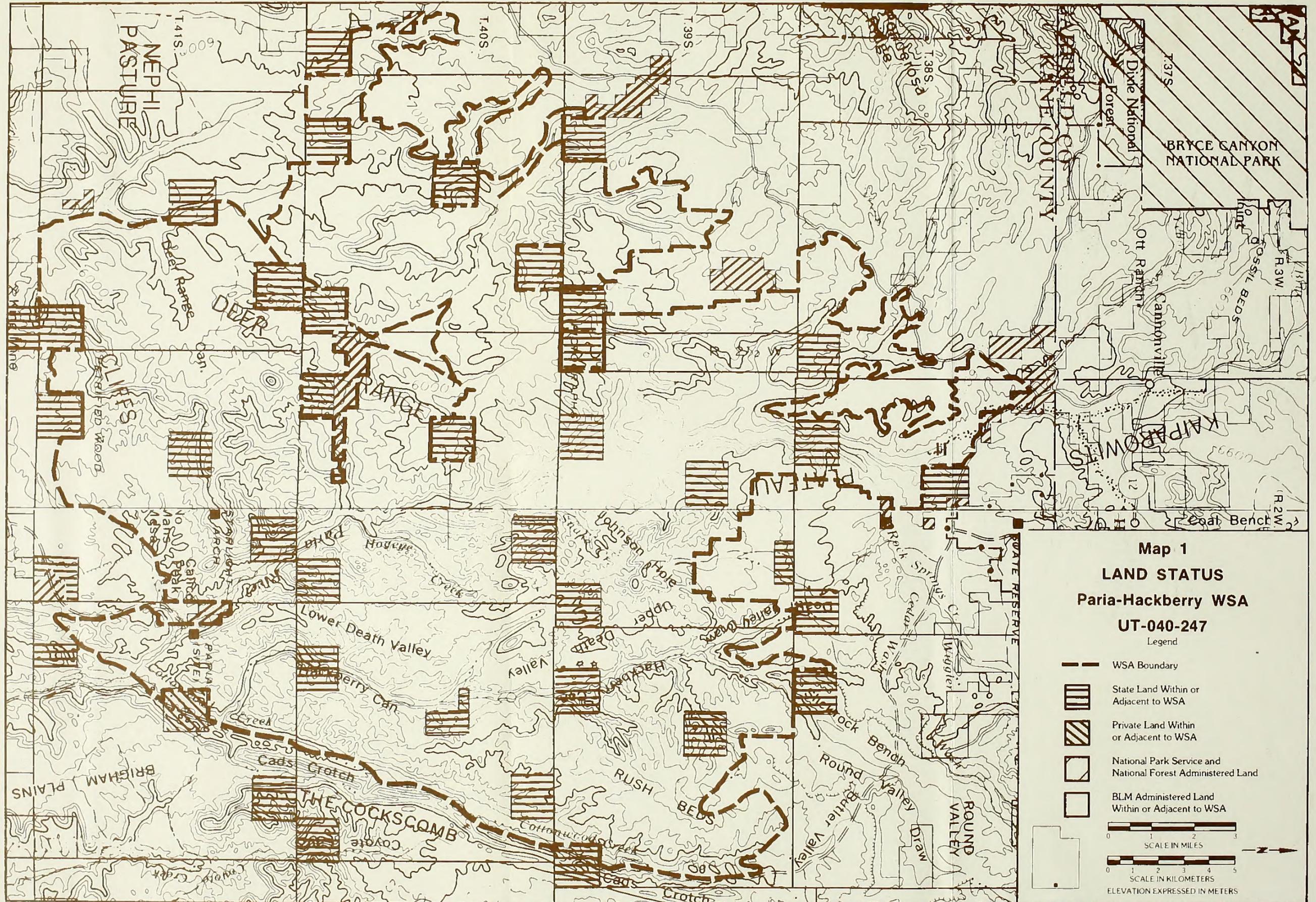
Under the All Wilderness Alternative, all 135,822 acres of the Paria-Hackberry WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981c) to preserve its wilderness character. Upon designation, acquisition of 8,371 acres of State land within the WSA is likely, and would be authorized by purchase or exchange. (Refer to Volume I for information regarding State in-holdings.) Seventeen State sections adjacent to the WSA likely would be exchanged (refer to Map 1). Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only.

taken under this alternative:

- After wilderness designation, all 135,822 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 600 acres of the 39 existing mining claims that may be determined to be valid. Existing oil and gas leases involving 91,422 acres would be phased out upon expiration unless an oil or gas find in commercial quantities is shown.
- Present livestock grazing would continue as authorized in the Paria and Vermilion MFPs and the *Kanab-Escalante Grazing Management EIS*. The 1,695 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 would continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new livestock facilities

and range developments would be allowed only if consistent with wilderness protection standards (refer to Appendix 1). Several developments currently planned and identified in the No Wilderness Alternative might be allowed after wilderness designation. However, land treatments for livestock (burnings, chainings, spraying, and seeding) proposed on 12,300 acres in the WSA would not be allowed.

- New water resource facilities or watershed activities would be allowed after designation only if compatible with wilderness values, needed to correct imminent hazards to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. There are 6,500 acres of land treatment proposed for watershed purposes.
- Three undeveloped transportation corridors cross portions of the WSA. Designation of the Paria-Hackberry WSA as wilderness would prohibit development of these corridors, and other routes would be needed to remove coal from the Kaiparowits Coal Field.
- Wildlife transplants and habitat improvements would be allowed after designation if compatible with wilderness values. However, plans to improve 14,600 acres of wildlife habitat (chainings, burnings, spraying, and seeding) would not be allowed. The livestock and wildlife vegetation treatment areas overlap on 8,700 acres.
- The entire 135,822-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 33 miles of existing vehicular ways would not be available for vehicular use. About 4 miles of "cherry-stemmed" roads within the WSA would remain open to vehicular use. About 27 miles of the WSA boundary follow existing gravel roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 135,822-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel



Map 1
LAND STATUS
Paria-Hackberry WSA
UT-040-247

Legend

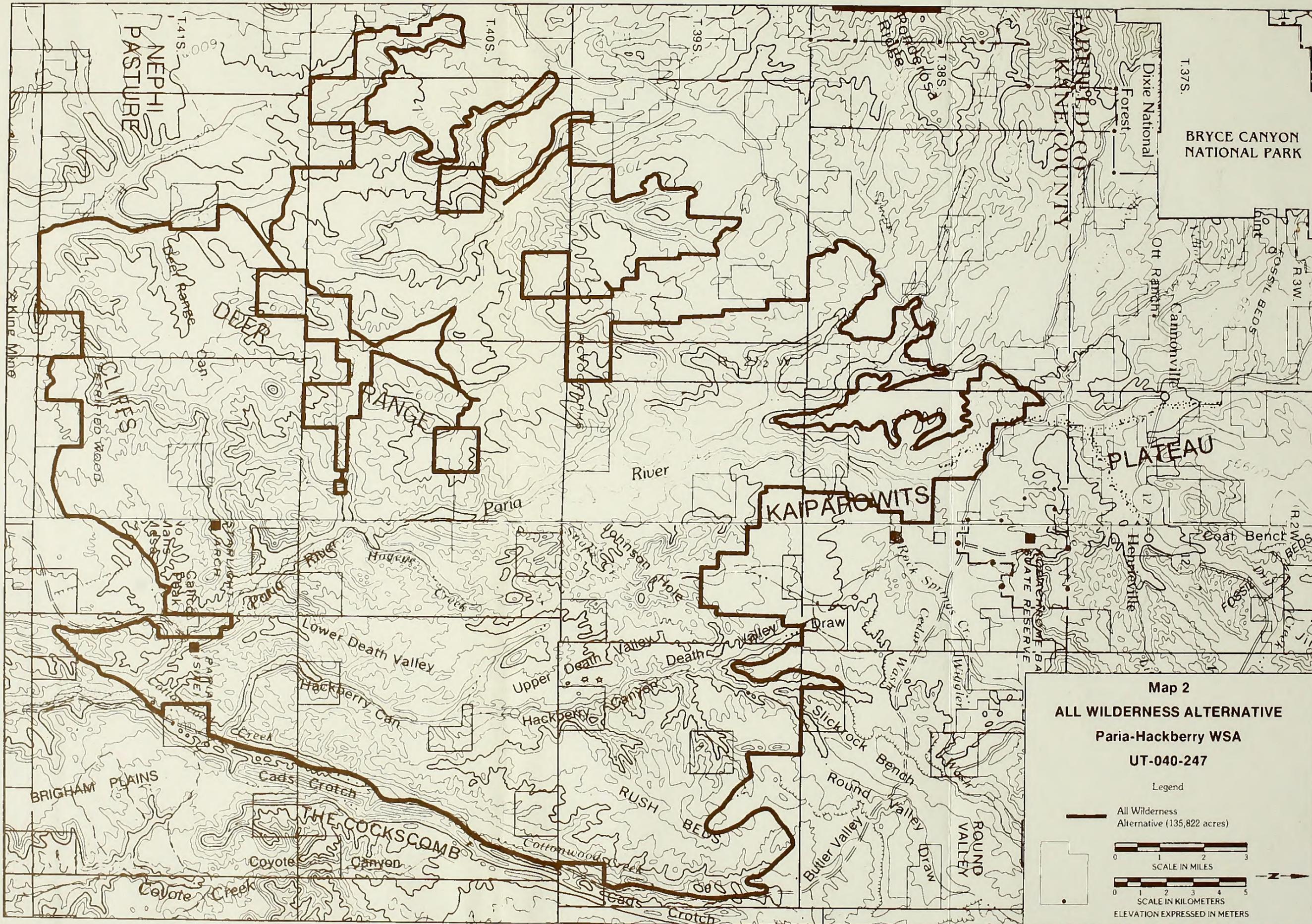
- WSA Boundary
- State Land Within or Adjacent to WSA
- Private Land Within or Adjacent to WSA
- National Park Service and National Forest Administered Land
- BLM Administered Land Within or Adjacent to WSA

SCALE IN MILES
 0 1 2 3

SCALE IN KILOMETERS
 0 1 2 3 4 5

ELEVATION EXPRESSED IN METERS

PARIA-HACKBERRY WSA



Map 2
ALL WILDERNESS ALTERNATIVE
Paria-Hackberry WSA
UT-040-247

Legend

— All Wilderness Alternative (135,822 acres)

0 1 2 3
SCALE IN MILES

0 1 2 3 4 5
SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS

surface.

- 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. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 135,822 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 135,822-acre area would be taken 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. It is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the wilderness area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. 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 area.

**PARTIAL WILDERNESS ALTERNATIVE
(PROPOSED ACTION)**

For the Partial Wilderness Alternative, 59,270 acres of the Paria-Hackberry WSA would be

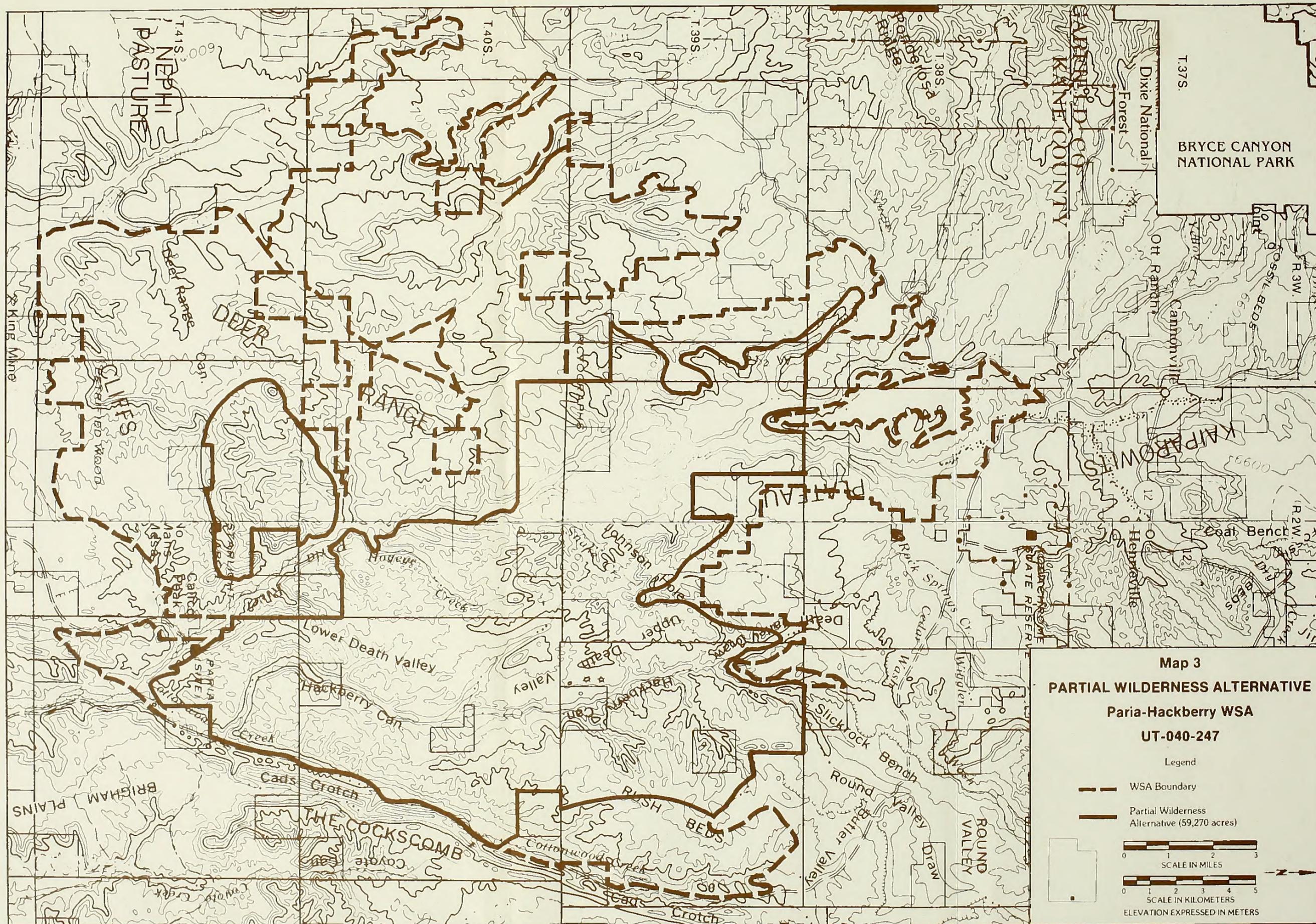
designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA with the most outstanding wilderness values and to reduce resource conflicts. The 59,270 acres analyzed as wilderness under this alternative include the area east of the Paria River (except for the Rushbeds area), Starlight Canyon, and the Bull Valley Gorge areas. The 76,552 acres within the WSA but outside of that designated as wilderness would be managed in accordance with the Paria and Vermillion Planning Unit MFPs and the *Kanab-Escalante Grazing Management EIS*, as described for the No Action Alternative. The 59,270-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy," as described in the All Wilderness Alternative. This alternative would likely involve Federal acquisition of seven sections of State land by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) The nine State sections adjacent to this alternative likely would be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 59,270-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 four existing mining claims (80 acres), provided that they are valid. The existing oil and gas leases, covering 20,600 acres, would not be reissued upon expiration unless a find in commercial quantities is shown. The 76,552-acre area not designated wilderness would be open to mineral location, leasing, and sale. Development work, extraction, and patenting of existing (35 claims) and future mining claims could occur if claims are valid. The area not designated as wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on about 70,000 acres, Category 3 (no surface occupancy) on about 4,552 acres, and Category 4 (no leasing) on 2,000 acres. Development of existing oil and gas leases (70,822 acres) and future leases could be developed without concern for wilderness values.
- Livestock grazing would continue in the 59,270-acre wilderness area. The 1,695

AUMs would remain available to livestock as presently allocated. The use and maintenance of range developments existing at the time of designation could continue in the same manner as in the past based on practical necessity and reasonableness. After designation, new developments would be allowed on a case-by-case basis if necessary for range and/or wilderness resource protection and management. Several developments are currently proposed and include 4 miles of fence, eight slickrock catchments, eight spring developments, and 7 miles of pipeline. However, proposed vegetation treatments for livestock range improvement on 6,300 acres would not be allowed. In the 76,552-acre nonwilderness area, grazing use would continue as authorized in the Paria and Vermilion Planning Unit MFPs and the *Kanab-Escalante Grazing Management EIS*. New range development and land treatment proposals could be developed in this area without concern for wilderness values.

- In the 59,270-acre wilderness new water resource facilities or watershed activities would be allowed only if compatible with wilderness, necessary to correct imminent hazards to life or property, or authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. Approximately 900 acres of the 6,500 acres proposed for land treatment for watershed improvement would not be allowed. In the remaining 76,552-acre nonwilderness area, water resource developments would be allowed if in accordance with the Paria and Vermilion MFPs.
- That portion of the three undeveloped transportation corridors that traverse the wilderness area would not be developed. That portion outside of the wilderness area, but within the WSA, could be developed, allowing for a transportation corridor through the Paria Box.
- In the wilderness area, wildlife transplants or habitat improvements would be allowed if compatible with wilderness values. Vegetation manipulation would not be allowed on 9,800 acres proposed for land treatment. In the remaining nonwilderness area, wildlife transplants or habitat improvements including vegetation manipulation would be allowed without concern for wilderness values.
- The wilderness area would be closed to ORV use. About 3.50 miles of existing ways would not be available to vehicular use. No "cherry-stemmed" road would remain within the wilderness area. The remainder of the unit, including the existing roads that border the WSA, would remain open to vehicular travel, although use would be restricted to existing roads and trails on 16,200 acres.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 59,270-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the 59,270-acre wilderness area would not be allowed except for harvest of pinyon nuts or non-commercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 76,552 acres would be open to woodland harvest.
- 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 remaining acres would be managed as VRM Class II, III, and IV as outlined in the Paria and Vermilion Planning Unit MFPs.
- Within the wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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. It is assumed that firefighting would be limited to hand and aerial methods. In the nonwilderness area measures of control would be taken without wilderness considerations.
- In the nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the wilderness area, such activity would be allowed by permit provided it would be compatible with wilderness protection. Information gathering would be limited to that conducted without use of



motorized equipment or construction of temporary or permanent structures.

- Hunting would be allowed subject to applicable State and Federal laws and regulations in the nonwilderness area. In the wilderness, hunting would be subject to applicable laws and regulations but would be limited to nonmotorized means.
- Throughout the 76,522-acre nonwilderness area control of predators would be allowed without wilderness consideration to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 59,270-acre wilderness area, control of predators would be allowed to protect such wildlife species or livestock, but only under conditions that would assure minimal disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

No measurements of air pollution or visibility levels have been made in the immediate area of the WSA; however, data collected from various sites (Page, Arizona and Four Mile Bench, Kane County, Utah) indicate the air is generally free of pollutants and within National Ambient Air Quality Standards and State regulations.

The area is presently classified as Class II air under the Prevention of Significant Deterioration (PSD) regulations as outlined by the Clean Air Act as amended in 1977. The BLM will not consider nor recommend any change in air quality classification as part of the wilderness study or wilderness recommendations. Any further air quality reclassification is the prerogative of the State government, not of the BLM. (USDI, BLM, 1982b).

The nearest Class I air quality area is Bryce Canyon National Park, approximately 6 to 10 miles northwest of the WSA.

Geology

The Paria-Hackberry WSA is in the Canyonlands Section of the Colorado Plateau Physiographic Province. The tract is a typical example of this landform, characterized by plateaus and benches sharply cut by the Paria River and its tributaries. The surface of the plateaus and benches form knobs, domes, and aprons of white Navajo Sandstone. Sandy pockets and sand dunes lie between these sandstone features. The exposed bedrock consists largely of the Glen Canyon Group of Triassic-Jurassic Age and the Carmel Formation of Jurassic Age. Typical rock units include the Moenave and Chinle Formations.

Petrified wood deposits are located just west of the Old Paria Townsite and in Hackberry Canyon. Both of these deposits are within the Chinle Formation.

The highest elevation is approximately 7,200 feet and is found on top of No Man's Mesa along the White Cliffs in the west-central part of the WSA, and also at another point several miles farther north along the top of the White Cliffs overlooking Deer Creek Canyon. The lowest elevation is approximately 4,700 feet and is found along the Paria River in the extreme southern portion of the WSA.

Topography in the northern part of the tract is dominated by the White Cliffs of Navajo Sandstone. Canyons in the Navajo Sandstone tend to be sharply cut and narrow.

A number of natural arches are found in the unit. Sam Pollock Arch is located near the head of a tributary drainage of Hackberry Canyon while Starlight Arch is located on the west boundary of Little No Man's Mesa and the east boundary of Pilot Ridge. Also there are a few more unnamed arches found within the Paria Canyon system. Their exact locations have not yet been identified.

Other topographic features include Mollie's Nipple, No Man's Mesa, and The Cockscomb. Mollie's Nipple is an erosional remnant which is a major landmark in the WSA. No Man's Mesa is a 2,000-acre flat-topped isolated mesa standing nearly 1,000 feet above surrounding lands. The Cockscomb is a small portion of the East Kaibab monocline representing 150 million years of sedimentation.

Soils

Approximately 47 percent of the WSA consists of rock outcrop, predominantly sandstone with

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
PARIA-HACKBERRY WSA**

Resource	Alternatives		
	No Action	All Wilderness (135,822 Acres)	Partial Wilderness Designation (59,270 Acres) (Proposed Action)
Mineral and Energy Resources	Potential recovery could be achieved for up to 3 to 15 million barrels of oil, 18 to 90 billion cubic feet of natural gas, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. The loss of development opportunity for uranium would not be significant.	Up to 2 to 8 million barrels of oil, 10 to 50 billion cubic feet of natural gas, and 280 tons of uranium oxide could be recovered.
Wildlife	About 0.24 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Land treatments on about 10.7 percent of the WSA would benefit wildlife.	Wildlife would benefit from solitude, but land treatments that would improve wildlife habitat would not be allowed and the overall effect would be negative.	Wildlife in the designated area would benefit from solitude. About 0.2 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat. Land treatments on about 2.6 percent of the nondesignated portion would benefit wildlife.
Livestock	Grazing of 1,695 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of eight spring developments, eight catchments, 4 miles of fences, 9 miles of pipelines, and 12,300 acres of land treatments, could be implemented, increasing AUMs by about 1,230.	Grazing of 1,695 AUMs and maintenance of existing developments would continue. Little effect on existing management is expected, but proposed new developments might not be allowed, which would adversely affect livestock management. Potential for at least 1,230 additional AUMs would be lost.	Grazing of 1,695 AUMs and maintenance of existing developments would continue. About 6,000 acres of proposed land treatments would be in the undesignated portion and could be allowed. Potential for 630 additional AUMs would be lost.
Visual Resources	The quality of visual resources could be impaired on up to 25,030 acres.	Visual quality could be impaired on 20 acres.	Visual quality could be impaired on up to 11,790 acres, including 80 acres in the designated portion. About 61 percent of the Class A scenery would be within the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 33 miles of ways at current low levels. Overall recreational use could increase from the present 300 visitor days per year to 450 over the next 20 years. Up to 330 acres of mineral-related disturbance and 24,700 acres of land treatments could reduce the quality of primitive recreation.	The WSA, including 33 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV recreational use could continue on 29.5 miles of ways in the undesignated portion.

PARIA-HACKBERRY WSA

TABLE 1 (CONTINUED)
 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
 PARIA-HACKBERRY WSA

Resource	Alternatives		
	No Action	All Wilderness (135,822 Acres)	Partial Wilderness Designation (59,270 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 25,030 acres (18.4 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 20 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on up to 80 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on 15 percent of the 76,552 acres not designated. Overall, wilderness values could be lost on 8.7 percent of the WSA. Approximately 44 percent of the area meeting the standards for naturalness, 57 percent of the area meeting the standards for outstanding opportunities for solitude, and 70 percent of the area meeting the standards for outstanding opportunities for primitive recreation would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, potential Kaiparowits transportation corridors, and the current BLM Paria and Vermilion MFPs.	This alternative would not be consistent with Kane County's concept of multiple use, or potential Kaiparowits transportation corridors. It would be consistent with State policy if lands were exchanged. Designation would constitute amendments of the BLM Paria and Vermilion MFPs.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with potential transportation corridors.
Socio-economics	Annual local sales of less than \$39,030 would continue. Land treatments could increase local sales by up to \$24,600. Federal revenues would decrease by \$7,950 due to phasing out of oil and gas leases to meet category restrictions. However, an additional \$11,190 per year in Federal revenues could be derived from leasing of presently unleased areas. Overall oil and gas lease fees could increase by up to \$3,240 per year and Federal grazing revenues could increase by \$1,722 per year due to additional forage production from land treatments.	Annual local sales of less than \$39,030 and Federal revenues of up to \$2,373 would continue, but potential Federal revenues of up to \$279,228 from mineral leasing and grazing fees and increases in local sales of \$24,600 from range improvements would be foregone. The opportunity for future energy and economic mineral development and local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that potential annual Federal revenues from oil and gas leasing and grazing fees would be reduced by up to \$43,542. Range improvements could provide up to an additional \$12,000 per year in local sales and \$840 in Federal grazing fees.

some shale and siltstone. The bulk of the remaining soils are well drained, moderately undulating to moderately rolling, very shallow to moderately deep with loamy sand or gravelly fine sandy loam surface layers.

Approximately 72 percent of the unit is classified as having moderate erosion susceptibility while only 13 percent is classified as being critical. Current erosion is primarily geologic in origin. Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	17,250	13	46,580
Moderate	1.3	98,172	72	127,620
Slight	0.6	18,250	13	10,950
Stable	0.3	2,150	2	650
Total		135,822	100	185,800

Sources: USDI, BLM, 1979a and 1978b; Leifeste, 1978.

The MFP has identified a number of watershed treatment potentials for this WSA to mitigate erosion problems. These land treatment opportunities include 4,300 acres of watershed tillage practices, 2,000 acres of pinyon-juniper chaining and seeding, and 200 acres of sagebrush control and seeding. These projects have been identified as being necessary and will be completed as money becomes available.

Vegetation

Existing vegetation in the WSA is largely composed of one vegetative association—pinyon-juniper woodland (105,352 acres, 78 percent) with some ponderosa pine and lesser amounts of other associations. These include sagebrush (9,810 acres, 7 percent), saltbush (670 acres, less than 1 percent), and mountain shrub (340 acres, less than 1 percent). Slightly over 1 percent of the WSA is barren (1,500 acres) and 13 percent (17,650 acres) steep and rocky with very little sparse vegetation.

Riparian vegetation is found along the Paria River and in Hackberry and Cottonwood Canyons; approximately 50 miles or 500 acres of riparian vegetation comprise less than 1 percent of the total vegetative cover.

The Paria-Hackberry WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) types of the WSA are juniper-pinyon woodland and saltbush-greasewood. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

No known threatened or endangered plants occur within the WSA. However, one plant, *Psoralea pariensis* (Paria scurfpea), found within the WSA is currently under status review by the Fish and Wildlife Service (FWS). A relict plant association is found on top of Little No Man's Mesa. Such sites are of scientific value in determining the effects of land management practices.

Water Resources

The primary drainages in the WSA include the Paria River, its major tributary Hackberry Creek, and their numerous tributaries. There are no continuously gauged streams within the WSA, but there is a continuously recording gauge located at the mouth of the Paria River near Lee's Ferry, Arizona. The average annual discharge is 26 cubic feet per second. The vast majority of this discharge passes through the Paria-Hackberry WSA.

There are 24 undeveloped springs in the WSA (three of questionable reliability). Ten of these springs are in the upper Paria drainage, six in Hackberry, five along the east border of Cottonwood Canyon, and three others along the western boundary. There are approximately six developed springs in the WSA. Five wells are found in the WSA; three are along the periphery in Cottonwood Canyon and two are in Hackberry Canyon. Paria, Hackberry, and Cottonwood Canyons all contain perennial streams within the WSA boundaries. There are about 85 miles of streams in the WSA of which 50 miles are perennial and 35 are intermittent. Two reservoirs are within the WSA, located southwest of the Paria Townsite. Water quality is generally poor and not recommended for human consumption without treatment. Present use is primarily for wildlife and livestock.

The Paria River is one of the major sources of nonpoint salinity and sediment to the Colorado River. It carries more sediment per acre of drainage area than any other river in the United States.

The reduction of the Colorado River's sediment and salinity is of national importance due to treaty obligations with Mexico. The Bureau of Reclamation, the agency responsible for reducing Colorado River sediment and salinity, has yet to evaluate the Paria River for possible control measures.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3+ was assigned to the Paria Hackberry WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The energy and mineral resource rating summary is given in Table 3.

Mineral development companies with an interest in the WSA were asked to evaluate the WSA's mineral favorability. Two responses were received; both generally agreed with the SAI's projections. The one exception was coal. One of the industry respondents indicated a moderate favorability for coal while the other supported the SAI's projection of low favorability. In the absence of any supporting justification, the WSA is assumed to have a low favorability for coal.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c1	Less than 10 to 50 million barrels; of oil; less than 60 to 300 billion cubic feet of gas
Uranium	f2	c2	Less than 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f1	c2	None
Hydroelectric	f2	c4	.05 to 15 megawatts

Source: SAI, 1982; U.S. DOE, 1983.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas (f3/c1)

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981c). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

There are 92 oil and gas leases within the WSA. Thirty-one of these leases were issued prior to FLPMA. The remaining 61 leases were issued after this date. These leases cover 24,655 acres (18 percent of the WSA) and 66,767 acres (49 percent of the WSA), respectively. There are currently 120 acres under lease application. Lands within the WSA fall under three different oil and gas leasing categories. They are as follows: Category 4, not open for leasing, 43,320 acres (32 percent); Category 3, open to leasing, no surface occupancy stipulations, 18,924 acres (14 percent); and Category 1, open to leasing without special stipulations, 73,578 acres (54 percent).

The oil and gas favorability appears to be low (f2) within the western part of the WSA and moderate (f3) within the northern and eastern parts of the WSA. The northern part of the WSA is considered favorable because of the combination of folds and a southward pinchout of Pennsylvanian rocks. The eastern side is favorable because of abundant folds (Paria, Butler Valley, Cockscomb). The western side is somewhat less favorable because the rocks are relatively flat lying and have been disrupted by young faults (late Cenozoic).

Certainty of occurrence of oil and gas is low. One exploratory well showing no oil and gas was completed in 1930, but it may not have tested the most favorable rock units since completion techniques and positioning may have been inadequate at that time (SAI, 1982).

LOCATABLE MINERALS

There are 19 mining claims located entirely within the WSA. There are an additional 20 claims that lie along the boundary of the WSA and are partially in the tract. All claims are located in a small area in the extreme northeastern portion of the tract. The minerals for which these claims were made are not known, but it is assumed these claims were made for uranium or gypsum, a common mineral resource in the vicinity of the WSA. All claims were staked after the passage of FLPMA in 1976.

Uranium (f2/c2)

According to the U.S. DOE (1983) none of the WSA is coincident to an area classified as a potential resource area. The U.S. DOE (1983) has assigned the WSA a relatively low certainty (c2) for the occurrence of small uranium deposits (f2). Favorable host rocks (the Moenave and Chinle

Formation) crop out over a large area within the WSA, especially in the southern portion. Deposits situated in this portion of the WSA would have an economic advantage over more deeply buried deposits due to their shallow depth and would, therefore, have a greater potential for development.

Other Minerals

Petrified wood can be found within the WSA on both public and State lands. There are currently two gemstone leases on State lands within or adjacent to the WSA boundary. No commercial sales of this material have been made from public lands.

Wildlife

The Paria-Hackberry WSA has habitat that could support 40 species of mammals, 140 species of birds, 12 species of reptiles, and three species of amphibians. Since no wildlife inventory has been made in the WSA, it is unknown how many species actually inhabit the area. The speckled dace is the only fish species present. No critical wildlife habitat has been identified in the WSA. There are no sensitive, threatened, or endangered species in the WSA.

Game species in the WSA are mule deer, cougar, cottontail rabbit, and mourning dove. Mule deer occur in the WSA from late fall to late spring, usually in the vicinity of pinyon-juniper habitat. A few cougar move into the WSA during the winter, where they occupy pinyon-juniper and rocky habitats. Cottontails are yearlong residents throughout the WSA. Mourning doves are common throughout the WSA from May to September. The lack of water in portions of the WSA limits wildlife populations.

There are 13,800 acres of pinyon-juniper chaining identified for deer habitat improvement within the WSA. Approximately 8,700 acres of this total acreage were also recommended for treatment to improve livestock range. There were also 800 acres of desert shrub treatment and seeding recommended in the Paria Planning Unit MFP to improve wildlife habitat.

Forest Resources

The majority of the WSA is composed of the pinyon-juniper ecotype. It has forest resources suitable for firewood, posts, pine nuts, and Christmas tree cutting. However, because of the area's lack of access and the same resources being available elsewhere, there is little use of

PARIA-HACKBERRY WSA

these forest resources at the present time. There are scattered ponderosa pines in the WSA but no commercial quality stands exist.

Livestock and Wild Horses/Burros

Thirty-nine operators graze cattle within the 11 allotments found in the unit. However, 25 of these operators use only small portions of the Headwaters and Dry Valley Allotments which contain very little forage. There are approximately 1,695 AUMs within the WSA boundary. The following existing range improvements are located within the WSA boundary: 21 miles of fence, six spring developments, two reservoirs, and two corrals. The Paria River bed and Hackberry Canyon have historically had vehicle usage to facilitate livestock operations.

The WSA also has a number of proposed range improvements recommended for development by the Paria Planning Unit MFP. They are as follows: 12,300 acres of land treatment (burnings, chaining, spraying, and seedings), six fences totaling about 4 miles, eight slickrock catchments, eight spring developments with watering troughs, and approximately 7 miles of pipeline with watering troughs. Approximately 8,700 acres of the proposed land treatment acreage (12,300 acres) were also recommended to restore wildlife habitat (refer to Wildlife section).

There are no wild horses or burros within the WSA.

Visual Resources

The BLM visual resource inventory classified approximately 97,800 acres as Class A, 35,000 acres as Class B, and 3,000 acres of the WSA as Class C scenery. The Paria-Hackberry WSA is large and possesses a variety of landscape features. Many of these features are of high scenic value. (For a discussion of the area's scenic value, refer to Special Features, Wilderness Values, Affected Environment section.) VRM Class ratings are Class II, 97,792 acres (72 percent); Class III, 13,582 acres (10 percent); and Class IV, 24,448 acres (18 percent). (Refer to Appendix 7 for an explanation of BLM's VRM rating system.)

Cultural Resources

No sampling inventory for archaeological and other cultural resources has been conducted in the Paria-Hackberry WSA, and there is only a small amount of intensive inventory work within the unit. Pictograph panels can be found in Deer

Creek Canyon and petroglyphs are located in Snake Creek Canyon.

Based on knowledge of significant archaeological sites to the east and west of the unit, the WSA has the potential for significant cultural resources. Until the necessary extensive inventory work is completed, however, the actual resources will remain unknown.

Recreation

Although the Paria-Hackberry WSA offers opportunities for both primitive and nonprimitive types of recreation use, reliable data on existing visitor use are not available. However, in 1976 a traffic counter at the Old Paria Townsite/Movie Set adjacent to the WSA gave an estimate of 6,000 visitors to the site. The WSA was at least viewed by these visitors but probably very few hiked into the unit. Similarly, the east face of the WSA receives heavy sightseeing use by motor vehicle tourists traveling the Cottonwood Wash route between Bryce Canyon National Park and Glen Canyon Dam. The Paria River bed is open to ORV travel, and some recreational ORV use does occur presently on the river. Use is undoubtedly the heaviest in the Paria Box area, but recreationists from Tropic Valley communities also use the upper end of the Paria River in the WSA. Groups and individuals do occasionally travel the entire length of the Paria River by ORVs. BLM has received requests from nearby communities who wish to sponsor off-road events through the WSA. Backcountry use of the WSA is low and is estimated by BLM recreation specialists to be approximately 200 visitor days annually. Most of this backcountry use is probably attributable to dayhikes by tourists on the Cottonwood Wash Road or at the Old Paria Townsite/Movie Set. It is assumed that limited overnight use is occurring in Hackberry Canyon and the lower Paria River Canyon.

ORV use designations put approximately 66,200 acres of the WSA, including No Man's Mesa and the area from the Paria River east to Cottonwood Canyon, in the limited to existing roads and trails category. The Paria River bed is open to ORV travel, and the remainder of the WSA is an open zone for ORVs. None of the WSA is currently closed completely to ORV travel. It is estimated that ORV use accounts for 100 visitor days annually.

A number of factors theoretically influence future recreation use of this WSA. These factors include the area's characteristics, availability of substitute areas, population distribution about the area,

tastes and preferences, and income and leisure time. Because of the Paria-Hackberry WSA's site characteristics and ease of local access, higher levels of nonprimitive recreational use can be expected. Given the availability of the Paria Canyon-Vermillion Cliffs Wilderness Area immediately south of the WSA, primitive recreation use may not increase significantly. Inquiry experience at the Paria Ranger Station indicates that nonlocal public awareness of the WSA is presently low compared to the nonlocal awareness of the Paria Canyon-Vermillion Cliffs Wilderness Area.

The Paria River, from the Colorado River to its source, has been identified by the National Park Service (NPS) as possessing values that may be of national significance and, therefore, as having the potential to be included in the National Wild and Scenic Rivers System. The BLM must, as part of its Environmental Protection Review process, avoid or mitigate adverse impacts to the river and consult with the NPS before taking any action which could foreclose wild, scenic, or recreational river status (Council on Environmental Quality, 1980). Approximately 25 miles of the Paria River are within this unit.

Wilderness Values

SIZE

The size of the WSA is 135,822 acres. It extends 23 miles in a north-south direction and 19 miles in an east-west direction.

NATURALNESS

The WSA is natural with only minor imprints of man. Imprints of man that remain in the WSA include short drift fences, ways, log skid trails, corrals and sheds, and mining prospects. Prospects and associated ways are present below Pilot Ridge. The upper Rush Beds area contains ways, short fences, and corrals. Skid trails are present on the Deer Range and Calf Pasture Point benches. A way is present in the North Swag and Park Wash area. Another way is located on the

Deer Range ridge above Box Elder Canyon and South Swag. These imprints constitute less than 100 acres in the WSA.

In the Paria-Hackberry WSA, the high quality of naturalness has not changed since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980b) decision. No additional imprints have occurred in the WSA as a result of impairing uses or activities allowed under the BLM's *Interim Management Policy* (USDI, BLM, 1979b).

SOLITUDE

The WSA affords outstanding opportunities for solitude most closely identified with the topographic screening situations offered by the canyon-land landscapes in the WSA. The size of the WSA enhances the outstanding opportunities present. Configuration neither enhances nor detracts from the solitude. The outstanding opportunity for solitude is thus present somewhere in all landscapes of the WSA.

Where the WSA is not cut by canyons, the White Cliffs cliffline forms a very irregular but continuous barrier with a distinct vertical cliff face. These cliffs, plus the Vermilion Cliffs, form barriers and screens that provide opportunities for solitude.

No Man's Mesa, unlike the other benches in the area, is totally isolated by the White Cliffs. This island-like structure provides an exceptional opportunity for solitude.

Deer Range Canyon and its Tank Canyon tributary lack the typical features of other canyons of the area. However, they are long, winding, 300-to-400-foot canyons with broken walls and shrub and ponderosa pine vegetation screening. Topographic and vegetation screening combine here to create an excellent opportunity for solitude.

The large area between the Paria River and Cottonwood Wash constitutes another distinctive topographic component of the WSA. This area includes most of the Paria River Canyon; several east side tributary canyons, including Hogeeye and Snake Creek Canyons; Hackberry Canyon and its tributaries, including Death Valley and Round Valley Draws; Upper and Lower Death Valleys; and the Rush Beds and west escarpment of Cottonwood Wash. The area contains a mixture of entrenched canyons, flats with outcroppings of Navajo Sandstone slickrock and rimrock, several massive outcroppings of Navajo Sandstone in the form of domes and fins, "holes" of sandstone formations in the upper reaches of some drainages, and the dissected west escarpment of Cottonwood Wash. Opportunities for solitude are directly correlated with sandstone exposures in this area. Where the sandstone is absent, topographic screening is minimal.

Hackberry Canyon in its entirety possesses outstanding opportunities. All of Hackberry Canyon's upper eastern tributaries also possess this attribute. The western escarpment to Cottonwood Wash and most of the Rush Beds are characterized by exposed sandstone eroded into various complex topographic screening situations. Several benches and open flats on the

PARIA-HACKBERRY WSA

Hackberry Canyon-Cottonwood Wash divide lack sandstone exposures and do not exhibit outstanding opportunities for solitude.

Outside sights and sounds are an insignificant influence on solitude at present.

A visitor can easily find seclusion in certain locations where canyonlands physiography is exceptionally rough or complex. The lower Bull Valley Gorge-Johnson Hole area is perhaps the best location in the WSA where the sights and sounds of others could easily be avoided.

In summary, it is felt that approximately 89,300 acres (66 percent of the WSA) present outstanding opportunities for solitude. The areas of rough topography provide exceptional screening potential. The 89,300 acres of the WSA provide for a dispersion of visitors throughout.

PRIMITIVE AND UNCONFINED RECREATION

The WSA offers outstanding opportunities for hiking, backpacking, horseback riding, exploring, rockclimbing, sightseeing for geology, photography, and rockhounding for petrified wood and agates. Several of these activities (i.e., sightseeing for geology, photography, rockclimbing, and rockhounding) are particularly appropriate to the canyon areas. The hiking, backpacking, and exploring opportunities are superior because the WSA's canyon areas contain an unusually high number of tortuous canyons and slickrock exposures. Just as the canyonlands landscape offers outstanding opportunities for solitude because of its topographic screening capacities, it also offers superior primitive recreation opportunities because its topography is characteristically scenic, dissected, and exposed. Judged by either of the inventory standards—activity diversity or superior activity quality—the opportunity becomes outstanding within the Paria-Hackberry WSA in those locations where canyonlands are present.

Rockhounding areas for petrified wood and agate are found below the Vermilion Cliffs and extend up the Paria River Canyon to Starlight Canyon. Although horseback riding opportunities are distributed throughout the WSA, the riding activity is limited in some areas of very difficult terrain. Conversely, the rockclimbing activity is limited to cliff face areas, but these areas are distributed throughout the portions of the WSA where foot travel activities are excellent. The sightseeing for geological features and photography activities are directly associated with areas where the quality of the individual foot travel activities are high.

The outstanding opportunity for primitive recrea-

tion exists in virtually the same locations as the outstanding opportunity for solitude. Exceptions include several areas in the upper Rush Beds area where topographic screening is inferior but the opportunity for primitive recreation is excellent because of photographic, geological sightseeing, or hiking and riding possibilities. Another area is the tip of Rock Springs Bench where a hiking route to the Upper Death Valley-Johnson Hole area exists.

It is felt that outstanding opportunities for primitive and unconfined recreation are found on 89,700 acres.

Approximately 91,600 acres of the WSA possess either solitude or primitive recreation. Approximately 44,200 acres lack outstanding opportunities. Of the 91,600 acres that meet the standard, 87,400 acres have both outstanding opportunities for recreation and solitude. Thus, in terms of cumulative quality, the Paria-Hackberry WSA is characterized by extremes in quality. One-third of the WSA does not meet the *Wilderness Act* standard for wilderness quality in Section 2(c), yet almost 64 percent of the remaining WSA meets the statutory standard for the NWPS.

The major area where quality does not meet the standard is the large contiguous area formed by the North, South, and West Swags; lower Park Wash; and Deer Range-Box Elder Canyon. Smaller areas include the east and west sides of the Deer Range bench, the extreme upper Paria River area, and portions of the Lower Death Valley-Rush Beds area.

SPECIAL FEATURES

The Paria-Hackberry WSA possesses scenic and scientific values as special features.

The relict plant associations found on top of No Man's Mesa and Little No Man's Mesa have scientific value. They serve as a standard to compare nearby land management practices and as a living museum of the pristine vegetation. The total area of scientific values is about 1,500 acres.

The Paria-Hackberry WSA possesses a variety of landscape features of high scenic value. The unit's landscape geology is unique because it embraces two prominent southern Utah physiographic systems. At Bull Valley Gorge and Deer Creek Canyon, the Paria River marks the easternmost extension of the White Cliffs component of the famous ascending staircase, cliff, and terrace physiography of southwestern Utah—the Vermilion Cliffs, White Cliffs, and Pink Cliffs. East of the Paria River, the landscape is representative of the Glen Canyon physiography of sculptured, dis-

sected, and exposed Navajo Sandstone. Portions of this WSA are characterized by Navajo and Kayenta Sandstone canyons, intervening divides of exposed Navajo Sandstone, the White Cliffs of Navajo Sandstone, and the Vermilion Cliffs of the Chinle Formation.

The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Cliff heights vary from 600 feet at the edge of Deer Springs Point bench to 1,200 feet in the vicinities of Deer Range Point and the Sheep Creek-Bull Valley Gorge-Paria River confluences. In the remainder of the WSA, the White Cliffs consistently reach 1,000 feet in height. The cliffline is interrupted by eight canyons. This escarpment is considered to possess high scenic values. Approximately 7,400 acres in the White Cliffs possess scenic value.

The most important area of scenic value in the WSA is where the White Cliffs and canyonlands landscapes merge. This occurs in the large basin between Deer Range and Rock Springs Bench-Upper Death Valley area. This is a complex and colorful landscape, and it possesses extremely high scenic value. The WSA exhibits about 19,500 acres of this high quality landscape.

A third area of scenic value includes the breaks of the Rush Beds and the west wall of Cottonwood Canyon; the upper tributaries to Hackberry Canyon, such as Death Valley Draw; and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon. With the exception of the Navajo Sandstone Formations, this area's scenic values are not of the quality of values in the Bull Valley Gorge-Johnson Hole area. Approximately 16,600 acres of this landscape possess scenic value.

The Vermilion Cliffs terrace constitutes the remaining landscape component with scenic values. The Vermilion Cliffs, with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons, possesses high scenic values. The multiple colors and the intensity of the coloration contribute to the scenic quality of this landscape. Included in this landscape are Hackberry Canyon, the Paria River Valley, Hogeeye Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area, and Eight Mile Pass. Approximately 15,800 acres possess scenic values.

The aggregate area of scenic values in the Paria-Hackberry WSA is about 59,300 acres.

Land Use Plans and Controls

The WSA lies within the BLM Vermilion and Paria

Planning Units and is being managed under the land use decisions of the Vermilion and Paria MFPs (USDI, BLM, 1981a and 1981b).

The BLM has surface and subsurface ownership of all 135,822 acres of public land within the WSA boundary. The State has subsurface ownership of the 8,371 acres of State land located within the WSA boundary. State lands are managed by the State Land Board for the purpose of generating revenues for the public school system.

A 40-acre tract of private land is located along the Paria River in the northern portion of the WSA. The property is presently utilized for livestock purposes and access to it is along the river bed.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

The "Kaiparowits Coal Development and Transportation Study for Southern Utah" (Environmental Research and Technology, Inc., 1980) identified a number of potential transportation corridors and truck haul routes. The objective of the study was to identify areas where it would be feasible to construct and operate future coal transportation systems within general environmental and engineering constraints. The Paria-Hackberry WSA lies across all but a 1-mile section of corridor C10, the northern east-west connection between the Alton and Kaiparowits Coal Fields. It also extends into corridors C14 and C15, although not to the extent noted for corridor C10.

The Union Pacific Railroad (1980) has proposed and surveyed a possible rail route to serve southern Utah coal fields if development should take place. This route extends through the WSA for approximately 11 miles. It basically crosses through the Paria Box and loops around the Paria Townsite.

There are no rights-of-way within the WSA. However, powerlines are located adjacent to the eastern boundary of the WSA.

Socioeconomics

DEMOGRAPHICS

The Paria-Hackberry WSA is 30 road miles from Kanab and located in Kane County, Utah. Kane

PARIA-HACKBERRY WSA

County is a rural county with a 1980 population of 4,024 persons (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

EMPLOYMENT

The dominant sectors, in terms of employment, in the Kane County economy are retail trade (17 percent), government (17 percent), and services (14 percent) (USDC, Bureau of Economic Analysis, 1982). The strength of the retail trade sector reflects the importance of tourism to the Kane County economy. Table 4 presents employment and personal income estimates for the county.

TABLE 4
Employment and Personal Income Estimates
Kane County, Utah

Industrial Sector	Employment	Personal Income (\$1,000)
Total	1,452	12,595
Proprietors	382	2,623
Farm Proprietors	122	136
Nonfarm Proprietors	260	2,487
By Industry Source	-	-
Farm	27	382
Nonfarm	1,043	12,213
Private	798	9,614
Ag. Serv., For., Fish., and Other	(L)	0
Mining	17	196
Construction	51	1,544
Manufacturing	70	566
Nondurable goods	(D)	(D)
Durable Goods	(D)	(D)
Transportation and Public Utilities	150	1,875
Wholesale Trade	12	230
Retail Trade	252	2,364
Finance, Insurance and Real Estate Services	39	392
Government and Government Enterprises	202	2,427
Federal, Civilian	245	2,599
Federal, Military	18	252
State and Local	30	78
	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, mineral leasing, livestock production, and recreation. Table 5 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has 39 mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of

which is spent in the local economy. Not all of the claims are current in assessment. The geophysical exploration that has been conducted in the WSA has generated some temporary local employment and income. One oil and gas well has been drilled in the WSA. This drilling done in 1930 generated an undetermined amount of 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 significantly to local employment or income.

Thirty-nine livestock operators have a total grazing privilege of 1,695 AUMs within the WSA. If all this forage were utilized, it would account for \$33,900 of livestock sales and \$8,475 of ranchers' returns to labor and investment.

Some woodland products are harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

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 from 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 Paria-Hackberry WSA is estimated as about 300 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane County.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 5).

TABLE 5
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$274,266
Mineral Production	0	0
Mining Claim Assessment	Less than \$3,900	0
Livestock Grazing	\$33,900	\$2,373
Woodland Products	0	0
Recreational Use	\$1,230	0
Total	Less than \$39,030	Up to \$276,639

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

Ninety-two oil and gas leases in the WSA cover 91,422 acres. At \$3 per acre, lease rental fees generate up to \$274,266 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 1,695 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$2,373 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially

recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be low in the near future due to the WSA's rough terrain. However, SAI (1982) indicates that the overall favorability for development of the mineral resources within the WSA is moderate. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: oil and gas, 310 acres; and uranium, 20 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.) There could also be 24,700 acres of land treatment for watershed, wildlife, and livestock purposes. The 24,700-acre figure is used for analysis purposes but the probability of such extensive land treatment is low.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Disturbance of 330 acres from mineral development would result in only minor increases in fugitive dust emissions and would not exceed the WSA's PSD Class II limitations. The proposed land treatment would not impact air quality except in the very short term as fugitive dust would be created during the burning, chaining, and seeding activities.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium and oil and gas exploration and development activities would probably not exceed 330 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 330 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with critical erosion class (worst-case

analysis) and that erosion condition would increase one class, soil loss on the 330 acres would increase from 891 cubic yards/year to 1,782 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA from mineral development would increase by approximately 891 cubic yards (0.5 percent) over current annual soil loss. This is a small increase, and the effects would likely be imperceptible. The proposed land treatments would result in a temporary (2 to 3 year) increase in soil loss until the seedlings were established. However, in the long term these treatments, particularly the 6,500 acres for watershed purposes, would reduce erosion rates, and overall this alternative would have a beneficial impact on soils.

VEGETATION

The anticipated maximum of 330 acres disturbed due to mineral development would not significantly impact the WSA's sparse vegetation. The proposed land treatments on 24,700 acres would alter the affected area's vegetation cover from a pinyon-juniper or brush type to a grassland type.

The Paria scurfpea, a sensitive plant, is found within the WSA. Before authorizing surface-disturbing activities (24,230-acre potential from mineral activities and land treatments), the BLM would conduct site-specific clearances of the potentially disturbed areas. If this species could be affected, the BLM would consult with the FWS as required by BLM policy. Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of this sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Since precipitation is low and all streams within the WSA have poor water quality, no significant sedimentation or change in total dissolved solids is expected to occur from the 891 cubic yards of annual soil loss from surface disturbance due to mineral development. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current Paria and Vermilion Planning Unit MFPs. The proposed land treatments could improve water quality, but the amount would not be measurable.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The potential for up to 10 to 50 million barrels of oil in-place (3 to 15 million estimated recoverable) and up to 60 to 300 billion cubic feet of natural gas (18 to 90 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1, 3, and 4 stipulations, and would not be affected by the adoption of this alternative. Approximately 310 acres of surface disturbance would take place if exploration and development were to occur. However, no immediate development is expected under this alternative but with moderate potential in the north and eastern portions of the WSA, development is a possibility in the distant future.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 500 tons of uranium oxide could be developed. Approximately 20 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood for development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of water catchments and spring developments. The proposed 14,600 acres of land treatment could be developed without concern for wilderness values and would improve habitat mainly for deer. However, disturbance of an estimated 330 acres (0.24 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer and mobile nongame animals would be dispersed from the disturbed areas for the lifetime of these activities. Less mobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels. Overall there would be a positive affect on wildlife due to creation of improved and varied habitat.

FOREST RESOURCES

Since there are few trees other than scattered pinyon and juniper, none of which are utilized (except by occasional campers or hikers), and since minimal surface-disturbing activities are anticipated, no significant impacts to forest resources are expected. The proposed land treatments on 23,900 acres would reduce pinyon-juniper trees in chained areas but would make more dead-and-down wood available for harvest; however, since these trees are currently not used, there would be little impact on harvest of forest resources.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Paria and Vermilion Planning Unit MFPs. The 1,695 AUMs currently allocated in the WSA are controlled by 39 livestock permits. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Motorized vehicles currently used to manage livestock in the WSA could continue. The 12,300 acres of land treatment, 4 miles of fence, eight catchments, eight spring developments, and 7 miles of pipeline could be developed without concern for wilderness values. This would result in improved livestock distribution and carrying capacity. If these land treatments were only partially successful (10 acres per AUM), an additional 1,230 AUMs could be produced.

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 330 acres of surface disturbance from mineral and energy exploration and development would be degraded, and VRM Class II management objectives would probably not be met during the short term. Management objectives in Class III and IV areas would be met. After rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected. Even though land treatments would generally be designed to meet VRM management objectives, treatments would not meet VRM Class II objectives and could degrade visual quality on 18 percent of the WSA.

CULTURAL RESOURCES

The cultural resources in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 330 acres by mineral exploration

and development and the proposed land treatments (24,700 acres) under this alternative could affect archaeological sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

Up to 330 acres could be disturbed by mineral and energy activities and 24,700 acres could be disturbed by land treatments. Primitive recreational opportunities would be diminished on the affected areas but increased access could lead to increased in nonprimitive recreation. The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hoff and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreational use is expected to increase from 300 current visitor days per year to 450 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 200 visitor days per year to about 300 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing, ORV use, etc.) would increase from 100 visitor days per year to 150 visitor days. Because of the proximity of the Paria-Vermilion Cliffs Wilderness Area, increases in visitation will probably be slightly higher than projected above.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Paria and Vermilion MFPs. Expected mineral and energy exploration and development could disturb an estimated 330 acres. Land treatments could disturb an additional 24,700 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) would be lost or diminished in affected areas. The 24,700 acres of land treatment and 330 acres of mineral-related surface disturbance could result in significant losses of natural-

ness and solitude throughout the WSA as a whole, particularly if roads, vehicular ways, and drill pads are located throughout the area.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use of public lands. It would also be consistent with proposed Kaiparowits coal transportation corridors. This alternative is based on implementation of current BLM Paria and Vermilion Planning Unit MFPs and is, therefore, in conformance with them. The No Action Alternative would be consistent with State of Utah plans and policies which emphasize economic return. The proposed coal transportation areas could be considered further under this alternative.

SOCIOECONOMICS

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 and uranium in the WSA were developed, it would lead to a significant increase in employment and income for Kane County. The probability of economic development of minerals within the WSA is moderate (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 (1,695 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed land treatments could produce 1,230 AUMs of new allocated forage and could lead to \$24,600 of livestock sales and \$6,150 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 150 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Surface-impacting activities that would be allowed without designation could reduce the demand for primitive recreation but would provide access into the area and increase nonprimi-

tive recreation use.

Federal and State revenues would not be reduced by this alternative. There are 2,650 acres of existing leases in the WSA that would be phased out to meet Category 4 restrictions. However, there are 3,730 acres open to oil and gas leases that are currently not leased. Overall there could be up to \$3,240 additional Federal lease fee revenues per week in addition to new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$2,373 per year) would continue. The additional 1,230 acres of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by \$1,722 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (135,822 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 135,822-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The proposed 24,700 acres of land treatment would also not be allowed. The entire area would be placed in leasing Category 4 (closed to leasing). About 33 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas for this alternative would be smaller than the No Action Alternative (20 vs. 25,030 acres from mineral activity and 23,900 acres from land treatment) the impacts from development and surface disturbance on air quality, geology, vegetation, forest, and cultural resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative. Wilderness desig-

nation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

Wilderness designation would negatively impact soil resources because the proposed 6,500 acres of land treatment for watershed purposes would not be allowed. The other land treatments proposed for wildlife and livestock would also reduce erosion and have a beneficial impact on watersheds and these would not be allowed. Therefore, it is concluded that wilderness designation would result in a continuation of current erosion levels in the WSA (185,800 cubic yards per year).

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements might not be allowed. The proposed eight catchments and eight spring developments might be allowed. However, each would be examined on an individual basis to determine if they could be constructed without impairing wilderness values.

Mineral exploration and development in the area would generally be confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 91,422 acres (24,655 acres pre-FLPMA and 66,767 acres post-FLPMA) are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing preand post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be re-issued.

Exploration for and development of a potential resource of up to 10 to 50 million barrels of oil in-place and 60 to 300 billion cubic feet of natural gas with 3 to 15 million barrels of oil and 18 to 90 billion cubic feet of natural gas that is recoverable could be foregone under this alternative. This would not result in an immediate significant loss of potential oil and gas recovery; however, there could be a long-term loss of a significant oil and gas resource.

Locatable Minerals

Approximately 600 acres are under mining claim within the WSA, assumably for uranium. Up to 500 tons of recoverable uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case the potential for recovery of up to 500 tons of uranium oxide would be foregone. Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development occur even without wilderness designation. Therefore, will this alternative would not result in a significant loss of recoverable uranium.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, water is a limiting factor for wildlife in this WSA. If future water improvements were curtailed and the eight proposed catchments and eight spring developments were not constructed, potential habitat for deer and nongame species would be reduced. Wildlife habitat would also not improve because the 14,600 acres of proposed wildlife land treatments would not be allowed.

Disturbance of 20 acres (.01 percent of the WSA) due to exploration of locatable mineral resources could disrupt wildlife populations and result in these species leaving the disturbed areas. Due to the small size of the disturbed areas the effects would be negligible. Wilderness designation would have an overall negative impact on wildlife due to restrictions on the potential improvement of wildlife habitat through water development and land treatment.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Paria and Vermilion MFPs. The 1,695 AUMs currently allocated in the WSA are controlled by 39 livestock permittees. Motorized vehicle use currently taking place to manage livestock could be restricted.

Rangeland improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock management facilities could be restricted to preserve wilderness values. In the case of the eight catchments, eight spring developments, 4 miles of fence, and 7 miles of pipeline proposed, which of these would be allowed, if any, is unknown since each would be considered on a case-by-case basis. The 12,300 acres of land treatment would not be allowed and the potential for at least 1,230 additional AUMs would be lost. Therefore, it is concluded that wilderness designation would have an adverse impact on range management.

VISUAL RESOURCES

A benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from Classes II, III, and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities.

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 20 acres of surface disturbance from mineral exploration and development would be degraded, and VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, because only .01 percent of the WSA would be disturbed, visual quality in the WSA as a whole would not be significantly affected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although use is currently low (about 300 visitor days a year), the WSA has outstanding primitive recreational values. If designated, those high quality recreational opportunities would be recognized, managed, and preserved.

As discussed for the No Action Alternative,

recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Because of the proximity of the Paria-Vermillion Cliffs Wilderness Area, the Paria-Hackberry WSA will be better known in the future and recreational use will increase above the baseline rate with or without wilderness designation. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use; also, due to the size and configuration of the WSA, the quality of the primitive recreation experience probably would not be negatively affected by the increased use. The 100 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values.

An impact on ORV recreational use, particularly in the Paria River bed, would be expected. This would not be a significant impact due to the present low use. Approximately 33 miles of ways would be closed to ORV use.

It is concluded that this alternative could benefit primitive recreation values by reducing the likelihood for surface-disturbing activities and increasing management attention.

WILDERNESS VALUES

Designation and management of all 135,822 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive recreation. Solitude would be preserved on approximately 89,300 acres that meet and 46,522 acres that do not meet the standards for outstanding opportunity for solitude. Naturalness would be preserved on all 135,822 acres and primitive and unconfined recreation would be preserved on 89,700 acres that meet and 46,122 acres that do not meet the standards for outstanding opportunities. The scenic and scientific special features in this WSA would also be protected and preserved.

No development of leases is foreseen under this alternative. The anticipated mineral-related surface disturbance would, therefore, be reduced from 330 acres to 20 acres for development of valid mining claims. Mitigation to protect wilder-

ness values would be considered during mining claim development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

Outstanding opportunities for seven recreational activities (backpacking, hiking, horseback riding, exploring, photography, rock climbing, and geological sightseeing) would be preserved. Although recreational use could increase (refer to Recreation section), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Thus, it is concluded that wilderness designation and management of all 135,822 acres of the Paria-Hackberry WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 89,300 acres) and primitive recreation (outstanding on 89,700 acres) except in localized areas affected by surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

The existing BLM Paria and Vermilion MFPs do not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to those MFPs.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would be phased out. If State lands within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Designating the WSA as wilderness would also conflict with Kaiparowits coal transportation corridor plans. Access to the 40 acres of private land via the Paria River bed would be maintained.

SOCIOECONOMICS

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 5) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is moderate, it is estimated that potential mineral-related local income would be significantly reduced by wilderness designation.

Livestock use and ranchers' income would continue as at present with \$33,900 of livestock sales and \$8,475 of ranchers' return to labor and investment. Proposed improvements (12,300 acres of land treatment) for livestock would be foregone along with any resulting increase in ranchers' income. If these projects were to be implemented and the additional forage used, ranchers' returns to labor and investment would increase by \$6,150.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would not be significant. Motorized recreational use of the WSA is light (100 visitor days per year). The decrease in related local expenditures would be small and insignificant to the local economy.

The loss of 88,772 acres of oil and gas leases that could continue with the No Action Alternative would cause an eventual loss of up to \$266,316 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$11,190 annually in Federal revenues from the 3,730 acres that could be leased without designation. Overall, \$277,506 of Federal oil and gas fees could be lost annually.

If the proposed range improvements are not developed and used, an estimated annual \$1,722 of Federal grazing revenues from 1,230 increased AUMs would be foregone.

This alternative would hinder, if not preclude, the transportation of coal from the Kaiparowits Coal Field, which could cause a significant future economic impact to the area.

Locatable Minerals

Approximately 220 acres of mining claims are within the area that would be designated wilderness. Development work, extraction, and patenting could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981c).

It cannot be determined how much of the potentially recoverable 500 tons of uranium oxide in the WSA are within the area that would be designated as wilderness under this alternative. Assuming that the locatable minerals are evenly distributed in the WSA and that mineral deposits were not included in mining claims filed before designation, the potential for recovery of uranium would be foregone in the portion of the WSA designated as wilderness. However, uranium could be developed in the nondesignated area and an estimated 280 tons of uranium oxide could be recovered.

Because this metal is not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

Partial Wilderness Alternative (59,270 Acres)

(Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 59,270-acre area designated as wilderness and the 76,552-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some of the existing mining claims would eventually be explored and developed, causing an estimated 10 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be

renewed and future leasing of oil and gas would not be allowed.

It is assumed that, within the nondesignated area, only 180 acres would be disturbed sometime in the future due to mineral and oil and gas exploration and development. There could also be 11,600 acres in the nondesignated area disturbed by land treatments. The probability of such extensive land treatment is low. Overall, 190 acres of surface disturbance could occur within the WSA from mineral activity and 11,600 acres from land treatment—13,240 acres less than under the No Action Alternative and 11,770 acres more than with the All Wilderness Alternative. (Appendix 10 lists the mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 330 acres of surface disturbance from mineral and energy activities and 24,700 acres from land treatments, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes a total of 11,790 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same impacts on development of water sources, mineral and energy resources, wildlife, livestock, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 20,600 acres of oil and gas leases in the area that would be designated wilderness. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 10 to 50 million barrels of in-place oil and less than 60 to 300 billion cubic feet of natural gas falls within the area that would be designated as wilderness under this alternative. Of these amounts, 3 to 15 million barrels of oil and 18 to 90 billion cubic feet of natural gas are

estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potential resource of up to 1 to 7 million barrels of oil and 8 to 40 billion cubic feet of natural gas could be foregone. This would allow recovery of 2 to 8 million more barrels of oil and 10 to 50 billion more cubic feet of natural gas than under the All Wilderness Alternative.

This alternative is not expected to result in any immediate significant loss in recovery of the oil and gas resource; however, there could be a long-term loss of recoverable oil and gas.

LIVESTOCK

The effect of designation of 59,270 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the 1,695 AUMs allocated, 745 would be within the designated portion of the WSA and 950 within the nondesignated portion. Development of future roads or other livestock management facilities for use with 745 AUMs in the designated portion could be restricted to preserve wilderness values. Approximately 6,300 acres of proposed land treatments are located within the designated portion of the WSA and, consequently, would not be allowed. This would result in the loss of at least 630 AUMs of potential livestock forage. Other proposed range improvements could be built with this alternative.

VISUAL RESOURCES

Because total surface disturbance from mineral activity in the WSA would be 11,790 acres under this alternative as opposed to 25,030 acres under No Action and 20 acres under All Wilderness, the impact on visual resources would be less than under the No Action Alternative but more than under the All Wilderness Alternative. In the portion recommended for designation, 10 acres of surface disturbance (.02 percent of the designated portion) resulting from mineral exploration and development would cause localized long-term degradation of scenic values and exceed VRM Class I management objectives but would not have an overall effect on visual resources. An additional 180 acres in the nondesignated portion of the WSA would be disturbed by minerals and 11,600 acres would be disturbed by land treatments. These activities would not meet VRM Class II objectives, but might meet management objectives in Class III and IV areas. Disturbance of a total of 11,790 acres within the WSA would result in localized long-term impairment of visual

values in the nondesignated portion but probably would not significantly affect visual resources in the WSA as a whole.

RECREATION

Impacts on recreational values and opportunities for the 59,270-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected because the Paria River bed would be left open to ORV use. However, approximately 3.50 miles of ways within the WSA would be closed to ORV use.

In the area that would not be designated (76,552 acres), little change in recreational use is expected. Impacts would essentially be the same as described in the No Action Alternative.

WILDERNESS VALUES

Impacts to wilderness values would be the same as under the All Wilderness Alternative on the 59,270 acres that would be designated wilderness. Size, naturalness (all 59,270 acres affected are natural), outstanding opportunities for solitude (53,300 acres that meet the standard and 5,970 acres that do not meet the standard) and primitive recreation (including 54,700 acres that meet and 4,570 acres that do not meet the standard), and special features would be preserved. Although recreational use could increase (refer to Recreation section under the All Wilderness Alternative), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreation values would be expected. There could be some loss of wilderness values due to allowable surface disturbance from mineral exploration activities on up to 10 acres. Additionally, sights, sounds, and emissions of activities within and adjacent to the area that would not be designated could result in loss of solitude and primitive recreational values within the designated portion.

In the 76,552-acre area that would not be designated, there would be 180 acres of disturbance from mineral and energy exploration and development activities and 11,600 acres of disturbance from land treatments. Those activities would degrade wilderness values (naturalness, special features, and opportunities for solitude and primitive recreation) from the commencement of activities through rehabilitation. Thus, long-term impairment of wilderness values in the portion that would not be designated would be expected and, as noted above, the sights, sounds, and emissions of those mineral and energy activities could impair solitude and primitive recreation

values in portions of the area that would be designated.

Because no development of leases is foreseen in the designated wilderness area, the anticipated mineral-related surface disturbance would be reduced from 330 acres to 190 acres and land treatments would be reduced from 25,030 acres to 11,600 acres. Mitigation to protect wilderness values would be considered during development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use Plans and Controls section as described for the All Wilderness Alternative with the exception of conflicts with Kaiparowits coal transportation corridors. This alternative would allow further consideration of coal transportation corridors through portions of the WSA. This alternative would not be consistent with the *Kane County Master Plan*.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any immediate changes in existing patterns and trends of population, employment, and local income distributions. The potential future economic benefits that could result from the coal transportation corridors would not be precluded by this alternative. The existing 1,695 AUMs would remain available to cattle in the 11 allotments. The revenues, returns to ranchers, and sales from the proposed land treatments as described in the No Action Alternative would be reduced by about one-half or \$12,600 per year. Approximately \$53,850 per year in Federal oil and gas leasing revenue would be lost as leases that could be continued with the No Action Alternative would be phased out. In the nondesignated area \$223,656 per year of revenue would continue to be generated by oil and gas leasing and an additional \$11,190 per year could be collected by leasing of presently unleased acres. Overall, the immediate local economic impact from this alternative would be insignificant, as would economic impacts from the No Action and All Wilderness Alternatives. However, long-term economic increases could result under this alternative.

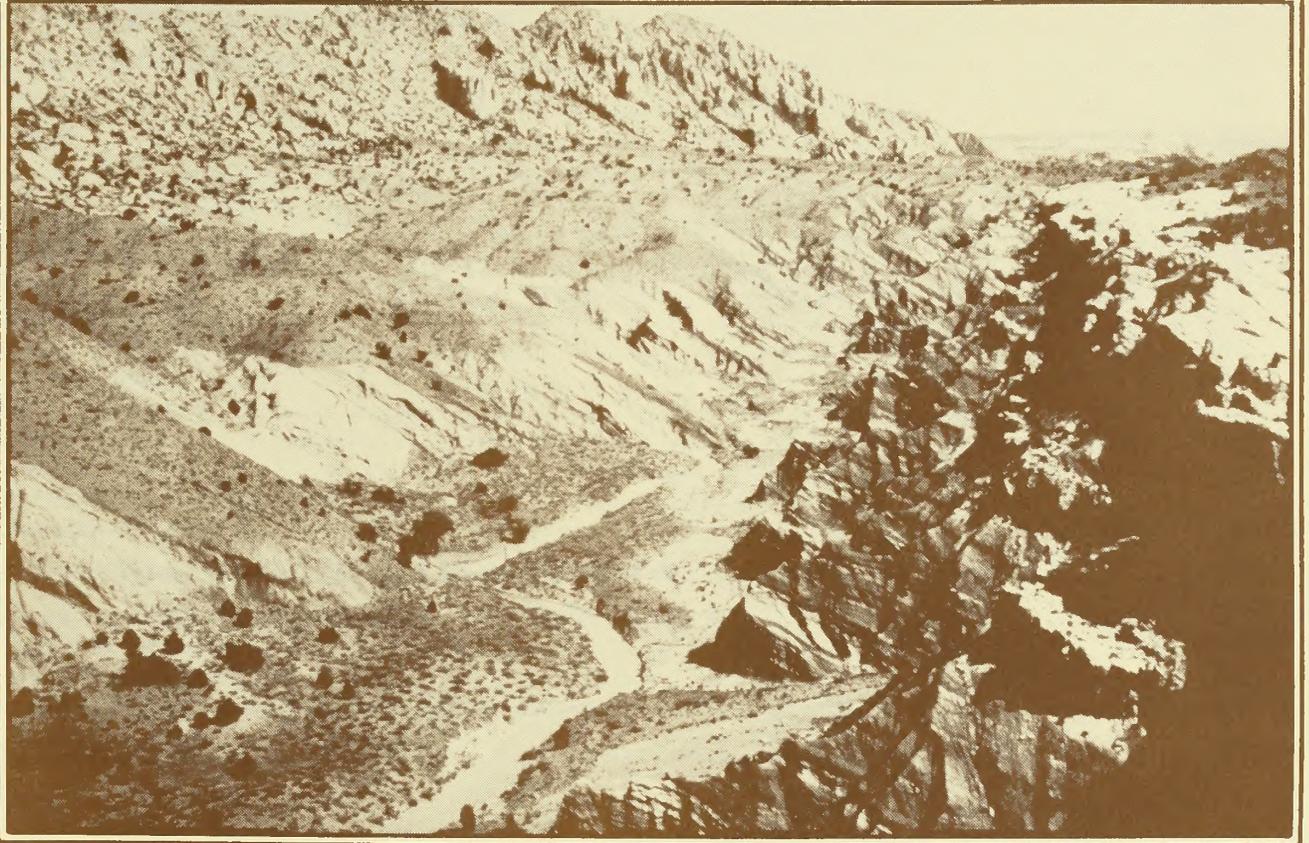
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The Cockscomb WSA



THE COCKSCOMB WSA

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THE COCKSCOMB WSA

(UT-040-275)

INTRODUCTION

General Description of the Area

The Cockscomb Wilderness Study Area (WSA) is approximately 40 miles east of Kanab, Utah. The unit is bordered on the south and west by Highway 89 and on the east by the Cottonwood Road. The north border lies approximately 2 miles south of the Paria Box along an existing powerline right-of-way. The area includes the Rimrocks, a portion of West Cove, the Paria River, and The Cockscomb. There are approximately 10,080 acres of public land in the unit. The WSA is managed by the BLM's Cedar City District, Kanab Resource Area Office. No State or private lands lie within the WSA. Major vegetation types are pinyon-juniper and desert shrub.

Average annual precipitation in The Cockscomb WSA is 9 to 11 inches. Highest monthly precipitation occurs from November through March, which is 60 to 70 percent of the yearly total. Most precipitation is a result of winter rain and snow.

Temperatures vary with aspect and altitude. July and January are the warmest and coldest months, respectively. July temperatures range from 50 degrees Fahrenheit (F) to over 100 degrees F, while the January range is from below 0 degrees F to 60 degrees F.

Specific Issues Identified in Scoping

General issues pertaining to the WSA are discussed in Volume I. The issues for The Cockscomb WSA identified in the study process are potential coal transportation corridors, coal development, and off-road vehicle (ORV) use of the Paria River. Issues and concerns raised in the spring of 1984 public scoping meetings (USDI, BLM, 1984) are responded to below.

1. *Comment:* The Environmental Impact Statement (EIS) should analyze potential water resource conflicts related to salinity, sediment control, and livestock grazing.

Response: The Paria River carries a heavy concentration of sediment; however, the sandstone and tropic shale formations within the unit are not great contributors. The water impoundment by the Blue Pool Water Users is described under the Affected Environment

and Environmental Consequences sections. No plans for salinity or sediment control structures are known within the WSA.

2. *Comment:* Wilderness should not be designated where it could preclude water developments (i.e., reservoirs) and impede developments in local communities.

Response: The EIS analysis discusses those areas, if any, where wilderness designation could conflict with water resources and/or community development. This information will be taken into account by BLM in its final recommendations as to wilderness suitability. The information also will be available to others for consideration during the legislative process.

3. *Comment:* The analysis should address the commercial viability of extraction (including underground mining) of hydrocarbons and other minerals. Would equal or better opportunities exist outside the WSA?

Response: The favorability and certainty of minerals being developed or found are discussed in the Affected Environment, Mineral and Energy Resources section. A regional or statewide analysis of mineral development is discussed in Volume I.

4. *Comment:* How would designation impact mining, removal, and transport of coal from leaseholds?

Response: Where valid rights exist, mining could occur after the WSA is designated wilderness. Where they don't occur, mining would be prohibited. No coal leases currently exist in the WSA.

5. *Comment:* Why did BLM recommend The Cockscomb Formation for protection as a geologic interpretive area? What are the geologic resources other than fossil claims?



Response: The BLM, during its planning process, identified the opportunity to interpret the geology along the Cottonwood Road because of the many formations exposed to the surface in a small area.

6. *Comment:* The analysis should consider coal transport corridors (identified in the "Kaiparowits Coal Development and Transportation Study" [Environmental Research and Technology, Inc., 1980]) of equivalent importance to the coal reserves.

Response: Two corridors have been identified that are affected by the WSA. Both corridors provide access between the Kaiparowits Coal Field and western markets. The impact of wilderness designation on these corridors is discussed in the Environmental Consequences, All Wilderness Alternative, Land Use Plans and Controls section.

7. *Comment:* Potential adjacent coal-unit train activity would impair wilderness characteristics in the WSA. Sights and sounds from coal transport routes would degrade wilderness values in this WSA.

Response: The solitude of the WSA could be reduced by outside sites and sounds if a railroad were built parallel to Highway 89 or through the Paria Box. Refer to Environmental Consequences, Wilderness Values section.

8. *Comments:* (1) The Site-Specific Analysis (SSA) recommends 4,980 acres as unsuitable because of potential resource conflicts, although there are no coal leases in the WSA and it is "unlikely that any of the coal in the WSA is potentially developable." Is there any real/potential conflict? The same is true for oil and gas and mining claims; none of the WSA is favorable for the occurrence of economic uranium or other minerals, and the promise for oil/gas is low. (2) It is senseless to recommend areas unsuitable because of resource conflicts that, according to the SSA, do not exist.

Response: During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input

is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982b) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

9. *Comment:* A potential water impoundment for coal operations would partially cover a portion of this WSA.

Response: A water impoundment by the Blue Pools Water Users could partially cover a portion of the WSA. This proposal is presently in the "talking stage." No formal application has been filed.

10. *Comment:* Once areas have been removed from the original WSA because of reasons that would disqualify the area for designation, there are less than 5,000 acres remaining. Size would disqualify this area for wilderness designation. All other normal considerations that are mandated as a part of the EIS must be adequately treated to the satisfaction of the Commission.

Response: A Partial Wilderness Alternative encompassing 5,100 acres has been developed. This alternative eliminates some but not all of the major conflicts with wilderness designation.

11. *Comment:* The Glen Canyon National Recreation Area (NRA) 1972 Enabling Act (Lloyd Act) directed a study of proposed road alignment within and adjacent to the recreation area. If a road were constructed, it could impact this WSA.

Response: National Park Study Route D-3 is the Cottonwood Wash Road, which forms the east boundary of the WSA. No direct impact to the WSA would occur because this is an existing, rather than an anticipated, road.

12. *Comment:* The SSA conclusion that 60 percent of the area offers outstanding opportunities for primitive recreation and 40 percent offers outstanding solitude is supported

by sketchy justification. The SSA does not have a map showing these areas.

Response: A map showing the areas of outstanding opportunities for solitude and primitive and unconfined recreation in the WSA is available in a technical report at the BLM Cedar City District Office. The information is on a U.S. Geological Survey quad base.

13. *Comment:* The EIS should discuss land use conflicts as a result of wilderness designation (especially around the perimeter and near private land holdings).

Response: The Affected Environment and Environmental Consequences sections of this document identify and discuss any conflicts with land use plans and private in-holdings.

14. *Comment:* Cost/benefit analyses are needed to identify wilderness economic trade-offs.

Response: BLM does not believe that a cost/benefit analysis or any other comparison based solely on economic considerations can properly portray tradeoffs involved. This is because: (1) many of the values related to wilderness are intangible; (2) market conditions that affect consumptive resources are highly variable over time; (3) the wilderness study criteria do not lend themselves to cost/benefit interpretations; and (4) the numerous and divergent factors that contribute to wilderness considerations would make a meaningful cost/benefit analysis very difficult, if not impossible. BLM believes that it can serve best by narrating the situation and offering a recommendation that can be pursued in the political and legislative forums.

15. *Comment:* How would local communities be involved in wilderness designation?

Response: Public scoping meetings were held by BLM in 12 communities throughout the State. Likewise, public hearings on the Draft EIS will be held in various local communities. The public, elected local officials, and other community representatives may provide input at these hearings. Also, community representatives may provide input by writing to the BLM Utah State Director. Later, local communities also may provide input to the wilderness designation process through the Utah Governor's Office and through the Utah Congressional delegation during the legislative phase of the process.

16. *Comments:* (1) The oil and gas (mineral potential) of the WSA is ranked low to moderate by Science Applications, Inc. (SAI, 1982 and 1983). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be high or moderate. This information should be considered in the Draft EIS. (2) The potential for discovery of energy or mineral resources is reasonably high.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982 and 1983) reports will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping it was suggested that a partial alternative be formulated to allow for a potential road to Glen Canyon NRA and for potential water impoundment for future coal development.

The first part of the comment pertains to the Glen Canyon Enabling Act Section 8, which directed the National Park Service (NPS) to study road access within and adjacent to the NRA. Study route D-3 is the Cottonwood Wash Road, which forms the east boundary of The Cockscomb WSA. Since this route is not within the WSA, a new partial alternative was not necessary to avoid conflict with access to the NRA.

The second part of the comment refers to a possible reservoir sponsored by the Blue Pool Water Users. The Partial Wilderness Alternative originally identified by BLM eliminates the Paria River and its floodplain from the potentially designated area; therefore, that alternative is expected to avoid any conflict with water storage for coal development, and consequently, another partial alternative was not studied.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (10,080 acres); and (3) Partial Wilderness (5,100 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 ALTERNATIVE

Under this alternative, none of the 10,080-acre The Cockscomb WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Paria Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1981b), the *Kanab-Escalante Grazing Management EIS* (USDI, BLM, 1980a), and subsequent planning and management documents. There are no State lands within the WSA; however, State lands are adjacent to the WSA in three locations and private lands are adjacent in two locations (refer to Map 1). None of these adjacent lands have been identified in the MFP for special Federal acquisition through exchange or purchase, and these lands are expected to remain under existing ownership.

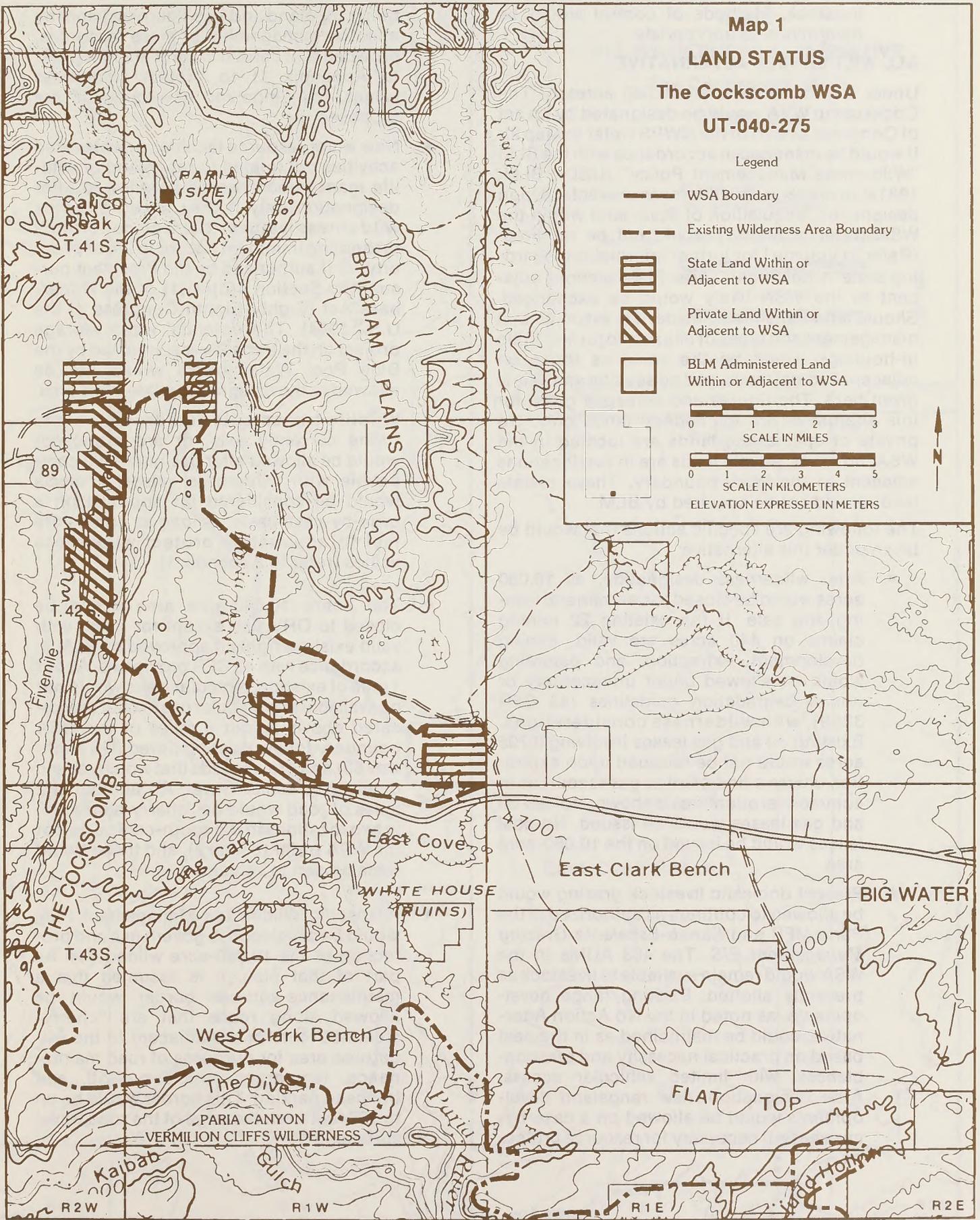
The following are specific actions that would take place under this alternative:

- All 10,080 acres would remain open to mining claim location, mineral leasing, and mineral sale. Development work, extraction, and patenting would be allowed on 22 existing mining claims (440 acres) and on any future mining claims if such claims are determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without concern for wilderness values. Nine existing oil and gas leases (8,705 acres) and new leases could be developed under leasing Category 1 (standard stipulations) on the entire 10,080 acres. Future leases for coal could be considered and issued if coal leasing criteria are met.
- The present 463 Animal Unit Months (AUMs) of domestic livestock grazing use in the 10,080-acre area would continue as authorized in the MFP and in decisions based on the *Kanab-Escalante Grazing Management EIS*. Existing developments

of 3.5 miles of fence, four water catchments, and one cattleguard could be maintained by mechanical methods. New rangeland developments could be implemented without wilderness considerations, although none are currently proposed.

- Developments for wildlife, water resources, etc., would be allowed without concern for wilderness values if in conformance with the Paria Planning Unit MFP and future BLM planning documents. No developments for wildlife are now proposed. A potential water storage project has been suggested by the Blue Pool Water Users and could be considered further without concern for wilderness values.
- ORV use on about 550 acres would continue to be limited to existing roads and trails, and the remaining 9,530 acres of the WSA (including 1 mile of way) would remain open for vehicular use in accordance with the Paria MFP. New access could be developed. Portions of the WSA could be used for future coal slurry pipeline and/or railroad corridors.
- The entire 10,080-acre area would continue to be open to woodland product harvest. There is minimal harvest of forest products at the present time, and no increase is planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (8,280 acres), Class III (600 acres), and Class IV (1,200 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations, with no management restrictions on vehicular access.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic

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livestock. Methods of control would be determined as appropriate.

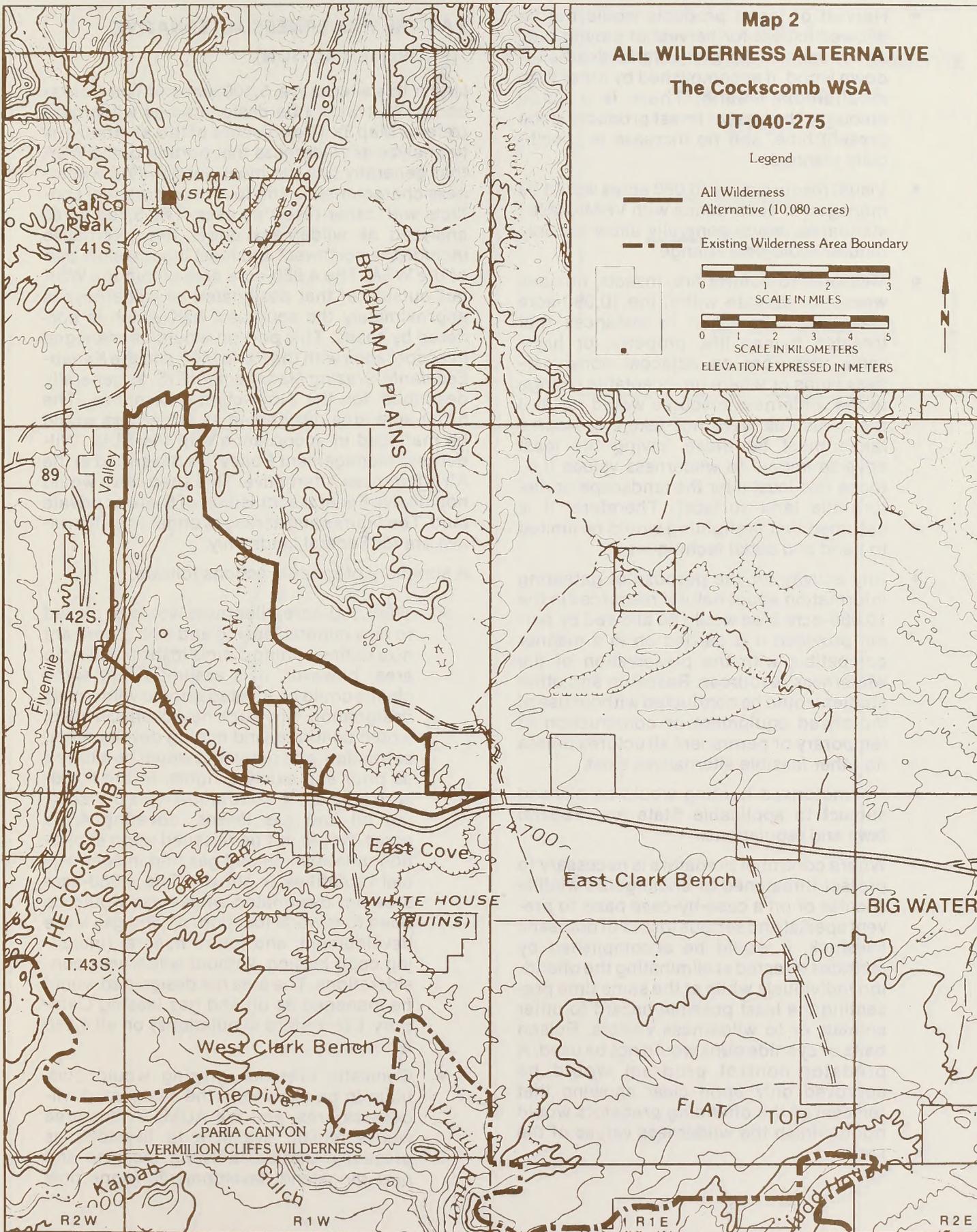
ALL WILDERNESS ALTERNATIVE

Under this alternative, all 10,080 acres of The Cockscomb 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" (USDI, BLM, 1981a) to preserve its wilderness character. Upon designation, acquisition of State land within the WSA (refer to Map 1) would not be required. (Refer to Volume I for further information regarding State in-holdings). Three State sections adjacent to the WSA likely would be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only. No private or split estate lands are located in the WSA; however, private lands are in two locations adjacent to the WSA boundary. These private lands would not be acquired by BLM.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 10,080 acres would be closed to new mineral leasing and sale. If the existing 22 mining claims on 440 acres are valid, mining development, extraction, and patenting would be allowed under unnecessary or undue degradation guidelines (43 CFR 3809), with wilderness considerations. Existing oil and gas leases involving 8,705 acres would not be reissued upon expiration unless a find of oil or gas resources in commercial quantities is shown. No new oil and gas leases would be issued. No coal leases would be issued on the 10,080-acre area.
- Present domestic livestock grazing would be allowed to continue as authorized in the Paria MFP and *Kanab-Escalante Grazing Management EIS*. The 463 AUMs in the WSA would remain available to livestock as presently allotted. Existing range developments, as noted in the No Action Alternative, could be maintained as in the past based on practical necessity and reasonableness, with limited vehicular access. After designation, 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 certain criteria are met (refer to Appendix 1) to protect wilderness values. No rangeland developments are proposed.
- 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). The potential water storage project on the Paria River suggested by the Blue Pool Water Users would not be allowed in the designated wilderness area.
- Wildlife transplants and developments (none currently exist or are proposed) would be allowed after designation if compatible with wilderness values. Projects would be considered for approval on a case-by-case basis, as long as criteria are met to adequately protect wilderness values (refer to Appendix 1).
- The entire 10,080-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 1 mile of existing vehicular ways would not be available for vehicular use except as indicated above. About 8 miles of the WSA boundary follow existing paved (US Highway 89) and gravel roads that would remain open to vehicular travel. An additional 2 miles of road would be "cherry-stemmed" in two locations in the south-central part of the WSA (refer to Map 2), and these would remain open to vehicles.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 10,080-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are "cherry-stemmed" into or are adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

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- 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. There is a small amount of harvest of forest products at the present time, and no increase is specifically planned.
- Visual resources on 10,080 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 10,080-acre area would be taken 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 must 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 in the 10,080-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered 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 would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

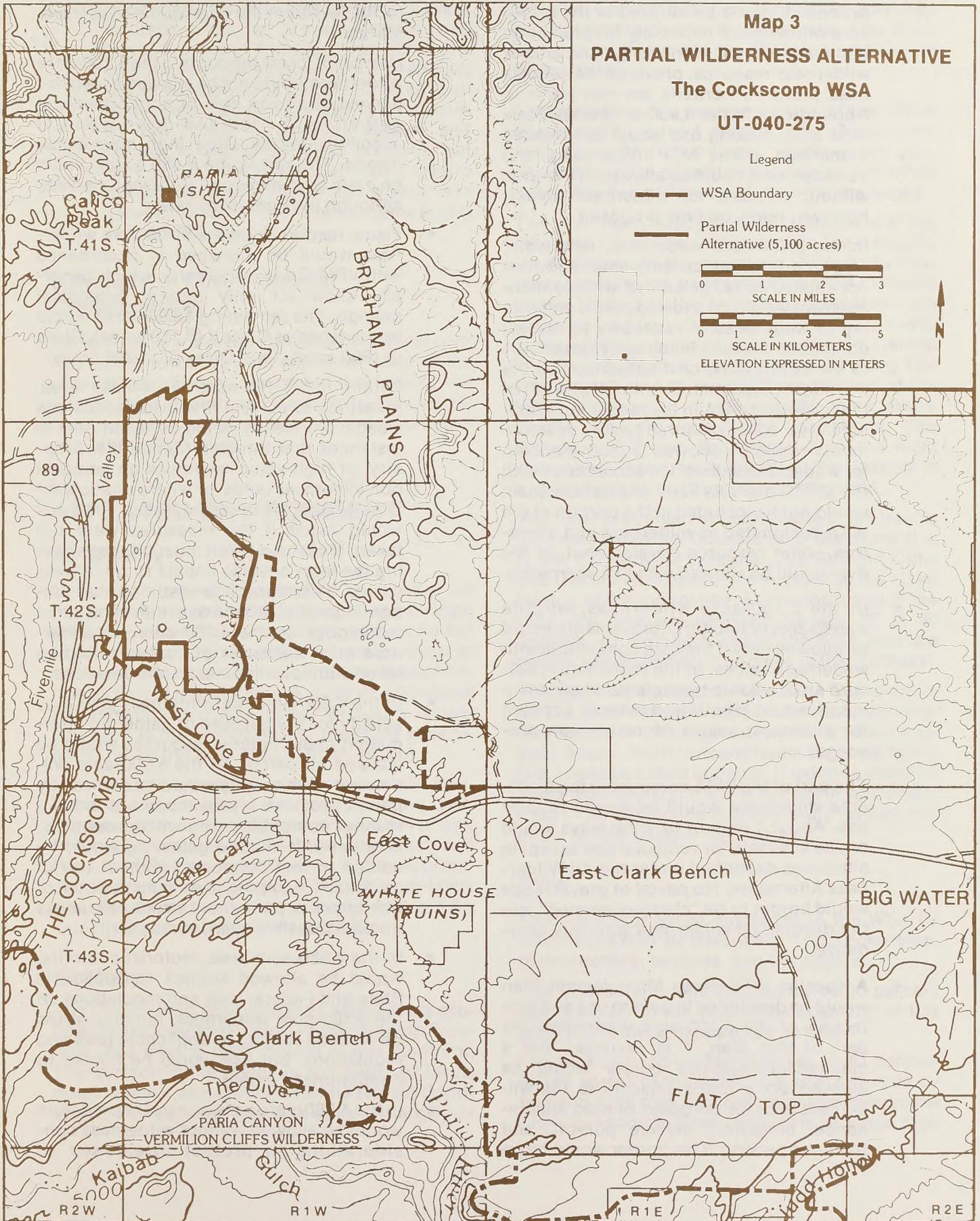
PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, 5,100 acres of The Cockscomb 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 generally has the most outstanding wilderness characteristics and to reduce potential conflicts with other resource uses. The 5,100 acres analyzed as wilderness under this alternative include the northwest and most inaccessible part of the WSA. The 4,980-acre area within the WSA but outside of that designated as wilderness is approximately the southeast half which is bordered by roads. This portion would be managed in accordance with the Paria MFP and the *Kanab-Escalante Grazing Management EIS*, as generally described for the No Action Alternative. The 5,100-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative. This alternative would not involve Federal acquisition of State or private land. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 5,100-acre wilderness would be closed to new mineral leasing and sale. There are no existing mining claims in the 5,100-acre area; however, it is assumed that some claims could be located prior to wilderness designation. Any such new claims, if valid, would continue, and mining development, extraction, and patenting would be allowed as prior and existing rights. In the 5,100-acre area designated wilderness the existing oil and gas leases, covering 4,755 acres, would not be reissued upon expiration unless an oil and gas find in commercial quantities is shown. The 4,980-acre area not designated wilderness would be open to mineral location, oil and gas lease development, and future mineral (including coal) leasing, without wilderness considerations. The area not designated would be managed as oil and gas leasing Category 1 (standard stipulations) on all 4,980 acres.
- Domestic livestock grazing would continue to be allowed in the designated wilderness area, and the AUMs in this area would remain available to livestock as presently allotted. Existing facilities and new rangeland developments (none now

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proposed) could be allowed in the 5,100-acre wilderness if necessary for protection and management of the rangeland and/or wilderness resource, provided that wilderness protection criteria are met (refer to Appendix 1). In the 4,980-acre nonwilderness area, grazing use would continue as authorized in the MFP. New rangeland developments could be allowed in this area without concern for wilderness values; however, none are now proposed.

- In the 5,100-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 that are imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the remaining 4,980-acre area, water resource facility developments would be allowed without concern for wilderness values if in accordance with the MFP. The Paria River and its floodplain would not be included in the portion of the WSA designated as wilderness and, therefore, water resource development on the river could be allowed with this alternative.
- In the 5,100-acre wilderness, wildlife transplants or habitat improvements would be allowed only if they are compatible with wilderness values. In the remaining 4,980-acre area, wildlife transplants or improvements would be allowed without concern for wilderness values. None are now proposed.
- The part of the WSA comprising the 5,100-acre wilderness would be closed to ORV use. About 1 mile of existing ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. No paved or gravel roads would border or be "cherry-stemmed" into the designated wilderness with this alternative.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 5,100-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up

to 100 feet from the edge of the road travel surface.

- Harvest of forest products in the 5,100-acre wilderness 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. The remaining 4,980 acres would be open to commercial woodland harvest, although little potential exists.
- Visual resources on the 5,100-acre wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The remaining 4,980 acres would be managed as Class II (3,180 acres), Class III (600 acres), and Class IV (1,200 acres).
- Within the 5,100-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only 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 must be those having the least adverse impact to wilderness values. Therefore, it is assumed that firefighting would be limited to hand and aerial techniques. In the 4,980-acre nonwilderness area, measures of control would be taken without wilderness considerations.
- In the 4,980-acre nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 5,100-acre wilderness such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the 4,980-acre area, motorized hunting would be allowed subject to applicable State and Federal laws and regulations. In the 5,100-acre wilderness, hunting would be allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means.
- In the 4,980-acre area, control of predators would be allowed without wilderness considerations to protect threatened or

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endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 5,100-acre wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The area is presently classified as Class II air under the Prevention of Significant Deterioration (PSD) regulations as outlined by the Clean Air Act as amended in 1977. The BLM will not consider or recommend any change in air quality classification as part of the wilderness study or wilderness recommendations. Any further air quality reclassification is the prerogative of the State government, not of the BLM (USDI, BLM, 1982b).

No measurements of air pollution or visibility levels have been made in the Paria Planning Unit; however, data collected from various sites (Page, Arizona, approximately 24 miles southeast, and Four Mile Bench, Kane County, Utah, approximately 15 miles east) indicate the air is generally free of pollutants and within National Ambient Air Quality Standards and State regulations.

Geology

The Cockscomb WSA is in the Canyonlands section of the Colorado Plateau Physiographic Province. The tract is fairly typical of this landform. The surface of the plateaus and benches forms knobs, domes, and aprons of white Navajo Sandstone. The exposed bedrock consists largely of

the Glen Canyon group of Triassic-Jurassic Age and the Carmel Formation of Jurassic Age. Typical rock units include the Moenave and Chinle Formations.

Topography in the western portion of the unit is dominated by over 4 miles of The Cockscomb Formation. The central and southeastern portions of the WSA consist of plateaus and benches cut by the Paria River and small side drainages.

The two main topographical features are the southern tip of The Cockscomb in the west and the Rimrocks in the southeast. Triassic to Cretaceous strata are exposed in the WSA. Triassic strata, limited to the Moenkopi Formation, are exposed on a few places along The Cockscomb. Jurassic strata, consisting of the Navajo, Carmel and Entrada Formations, are exposed along The Cockscomb and in the southern portion of the WSA. Cretaceous strata include the Dakota, Tropic, and Straight Cliffs Formations. The Dakota and Tropic Formations form the most extensive exposures in the WSA. The Dakota is coal-bearing throughout most of the WSA.

The most prominent structural axis in the tract is the East Kaibab monocline. East of the monocline is the Kaiparowits syncline. The Straight Cliffs and Dakota Formations are involved in the steep folding of the monocline. At the north end of the WSA the dips are eastward usually 25 to 80 degrees. At the south end of the WSA dips are gentle, approximately 2 degrees to the northeast.

The east Kaibab monocline, or The Cockscomb, as it is often called, is unique as a Colorado Plateau structure. Its alignment with the Paunsaugant, Sevier, and Hurricane faults suggests that it, too, could be a fault at depth. It extends about 60 miles from the Colorado River north to Canaan Peak. The monocline is often badly faulted and many breaks parallel the structure.

Soils

There are four major landforms in the WSA by which soils may be described: The Cockscomb, rock outcrops, terraces, and floodplains.

The Cockscomb landform occupies 20 percent (2,016 acres) of the WSA. Characteristic of this landform is steep exposed sandstone.

The rock outcrop landform makes up 61 percent (6,149 acres) of the WSA. It is characterized by badland-type rock outcrop on barren hills below The Cockscomb. Both landforms produce high

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
THE COCKSCOMB WSA**

Resource	Alternatives		
	No Action	All Wilderness (10,080 Acres)	Partial Wilderness Designation (5,100 Acres) (Proposed Action)
Water Resources	The reservoir proposed by the Blue Pools Water Users could be considered and possibly constructed.	The proposed reservoir would not be allowed.	The proposed reservoir could be considered and possibly constructed.
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 15 million barrels of oil, 90 billion cubic feet of natural gas, 168,000 tons of coal, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 7.5 million barrels of oil, 45 billion cubic feet of natural gas, and 250 tons of uranium oxide could be recovered.
Wildlife	About 3 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Wildlife would benefit from a reservoir proposal on the Paria River.	Wildlife would benefit from solitude. However, water is a limiting factor for wildlife in the WSA and loss of potential water sources would limit expansion of wildlife populations.	Wildlife in the designated area would benefit from solitude. About 3 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 463 AUMs and maintenance of existing developments would continue. New developments could be constructed; however, none are now proposed.	Grazing of 463 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. If proposed in the future, new developments might not be allowed.	Grazing of 463 AUMs and maintenance of existing developments would continue.
Visual Resources	The quality of visual resources could be impaired on up to 330 acres for mineral and energy exploration and an undetermined acreage for development of a proposed reservoir.	Visual quality could be impaired on up to 20 acres.	Visual quality could be impaired on up to 165 acres, including 10 acres in the designated portion. All of the Class A scenery would be within the designated portion and would be protected by the reduced potential for disturbance. Additional intrusion would be created by a proposed reservoir.
Recreation	ORV use would continue on 1 mile of ways at current low levels. Overall recreational use could increase from the present 100 visitor days per year to 144 over the next 20 years. Up to 330 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 1 mile of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV recreational use could continue in the undesignated portion.

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**TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
THE COCKSCOMB WSA**

Resource	Alternatives		
	No Action	All Wilderness (10,080 Acres)	Partial Wilderness Designation (5,100 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 330 acres (3 percent of the WSA). A reservoir proposed by the Blue Pools Water Users would impact the WSA's naturalness.	Wilderness values would be protected, except on up to 20 acres (less than 1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 10 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on 3 percent of the 4,980 acres not designated. Overall, wilderness values could be lost on 1.6 percent of the WSA. However, 51 percent of the area meeting the standards for naturalness, 61 percent of the area meeting the standards for outstanding opportunities for solitude, and 49 percent of the area meeting the standards for outstanding opportunities for primitive recreation would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Kane County Master Plan</i> , State of Utah plans and policies, the proposal to construct a reservoir on the Paria River, and the BLM Paria MFP. This alternative would be consistent with the proposal to build transportation corridors to the Kaiparowits Coal Field.	This alternative would not be consistent with Kane County's concept of multiple use or construction of a reservoir on the Paria River. It would also conflict with proposed transportation corridors for the Kaiparowits Coal Field. Designation would constitute amendment of the BLM Paria MFP.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Kane County's concept of multiple use, the proposal for a reservoir on the Paria River and transportation corridors for the Kaiparowits Coal Field.
Socio-economics	Annual local sales of less than \$11,870 and Federal revenues of up to \$26,763 would continue. An additional \$4,125 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$11,870 and Federal revenues of up to \$648 would continue, but Federal revenues of up to \$30,240 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$11,850.

volumes of sediment and have moderate to high salt hazards and high erosion hazards.

Terrace soils are shallow to moderately deep silty clay loams and clays on rolling topography. The 8 percent (806 acres) of the WSA in this landform is on the east side of the Paria River along the lower northeast border of the WSA. These soils have moderate to high erosion hazard and high sediment and salt yields.

The floodplain landform follows along the Paria River and West Cove drainages. Soils are deep, ranging from clay loams to gravelly fine sandy loams, some of which may be saline. Floodplains occupy 11 percent (1,109 acres) of the WSA. Floodplain soils have moderate erosion hazards and moderate to high sediment yields. Salt yields from these soils are moderate to low because of previous leaching along the river channel. Erosion condition was determined by using soil surface factors as summarized in Table 2 (terms are defined in the Glossary).

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	4,480	44	12,100
Moderate	1.3	2,000	20	2,600
Slight	0.6	3,600	36	2,160
Stable	0.3	0	0	0
Total		10,800	100	16,860

Sources: USDI, BLM, 1979a; Leifeste, 1978.

Vegetation

The existing vegetation on the WSA consists of 44 percent pinyon-juniper (4,435 acres) and 48 percent (4,883 acres) desert shrub. The desert shrub category includes mostly shadscale (3,878 acres) with a little blackbrush and snakeweed (781 acres) and big sage (224 acres) in the higher elevations west of The Cockscomb. Barren areas comprise 8 percent or 762 acres on the steeper badland areas east of The Cockscomb. The pinyon-juniper is found on The Cockscomb itself with desert shrub to the east of it. The floodplain along the Paria River supports thickets of salt cedar and other desert riparian vegetation, but is generally sparsely vegetated.

There are no known threatened or endangered plant species in the WSA. However, there is evidence that *Astragalus ampullarius*, which is being reviewed for inclusion in the Federal Threatened and Endangered List, may occur in The Cockscomb WSA.

The Cockscomb WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978a). The potential natural vegetation (PNV) type of the WSA is saltbush-greasewood. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

Nearly all of the WSA is drained by the Paria River and its tributaries. The average annual discharge of the Paria River, as measured at a gaging station on the mouth of the river near Lee's Ferry, is 26 cubic feet per second. No records exist for flow on the river within the WSA. The Paria River runs through the WSA for approximately 3 miles and is classified as perennial. Water quality samples taken 4 miles north of the WSA show that the water is unsuitable for human consumption because of high bacteria counts. The quality of the water improves after it reaches Cottonwood Creek north of the WSA. One irrigation and three stockwatering reservoirs are located in the WSA.

There are no known springs or wells in the WSA. One well has been developed adjacent to the WSA and is used for watering livestock and wildlife. Water quality data collected north of the WSA indicate that ground water quality varies depending on the source and geology. Ground water quality varies from fair quality to high total dissolved solids (TDS) and sulfate concentrations.

The Paria River carries one of the heaviest concentrations of sediment in the Colorado River Basin. The sandstone and tropic shale formations in the WSA are not great contributors to salinity, although sediment yields are high. The Mancos Shale Formation north of the Kane County line to the headwaters is the major contributor of Paria River salinity.

The Blue Pools Water Users have proposed a reservoir on the Paria River within or near the WSA. No formal application has been made by the Blue Pools Water Users and many obstacles

would have to be overcome before such a reservoir could be built.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982 and 1983). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 2+ was assigned to The Cockscomb WSA by SAI (1982 and 1983). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of titanium and copper that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983). Although listed as strategic, copper is relatively common. Supplies currently exceed domestic demand.

The energy and mineral resource rating summary is given in Table 3.

TABLE 3
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c1	Less than 50 million barrels of oil; less than 300 billion cubic feet of gas
Uranium	f2	c1	Less than 500 tons of uranium oxide
Coal	f2	c4	168,000 tons
Geothermal	f1	c2	None
Hydroelectric	f1	c4	None
Titanium	f2	c1	Unknown
Bentonite	f2	c1	Unknown

Source: SAI, 1982, 1983.

¹ Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

² Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas (f3/c1)

The only oil and gas production in south-central Utah in the vicinity of the WSA comes from the Upper Valley Field located approximately 30 miles to the north. This field was discovered on the Upper Valley anticline in 1964 and stimulated drilling activity on similar anticlinal structures in south-central Utah. To date, however, no commercial oil and gas potential has been identified in south-central Utah outside the Upper Valley Field.

No oil and gas wells have been drilled within the WSA. Two wells have been drilled nearby, one about 12 miles to the northeast and another about 2 miles to the southwest. The well to the northeast tested an anticlinal structure that does not affect the WSA. The well to the southwest tested the western edge of the prominent Kaibab monocline and penetrated Cambrian rocks at a total depth of 6,253 feet. No oil shows were reported from the well (Campbell, 1958; Kunkel, 1965).

The stratigraphic and structural setting of the WSA closely resembles the area of the Upper Valley Field. Although the east Kaibab monocline occurs along the west side of the tract, it does not represent a structure anywhere nearly as favorable for oil and gas as the Upper Valley anticline.

However, the Kaibab monocline has not been tested. This fact, combined with the potential for

subtle stratigraphic traps within the WSA, resulted in SAI (1983) rating the WSA as favorable for small- to moderate-size petroleum accumulations.

Accordingly, the WSA has been assigned an oil and gas rating of f3/c1, (i.e., favorable for small to moderate oil and gas fields [50 million barrels oil and 300 billion cubic feet of gas] but with a low certainty of occurrence). Fields of this size in Utah typically have an areal extent of about 2,500 acres and require about 310 acres for developmental facilities. Private industry believes that the unit has high or moderate oil and gas potential because of the similarity between the WSA's geology and Tenneco's Upper Valley Field.

Under the current land use plan all 10,080 acres within the WSA are open to oil and gas leasing subject to the standard use and wilderness stipulations (Category 1).

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations requiring exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases 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). Wilderness designation would not affect the termination of existing leases.

There are presently nine oil and gas leases covering 8,705 acres. Of these, three leases representing 3,490 acres are pre-FLPMA. The remaining 5,215 acres are post-FLPMA and were leased after October 21, 1976. A total of 1,375 acres remains unleased.

Coal (f2/c4)

The WSA lies along the western edge of the Kaiparowits Coal Field. Estimated coal reserves within the Kaiparowits Field total 15.2 billion tons (Doelling and Graham, 1972). Most of these reserves occur to the east of the WSA.

The only coal-bearing strata in the WSA is the Cretaceous Dakota Formation. Coal is usually present in the Dakota along the entire length of The Cockscomb, but is often intermittent. The coal is more continuous in the southern part of the WSA. Here the coal may be up to 5.6 feet thick and average 2.4 feet (Doelling and Graham, 1972). Total coal reserves within the WSA are estimated at 168,000 tons (based on seams greater than 4 feet thick). Overburden ranges from 200 to 300 feet. No coal analyses are available and coal quality is unknown. Based on the above discussion, the WSA is assigned a favorability rating of moderate (f2) and a certainty of occurrence rating of high (c4).

To date the only coal mining that has taken place in the WSA is that of the Bryce Canyon Coal and Coke Company in Section 21, Township 42 South, Range 1 West. Activity has been intermittent and the mine is no longer active. Only a small tonnage of coal has been removed. A small coal prospect is located in the northeast portion of the WSA. No coal leases currently exist in the WSA.

Any coal development would probably be in the same general area as the one previous mine. However, it is unlikely that any of the coal within the WSA is potentially developable.

LOCATABLE MINERALS

According to BLM mining claim records, a total of 22 mining claims are currently located in the southwest portion of the WSA. These claims are generally located in the southern part of the WSA. It is not known for which minerals these claims have been located, but it is assumed they are for uranium.

Uranium (f2/c1)

The following rock units are considered favorable for uranium in south-central Utah (U.S. DOE, 1979): the basal members and the Petrified Forest Members of the Triassic Chinle Formation, and the Salt Wash Member of the Jurassic Morrison Formation. According to SAI (1982), the Morrison has been removed by pre-Dakota erosion throughout the WSA. The Chinle Formation lies at depths ranging from 1,000 feet along The Cockscomb to about 2,500 feet in the eastern portion of the WSA.

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According to Bendix (1976), both the Chinle and Morrison Formations are relatively unfavorable uranium host rocks in the Kaiparowits Plateau Region. This conclusion was based largely on the high sandstone-to-mudstone ratios, the lack of organic matter, and the wide lateral continuity of the sandstones, especially in the Morrison Formation. Bendix (1976) also points out that, although the paucity of mudstone in the Morrison does not preclude uranium mineralization, deposits found in similar environments nearby, such as the Henry and Carrizo Mountains, tend to be small and highly localized. Small deposits of this type are economical to extract only when exposed in outcrop or when closely grouped.

None of the WSA is within an area considered favorable for the occurrence of economic deposits of uranium (U.S. DOE, 1979 and 1983). As a result, the favorability for economic deposits of uranium must be considered low. Based on the above discussion, the WSA is assigned a favorability rating of f2 (maximum 500 tons of uranium oxide at a minimum grade of 0.01 percent) and certainty of occurrence of c1. It is unlikely that small deposits at these depths (1,000 feet to 2,500 feet) would have any potential for development.

Other Minerals

Evidence of an abandoned small mining effort, generally thought to have been for copper, occurs in Section 18, Township 42 South, Range 1 West. No evidence of copper mineralization is known from the area.

Two other minerals, titanium and bentonite, were considered by SAI in their review of this WSA. Titanium was given a rating of low (f2) favorability and a low (c1) probability of occurrence. Although titaniferous sandstone deposits occur sporadically in late Cretaceous rock in the region, profitable mining of these deposits seems unlikely (SAI, 1983).

The most promising bentonite deposits in the region are located west of the WSA. Most of the known deposits have not been adequately investigated, but those that have (north of the WSA) have proven to be unimportant. Other deposits that may lie at depth in the WSA would probably be similar in size and would be too expensive to mine. For these reasons, bentonite was given a low (f2) favorability rating and a low (c1) possibility of occurrence (SAI, 1983).

Wildlife

The Cockscomb WSA contains four distinct habitat types: pinyon-juniper, desert shrub, sage-

brush, and riparian areas. Each of these habitat types supports a unique complement of animal species. Species composition may include as many as 113 birds, 18 mammals, 18 reptiles, and eight amphibians or as low as 15 birds, 11 mammals, 15 reptiles and three amphibians. In addition, a population of speckled dace inhabits portions of the Paria River.

Game species in the WSA are mule deer, antelope, cougar, cottontail rabbits, chukar, quail, and mourning doves. Mule deer are migrants typically found in the area during the winter months. A few head of antelope occur within the WSA. Approximately 540 acres within the unit have been designated as crucial big game (antelope) habitat. These lands are riparian areas utilized for fawning. Small numbers of cougar are yearlong residents. Cottontails occur throughout the WSA but are very abundant along the unit's western boundary. Chukar and quail are found along the Paria River. Mourning dove are fairly common throughout the WSA from May to September.

Two endangered species, the peregrine falcon and bald eagle, have been recorded within the WSA as migrants. Both species are present along Lake Powell and can be expected to migrate through the WSA. No other sensitive, threatened, or endangered species are known to exist within the WSA.

The Utah Division of Wildlife Resources (UDWR, 1982) list of sensitive species includes three species that occur in the WSA: Lewis woodpecker and the western and mountain bluebirds.

No land treatments have been proposed in the Paria Planning Unit MFP for the benefit of wildlife.

Forest Resources

Forest resources in the WSA are associated with the pinyon pine and juniper vegetation type, which occurs on about 44 percent of the WSA. The entire WSA is open to fuelwood collecting but, due to limited access and the remoteness of the area, use is minimal and undoubtedly will continue to be so.

Livestock and Wild Horses/Burros

The WSA contains portions of four livestock (cattle) grazing allotments. Table 4 summarizes livestock use in the WSA. Table 5 identifies existing and proposed range improvements in the WSA.

There are no wild horses or burros within the WSA.

TABLE 4
Livestock Grazing Use Data

Allotment	Total Acres	Acres in WSA	Suitable Acres in WSA ¹	Unsuitable Acres in WSA ¹	AUM Grazing Preference in WSA	Livestock Permittees Using WSA
Cockscomb	1,961	1,129	548	581	20	1
Clark Bench	64,341	1,426	0	1,426	95	1
East Clark Bench	9,555	1,405	0	1,405	1	1
Cottonwood	83,998	6,120	3,199	2,921	347	7
Total		10,080	3,747	6,333	463	10

Source: USDI, BLM, 1979a.

¹ The suitability of an area for grazing is determined by a number of factors including steepness of terrain, distance of forage from water, production of vegetation, etc. If the area does not meet these minimum requirements, it is listed as unsuitable for grazing, and any available feed is not allocated for domestic livestock grazing.

TABLE 5
Livestock Grazing Management Projects

Allotment	Existing Improvement	Proposed Improvement
Cockscomb	0	0
Clark Bench	1 Catchment	0
E. Clark Bench	¼ Mile Fence	0
Cottonwood	3-¼ Mile Fence 3 Catchments 1 Cattleguard	0

Source: USDI, BLM, 1979a.

Visual Resources

The WSA has a variety of landscape characteristics. The BLM visual resource inventory classified approximately 2,092 acres as Class A quality scenery, 5,915 acres as Class B, and 2,073 acres as Class C. Class A scenery is found in areas where features of landform, water, and/or vegetation patterns are of unusual or outstanding visual quality. Class C scenery is found in areas where features display little variety and tend to be monotonous.

The VRM classes for the WSA are 8,280 acres (82 percent) of Class II, 600 acres (6 percent) of Class III, and 1,200 acres (12 percent) of Class IV. (Refer to Appendix 7 for a detailed description of BLM's VRM system.) VRM management classes are a sensitivity rating based on view sheds from areas where people are found.

Cultural Resources

A Class I cultural inventory for the *Development of Coal Resources in Southern Utah Regional Analysis* (USDI, BLM, 1978b) identified one cultural site within the WSA boundary. There are no National Register sites in the WSA.

The Hattie Green copper mine, located on the crest of The Cockscomb, may have some historic value. Little is known about this mine other than that copper was discovered here at a very early date. There are no buildings on the site, but there are numerous mine shafts.

Recreation

The Cockscomb WSA offers limited recreational opportunities for hiking, sightseeing, clam fossil collecting, and ORV use.

Current use is limited to occasional stops by recreationists traveling on the Cottonwood Canyon Road and ORV use. It is estimated that the unit receives less than 100 visitor days per year. Most of these visits are associated with ORV use in the Paria River drainage (90 visitor days) and fossil collecting (10 visitor days).

ORV use is confined to existing roads and trails on approximately 550 acres in the floodplain and terraces along the Paria River. However, the actual river bottom is considered to be a trail and is open to ORV use. The remainder of the unit is open to ORV use, but much of the unit's topography makes it unsuitable. There are 2 miles of access road to stockwatering reservoirs and 1 mile of way within the WSA.

The Paria River, from the Colorado River to its source, has been identified by the NPS as possessing values that may be of national significance and, therefore, as having the potential to be included in the National Wild and Scenic Rivers System. Approximately 3 miles of the Paria River are within this unit. The BLM must, as part of its environmental protection review process, avoid or mitigate adverse impacts to the river and consult with the NPS before taking any actions which could foreclose wild, scenic, or recreational river status (Council on Environmental Quality, 1980).

Wilderness Values

SIZE

The WSA encompasses 10,080 acres. It is approximately 6 miles long (north to south) and 6 miles wide (east to west), being in the shape of a boot.

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NATURALNESS

There are four substantially noticeable imprints within the WSA, an open pit coal prospect near the 345-kilovolt powerline, a stockwatering reservoir, an irrigation reservoir on the Paria River, and the Bryce Canyon Coke and Coal Company mine. The Hattie Green mine and associated access route are substantially unnoticeable imprints within the WSA. These imprints involve less than .50 of 1 percent (50 acres) of the WSA.

SOLITUDE

In The Cockscomb WSA opportunities for solitude are associated with The Cockscomb and Rimrocks topographic features because of the extended linearity of the dissected topography. Both are several miles long and offer topographic screening along their lengths. Opportunities for solitude exist along both features in various side drainages and canyons. The Cockscomb-West Cove area also has topographic screening; however, it is separated from the Rimrocks area by the open Paria River Valley.

In this unit, size and vegetation are not significant factors in considering solitude. Vegetation is sparse throughout the unit. The stands of pinyon-juniper vegetation along The Cockscomb contribute very little to solitude; topography is the dominating factor contributing to solitude. The unit is small enough that roads and powerlines outside the WSA are readily observable from most of the WSA except where topographic screening in the Rimrocks and Cockscomb occurs. Outside sites and sounds from Highway 89 are noticeable from the southern portion of the WSA. Size does not contribute to the opportunities for solitude. About 43 percent (4,319 acres) of the WSA offers outstanding opportunities for solitude. The remaining 57 percent (5,761 acres) does not meet the criterion.

PRIMITIVE AND UNCONFINED RECREATION

Recreation opportunities are hiking, photography, and sightseeing for geologic features. These opportunities in the Rimrocks and Cockscomb areas are considered outstanding recreation activities. Although the unit possesses no hiking trails or routes, the entire unit is an easy one-day trip for hikers from Highway 89 or the Cottonwood Wash Road. The opportunity for primitive and unconfined recreation may be considered outstanding on 56 percent (5,600 acres) of the WSA, while 44 percent (4,480 acres) does not meet the standards for outstanding opportunities.

SPECIAL FEATURES

The WSA was found to have special scenic values. These values are associated with the same features that contribute to solitude and primitive recreation opportunities. The Cockscomb and Rimrocks Formations dominate the landscape and offer scenic values on about 43 percent (4,300 acres) of the WSA. The Geology section describes these features in detail. The scenic values are associated with sheer canyon walls, numerous and diverse erosional features, and the contrasting color and structure of the topography.

Land Use Plans and Controls

The WSA lies within the BLM Paria Planning Unit and is being managed under the land use decisions of the Paria MFP. Permitted uses in the WSA include livestock grazing, recreation, and mineral exploration. The BLM has surface and subsurface ownership of the entire 10,080 acres within the unit.

The *Kane County Master Plan* (Kane County Board of Commissioners, 1982) states, "Kane County supports the total concept of multiple use of lands. We reject exclusionary recreational forms that cannot be used by the average recreation visitor. Wilderness, as conceived by the Federal land agencies, is rejected because of the limited visitor utilization possibilities and rejection of the multiple use concept."

There are no current or presently proposed rights-of-way or development projects within the unit. However, three powerlines border the unit. A 345-kilovolt line borders the north boundary for approximately .75 mile, a 230-kilovolt line parallels the west boundary for approximately 3.5 miles, and a small distribution line follows the southern boundary for approximately 5.75 miles. Coal transportation and rail corridors (Environmental and Research Technology, Inc., 1980) under consideration overlap the WSA. The WSA is between the Paria Box and Highway 89 corridors, the two potential access routes from the Kaiparowits Coal Fields to western markets.

Socioeconomics

DEMOGRAPHICS

The Cockscomb WSA is 40 highway miles from Kanab and is located in Kane County, Utah. Kane County is a rural county with a 1980 population of 4,024 persons (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

EMPLOYMENT

The dominant sectors, in terms of employment, in the Kane County economy are retail trade (17 percent), government (17 percent), and services (14 percent) (USDC, Bureau of Economic Analysis, 1982). The strength of the retail trade sector reflects the importance of tourism to the Kane County economy. Table 6 presents employment and personal income estimates for the county.

TABLE 6
1980 Employment and Personal Income
Kane County, Utah

Industrial Sector	Employment	Personal Income (\$1,000)
Total	1,452	12,595
Proprietors	382	2,623
Farm Proprietors	122	136
Nonfarm Proprietors	260	2,487
By Industry Source		
Farm	27	382
Nonfarm	1,043	12,213
Private	798	9,614
Ag. Serv., For., Fish., and Other	(L)	0
Mining	17	196
Construction	51	1,544
Manufacturing	70	566
Nondurable Goods	(D)	(D)
Durable Goods	(D)	(D)
Transportation and Public Utilities	150	1,875
Wholesale Trade	12	230
Retail Trade	252	2,364
Finance, Insurance, and Real Estate	39	392
Services	202	2,427
Government and Government Enterprises	245	2,599
Federal, Civilian	18	252
Federal, Military	30	78
State and Local	197	2,269

Source: USDC, Bureau of Economic Analysis, 1982.

(D) Not shown to avoid disclosure of confidential information. Data included in totals.

(L) Less than 10 wage and salary jobs.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, livestock production, and recreation. Table 7 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has 22 mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

No oil and gas exploration and only limited min-

TABLE 7
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$26,115
Mineral Production	0	0
Mining Claim Assessment	Less than \$2,200	0
Livestock Grazing	\$9,260	\$648
Woodland Products	0	0
Recreational Use	Less than \$410	0
Total	Less than \$11,870	Up to \$26,763

Sources: BLM File Data; Appendix 9.

¹ Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

eral exploration 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 463 AUMs within the WSA. If all this forage were utilized, it would account for \$9,260 of livestock sales and \$2,315 of ranchers' returns to labor and investment.

Some woodland products are harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use is low and related local expenditures are low. These expenditures 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 from 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 Cockscomb WSA is estimated as about 100 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Kane County.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 7).

Oil and gas leases in the WSA cover approximately 8,705 acres. At \$3 per acre, lease rental fees generate up to \$26,115 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.

Livestock permittees in the WSA can use up to 463 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$648 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

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; and (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982 and 1983). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this

section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be relatively low due to the WSA's rough terrain and low to moderate resource potential. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: oil and gas, 310 acres; and uranium, 20 acres. (Appendix 10 lists surface disturbance assumptions and estimates.) It is assumed that, due to the low volume of coal within the WSA, no coal development would occur within the WSA.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. If minerals are developed, air quality could be reduced up to the PSD Class II limitations. Disturbance of 330 acres would result in only minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with uranium and oil and gas exploration and development activities would probably not exceed 330 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 330 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with critical erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 330 acres would increase from 891 cubic yards/year to 1,782 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time

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required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 891 cubic yards (5.2 percent) over current annual soil loss. This increase and the effects would likely have some minor local impacts but would be imperceptible in the Paria drainage as a whole.

VEGETATION

The anticipated maximum of 330 acres disturbed would impact the WSA's sparse vegetation. In the immediate areas of development, however, disturbance of approximately 3 percent of the area within the WSA would not significantly impact the area as a whole.

One species of candidate threatened or endangered plant is found within or near the WSA. Before authorizing surface-disturbing activities (330-acre potential) BLM would conduct site-specific clearances of the potentially disturbed areas. If this species could be affected, the BLM would initiate Section 7 consultation with the Fish and Wildlife Service (FWS) as required by Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect this plant, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Since precipitation is low and the Paria River has poor water quality, no significant sedimentation or change in TDS is expected to occur from the 891 additional cubic yards of annual soil loss from surface disturbance. Opportunities for maintenance, additional improvements, or expansion of existing water sources could occur as allowed in the current MFP for the Paria Planning Unit. The reservoir proposed by the Blue Pools Water Users could be considered.

Mineral exploration and development in the area is generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The potential for up to 50 million barrels of oil in-place (15 million estimated recoverable) and

up to 300 billion cubic feet of natural gas (90 billion estimated recoverable) exists within the WSA. These oil and gas resources could be explored and developed, subject to Category 1 stipulations, and would not be affected by the adoption of this alternative. Approximately 310 acres of surface disturbance would take place if exploration and development were to occur. However, due to the unknown quantities of these deposits, no development is expected in the near future.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of up to 500 tons of uranium oxide could be developed, and approximately 20 acres could be disturbed due to exploration and development of this locatable mineral resource. However, the likelihood of development is thought to be minimal because of economic considerations (e.g., transportation, low potential, etc.).

WILDLIFE

Under this alternative, wildlife could be affected by an increase in the availability of water through the construction of water developments; however, none are proposed at this time. Disturbance of an estimated 330 acres (3.2 percent of the WSA) through mineral and energy development and exploration would disrupt wildlife. Deer, pronghorn antelope, and mobile nongame animals would be dispersed from the disturbed areas for the lifetime of these activities. Less mobile wildlife would either perish or co-exist with these disturbances at smaller and less viable population levels.

Two species of officially listed threatened animals are found within or near the WSA. Before authorizing surface-disturbing activities (330-acre potential) BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the FWS as required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these animals, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive animal species would be preserved under the No Action Alternative.

FOREST RESOURCES

Since there are few trees other than scattered pinyon and juniper, none of which are utilized (except by occasional campers or hikers), no significant impacts to forest resources are expected.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Paria Planning Unit MFP. The 463 AUMs currently allocated in the WSA are controlled by 10 livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected.

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 330 acres of surface disturbance from mineral and energy exploration and development and an undetermined acreage for construction of a proposed reservoir would be degraded, and VRM Class II management objectives would probably not be met during the short term. This would particularly be true if access roads were developed through the area. However, management objectives on Class III and IV areas could be met. After rehabilitation, some permanent localized degradation would be expected.

CULTURAL RESOURCES

The cultural resources in the WSA would continue to receive protection under the National Historic Preservation Act and other regulations. Disturbance of 330 acres by mineral exploration and development under this alternative could affect archaeological sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would mitigate impacts. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown but, based on the experience of BLM District archaeologists, it is expected to be minimal. Vandalism could be a problem and would increase in proportion to the general population increase.

RECREATION

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation

Agency, 1980; 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 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 100 current visitor days per year to 149 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 10 visitor days per year to about 15 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access (hunting, sightseeing, etc.) would increase from 90 visitor days per year to 134 visitor days. The 1 mile of way and the Paria River bed would be left open to ORV use. However, up to 330 acres could be disturbed by mineral and energy activities. Primitive recreational opportunities could be diminished on the affected areas.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Paria MFP. Expected mineral and energy exploration and development could disturb an estimated 330 acres. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. The 330 acres of mineral-related surface disturbance could result in a significant loss of naturalness and solitude throughout the WSA as a whole if roads, vehicular ways, and drill pads are located throughout the area.

Several proposed developments could impact the area's wilderness values in the future. If a major transportation corridor is constructed from the Kaiparowits Coal Fields to western markets, a railroad could be constructed along the WSA's border and significantly impact the unit's solitude because of noise and visual intrusions. A proposed reservoir by the Blue Pool Water Users would impact the WSA's naturalness because of the impounded water and dam.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Kane County Master Plan* which recommends multiple use of public lands. It would also be consistent with the proposal to build transportation corridors into the Kaiparowits Coal Field and with proposals to build a reservoir on the Paria River. This alternative is based on implementation of the current BLM Paria Planning Unit MFP and is, therefore, in conformance with it.

SOCIOECONOMICS

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 uranium and oil and gas in the WSA were developed it could lead to a slight increase in employment and income for Kane County. The probability of economic development of minerals within the WSA is low to moderate.

There would be no livestock-related economic losses because the existing grazing use (463 AUMs) and ability to maintain, replace, and build new range improvements 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 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 49 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 1,375 acres in the WSA open to oil and gas leases that are currently not leased. If leased, they would bring up to \$4,125 additional Federal lease fee revenues per year in addition to royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$648 per year) would continue.

All Wilderness Alternative (10,080 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 10,080-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 1 mile of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be

explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas for this alternative would be smaller than under the No Action Alternative (20 vs. 330 acres), the impacts from development and surface disturbance on air quality, geology, soils, vegetation, forest, and cultural resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection for these resources.

WATER RESOURCES

Opportunities for additional improvements or expansion of existing water improvements could not occur. This would prohibit the Blue Pool Water Users from developing a reservoir on the Paria River.

Mineral exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not significantly impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Approximately 8,705 acres (3,490 acres pre-FLPMA and 5,215 acres post-FLPMA) are under oil and gas leases. However, no exploration or development of oil and gas is presently occurring within the WSA. Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases will be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases will not be reissued.

Exploration for and development of a potential resource of up to 50 million barrels of oil in-place (15 million barrels recoverable) and less than 300 billion cubic feet of natural gas (90 billion cubic feet recoverable) could be foregone under this alternative. However, due to the unknown quantities of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development activities, it is concluded that this alternative would not result in any significant loss of potential oil and gas recovery.

Locatable Minerals

Approximately 440 acres are under mining claim within the WSA, principally for uranium. Up to 500 tons of recoverable uranium oxide could occur within the WSA. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of the locatable mineral resources. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 500 tons of uranium oxide would be foregone.

Because production of this metal is not currently occurring and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not result in any significant loss of recoverable uranium resources.

WILDLIFE

Under this alternative, some wildlife could benefit due to the preservation of solitude. However, water is a limiting factor for wildlife in this WSA and the elimination of the potential reservoir on Paria River would adversely impact wildlife.

Disturbance due to exploration of locatable mineral resources could disrupt wildlife populations and result in these species leaving the disturbed area.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Paria MFP. The 463 AUMs currently allocated in the WSA are controlled by ten livestock permittees. Since little use of motorized vehicles is currently taking place to manage livestock and grandfathered uses will continue, little effect on the management of livestock grazing is expected. Two miles of road used for maintenance of reservoirs would be "cherry-stemmed."

Range improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, future roads or other livestock man-

agement facilities could be restricted to preserve wilderness values.

VISUAL RESOURCES

A slight benefit would occur to the exceptional visual resources of the WSA because the VRM class would change from Classes II, III, and IV to the more restrictive Class I. That class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 20 acres of surface disturbance from mineral exploration and development would be degraded, and VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected; however, in the WSA as a whole, values would not be significantly affected.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

Although use is currently low (about 100 visitor days a year), the WSA has some areas of outstanding primitive recreational values. If designated, those recreational opportunities would be recognized, managed, and preserved.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. One mile of way would be closed to vehicles.

Designating the area as wilderness would impact the ORV recreational use occurring in the area

along the Paria River bed. Approximately 90 percent of the recreation use occurring in the area is ORV play activity and/or vehicular hunting and sightseeing; therefore, wilderness designation could reduce visitor use in the short term. However, 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 vicinity of the WSA.

Primitive recreational use of the WSA would likely offset the loss of motorized recreational use.

Mineral-related surface disturbance on up to 20 acres could cause localized impairment of values.

It is concluded that this alternative could benefit recreation by reducing the likelihood for surface-disturbing activities and increasing management attention and recognition of primitive recreational values.

WILDERNESS VALUES

Designation and management of all 10,080 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive recreation. Solitude would be preserved on approximately 4,319 acres that meet and 5,761 acres that do not meet the standards for outstanding solitude. Naturalness would be preserved on all 10,080 acres and primitive and unconfined recreation would be preserved on 5,600 acres that meet and 4,480 acres that do not meet the standards for outstanding opportunities. The scenic special features in this WSA would also be protected and preserved.

No development of leases is foreseen under this alternative. The anticipated mineral-related surface disturbance would, therefore, be reduced from 330 acres to 20 acres for development of valid mining claims. Mitigation to protect wilderness values would be considered during mining claim development. Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

Outstanding opportunities for three recreational activities (hiking and geological and scenic sightseeing) would be preserved. Although recreational use could increase (refer to Recreation section), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreational values would be expected.

Thus, it is concluded that wilderness designation and management of all 10,080 acres of The Cockscomb WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 4,319 acres) and primitive recreation (outstanding on 5,600 acres) except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

This alternative would not complement the Blue Pools Water Users proposed reservoir or plans to develop a coal transportation corridor from the Kaiparowits Coal Fields. The existing BLM Paria Planning Unit MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the Paria MFP.

The *Kane County Master Plan* recommends multiple use of all public lands in the county. This alternative would not totally conflict with the multiple-use concept since many existing resource uses would continue, although under more restrictive conditions. However, this alternative would conflict with the county's multiple-use concept because restrictive conditions would be placed on mineral development and oil and gas leases would be phased out.

SOCIOECONOMICS

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 7) as well as a loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low to moderate. Valid existing oil and gas 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 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 Alternative. Because the potential for mineral development is low to moderate, it is

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estimated that potential mineral-related local 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 \$9,260 of livestock sales and \$2,315 of ranchers' return to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use. Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is 90 visitor days per year. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 8,705 acres now leased would cause an eventual loss of up to \$26,115 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$4,125 annually in Federal revenues from the 1,375 acres that could be leased without designation. In addition to these rental fees, any potential royalties from lease production could also be foregone.

Any economic benefits that would result from the construction of the reservoir proposed by the Blue Pools Water Users would be foregone.

Partial Wilderness Alternative (5,100 Acres)

(Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 5,100-acre area designated as wilderness and the 4,980-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some mining claims would be filed before designation and eventually be explored and developed, causing an estimated 10 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed.

It is assumed that, within the nondesignated area, 155 acres would be disturbed sometime in the

future due to mineral and oil and gas exploration and development. Overall, 165 acres of surface disturbance would occur within the WSA, 165 acres less than under the No Action Alternative and 145 acres more than with the All Wilderness Alternative. Appendix 10 lists the surface disturbance assumptions and estimates for the WSA.

The analysis of the No Action Alternative, based on 330 acres of surface disturbance, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, forest, and cultural resources. Consultation with the FWS regarding potential impacts to officially listed or candidate threatened and endangered plant and animal species would be required in both the designated and nondesignated areas prior to any development. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes 165 acres of surface disturbance.

Restrictions on management and development methods within the designated area would result in essentially the same impacts on development of water sources, mineral and energy resources, wildlife, livestock, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

WATER RESOURCES

The proposed reservoir on the Paria River by the Blue Pools Water Users would be outside the designated wilderness area. The impounded water would form the eastern boundary of the 5,100-acre wilderness area. Consequently, this proposal could be constructed under this alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 4,755 acres of oil and gas leases in the area that would be designated wilderness. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

It cannot be determined how much of the existing potential resource of 50 million barrels of in-place oil and less than 300 billion cubic feet of natural gas is within the area that would be designated as wilderness under this alternative. Of these amounts, 15 million barrels of oil and 90 billion

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cubic feet of natural gas are estimated to be recoverable. Assuming that the loss of potential resource recovery would be in direct proportion to the size of the area designated, exploration and development of a potentially recoverable resource of up to 7.5 million barrels of oil and 45 billion cubic feet of natural gas could be foregone.

It is concluded that, due to the unknown qualities of the potential deposits and the low certainty that these exist, development activities are not expected in the near future. However, long-range development may occur in the nondesignated area.

Locatable Minerals

There are presently no mining claims within the 5,100-acre designated area. However, claims can be staked up to time of designation. Development work, extraction, and patenting could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981a).

It cannot be determined how much of the potentially recoverable 500 tons of uranium oxide in the WSA is within the area that would be designated as wilderness under this alternative. Assuming that the locatable minerals are evenly distributed in the WSA and that the mineral deposits were not included in mining claims filed before designation, the potential for recovery of uranium would be foregone in the designated portion of the WSA. However, uranium could be developed in the nondesignated area and an estimated 250 tons of uranium oxide could be recovered.

Because this metal is not being recovered at present within the WSA and because economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not prevent recovery of significant amounts of uranium.

LIVESTOCK

The effect of wilderness designation of 5,100 acres on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the 463 AUMs allocated, approximately one half would be within the designated portion of the WSA. Development of future roads or other livestock management facilities for use in the designated portion could be restricted to pre-

serve wilderness values. Because no new improvements have been proposed in the WSA and motorized vehicles are used very little in livestock management, little effect on the management of livestock grazing is expected.

VISUAL RESOURCES

Because total surface disturbance in the WSA would be 165 acres under this alternative as opposed to 330 acres under No Action and 20 acres under All Wilderness, the impact on visual resources would be less than under the No Action Alternative and more than under the All Wilderness Alternative. In the portion recommended for designation, 10 acres of surface disturbance resulting from mineral exploration and development would cause localized long-term degradation of scenic values and exceed VRM Class I management objectives. The 155 acres in the nondesignated portion of the WSA would be disturbed and would not meet VRM Class II objectives. Disturbance of a total of 165 acres within the WSA would result in localized long-term impairment of visual values particularly where access roads would be developed.

RECREATION

Impacts on recreational values and opportunities for the 5,100-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to Paria River bed (highest ORV use area) not being closed to ORV use. However, approximately 1 mile of way within the WSA would be closed to ORV use.

In the area that would not be designated (4,980 acres), little change in recreational use is expected due to the limited recreational values.

WILDERNESS VALUES

Impacts to wilderness values would essentially be the same as under the All Wilderness Alternative on the 5,100 acres that would be designated wilderness. Size, naturalness (all 5,100 acres affected are natural), outstanding opportunities for solitude (2,650 acres meet the standard and 2,450 acres do not meet the standard) and primitive recreation (including 2,750 acres that meet and 2,350 acres that do not meet the standards), and special features would be preserved. Although recreational use could increase (refer to Recreation section under the All Wilderness Alternative), use relative to the size of the area would be low. Therefore, no significant effect on solitude and primitive recreation values would be

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expected. There could be some loss of wilderness values due to allowable surface disturbance from mineral exploration activities on up to 10 acres. Additionally, sights, sounds, and emissions of activities within and adjacent to the 4,980-acre designated area could result in loss of solitude and primitive recreational values within the designated portion. Outside sites and sounds would greatly increase if a railroad were built to haul Kaiparowits coal. This could significantly impact the area's solitude.

In the 4,980-acre area that would not be designated, there would be 155 acres of disturbance from mineral and energy exploration and development activities and potential disturbances from a coal transportation corridor and reservoir development. Those activities would degrade wilderness values (naturalness, special features, and opportunities for solitude and primitive recreation). Thus, long-term impairment of wilderness values in the portion that would not be designated would be expected. Additionally, the sights, sounds, and emissions of those mineral and energy activities and the railroad could impair solitude and primitive recreation values in the portion that would be designated.

Because no development of leases is foreseen in the designated wilderness area, the anticipated mineral-related surface disturbance would, therefore, be reduced from 330 acres to 165 acres. Mitigation to protect wilderness values would be considered during mining claim development.

Therefore, although disturbance would eliminate solitude and naturalness in the vicinity of the activity, it is less likely than the No Action Alternative to result in a significant loss of solitude and naturalness in the area as a whole.

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use Plans and Controls section as described for the All Wilderness Alternative with the exception of conflicts with proposed coal transportation corridors and the proposed reservoir on the Paria River. This alternative would not be consistent with the *Kane County Master Plan* because of the restrictions associated with wilderness designation.

SOCIOECONOMICS

Partial designation of this WSA is not expected to result in any changes in existing patterns and trends of population, employment, and local income distributions. The 463 AUMs would remain available to cattle in the four affected allotments. Approximately \$11,850 per year in Federal oil and gas leasing revenue, \$14,150 less than with the All Wilderness Alternative, would be lost as leases expired. This revenue would not be transferred to State programs. Overall, the local economic impact from this alternative would be considered insignificant as would economic impacts from the No Action and All Wilderness Alternatives.

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