



KANAB / ESCALANTE GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

DRAFT



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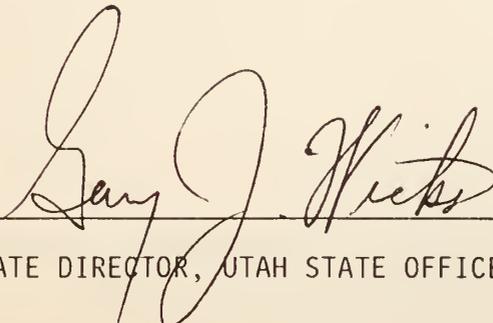
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DEPARTMENT OF THE INTERIOR
DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ON
GRAZING MANAGEMENT
IN THE
KANAB/ESCALANTE AREA
UTAH

PREPARED BY

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KANAB/ESCALANTE GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

(X) Draft () Final Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: (X) Administrative () Legislative

2. Abstract: The Bureau of Land Management (BLM) proposes to implement livestock grazing management on 2,567,466 acres of public land in Washington, Kane, and Garfield Counties in Utah, and Coconino County in Arizona. Of the six alternative plans proposed, Alternative 5, Rangeland Management Recommendation, is the preferred alternative. Under this alternative, specific management would be applied on 129 allotments, continuous seasonal management would be applied on 60 allotments, and livestock grazing would be eliminated on 21 allotments. The initial livestock grazing capacity under this alternative would be 68,298 AUMs, and the allocation to wildlife and other resources would be 69,253 AUMs. After 24 years the potential grazing capacity under this alternative would be 91,444 AUMs for livestock and 71,627 AUMs for wildlife and other resources. Under this alternative the production of desirable vegetation would increase, overall watershed conditions would improve, wildlife habitat would improve, and rancher income would improve but would continue to be negative in the long term. Considerable vegetation treatments and rangeland developments such as fences and water developments would be necessary to implement this alternative. These developments would degrade the aesthetic values in certain high visibility areas and could cause some short-term soil losses which would be irretrievable.

The environmental consequences would vary with each of the alternatives, but the primary effects would be to vegetation condition, trend, and production. The vegetation change would cause a change to soils, wildlife habitat, net annual rancher income, and aquatic riparian habitat condition. Specific impacts would vary with the degree of management proposed and the subsequent change from the existing situation.

3. Alternatives Analyzed:

- a. Continuation of Present Management
- b. Elimination of Livestock Grazing
- c. Multiple Resource Enhancement
- d. Adjustment to Grazing Capacity
- e. Rangeland Management Recommendation
- f. Livestock Optimization

4. Comments Have Been Requested From the Following: See List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent.

5. Date by Which Comments Must be Received: June 16, 1980

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7. Date Draft Statement Made Available to EPA and the Public:

TABLE OF CONTENTS



	<u>Page Number</u>
<u>SUMMARY</u>	11 pages
 <u>CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION</u>	
INTRODUCTION	1-1
PURPOSE AND NEED	1-1
BUREAU OF LAND MANAGEMENT PLANNING PROCESS	1-2
SCOPING	1-5
ALTERNATIVES	1-9
INTERRELATIONSHIPS	1-10
 <u>CHAPTER 2 - ALTERNATIVES</u>	
INTRODUCTION	2-1
DESCRIPTION OF ALTERNATIVES	2-4
SPECIFIC DESCRIPTION OF EACH ALTERNATIVE	2-4
Continuation of Present Management: ALTERNATIVE 1	2-4
Elimination of Livestock Grazing: ALTERNATIVE 2	2-5
Multiple Resource Enhancement: ALTERNATIVE 3	2-7
Adjustment to Grazing Capacity: ALTERNATIVE 4	2-8
Rangeland Management Recommendation: ALTERNATIVE 5	2-9
Livestock Optimization: ALTERNATIVE 6	2-11
GENERAL FEATURES NEEDED FOR IMPLEMENTATION	2-12
Grazing Management	2-12
Rangeland Developments	2-13
Vegetation Treatments	2-13
Design Restrictions and Standard Operation Requirements for Rangeland Developments	2-16
Monitoring and Study	2-16
Administrative Options and Flexibility	2-17
Development Costs	2-17
IMPACTS OF EACH ALTERNATIVE	2-18
 <u>CHAPTER 3 - AFFECTED ENVIRONMENT</u>	
INTRODUCTION	3-1
VEGETATION	3-1
Vegetation Types	3-1

Phenology	3-2
Condition	3-4
Trend in Rangeland Condition	3-4
Production	3-5
Riparian Vegetation	3-6
Noxious and Poisonous Plants	3-7
Threatened and Endangered Species	3-7
 SOILS	 3-7
Soil Associations	3-8
Erosion Condition	3-11
Sediment Yields	3-11
Important Soil Characteristics and Areas of Concern	3-12
 WATER RESOURCES	 3-13
Water Availability	3-13
Water Use	3-14
Water Quality	3-14
 LAND USE	 3-15
Land Ownership and Predominant Management	3-15
Land Production	3-16
Livestock Production Characteristics	3-18
 SOCIOECONOMICS	 3-18
Livestock Industry	3-18
Communities and the Region	3-22
 WILDLIFE	 3-26
Important Big Game Habitat	3-26
Mule Deer	3-26
Pronghorn Antelope	3-28
Elk	3-28
Desert Bighorn Sheep	3-29
Critical Habitat	3-29
Threatened and Endangered Species	3-29
Upland Game Birds	3-31
 FISHERIES	 3-31
 WILD HORSES	 3-34
 CULTURAL RESOURCES	 3-35
 VISUAL RESOURCES	 3-36
Scenery Quality	3-36
Visual Sensitivity	3-37
Visual Resource Management Classes	3-37
 RECREATION	 3-37
Activities	3-38
Special Management Areas	3-41
Glen Canyon National Recreation Area	3-41

WILDERNESS	3-42
CLIMATE	3-43
AIR QUALITY	3-43
TOPOGRAPHY/GEOGRAPHY	3-45

CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

INTRODUCTION	4-1
Assumptions	4-2
Analysis Guidelines	4-4
IMPACTS TO VEGETATION	4-4
Livestock Forage Condition	4-4
Trend in Rangeland Condition	4-4
Forage Production	4-6
Riparian Vegetation	4-6
Changes to Proposed Threatened and Endangered Vegetation	4-6
Continuation of Present Management: ALTERNATIVE 1	4-7
Conclusion	4-9
Elimination of Livestock Grazing: ALTERNATIVE 2	4-9
Conclusion	4-11
Multiple Resource Enhancement: ALTERNATIVE 3	4-11
Conclusion	4-13
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-13
Conclusion	4-16
Rangeland Management Recommendation: ALTERNATIVE 5	4-16
Conclusion	4-19
Livestock Optimization: ALTERNATIVE 6	4-19
Conclusion	4-21
Unavoidable Adverse Impacts	4-21
Short-Term Uses and Long-Term Productivity	4-21
Irreversible/Irretrievable Commitment of Resources	4-22
IMPACTS TO SOILS	4-22
Continuation of Present Management: ALTERNATIVE 1	4-23
Conclusion	4-23
Elimination of Livestock Grazing: ALTERNATIVE 2	4-25
Conclusion	4-25
Multiple Resource Enhancement: ALTERNATIVE 3	4-25
Conclusion	4-26
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-26
Conclusion	4-27
Rangeland Management Recommendation: ALTERNATIVE 5	4-27
Conclusion	4-29
Livestock Optimization: ALTERNATIVE 6	4-29
Conclusion	4-30
Unavoidable Adverse Impacts	4-30
Short-Term Uses and Long-Term Productivity	4-31
Irreversible/Irretrievable Commitment of Resources	4-31

IMPACTS TO WATER RESOURCES	4-32
Impact on Water Quality	4-32
Continuation of Present Management: ALTERNATIVE 1	4-32
Conclusion	4-34
Elimination of Livestock Grazing: ALTERNATIVE 2	4-34
Conclusion	4-34
Multiple Resource Enhancement: ALTERNATIVE 3	4-34
Conclusion	4-34
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-34
Conclusion	4-35
Rangeland Management Recommendation: ALTERNATIVE 5	4-35
Conclusion	4-36
Livestock Optimization: ALTERNATIVE 6	4-36
Conclusion	4-37
Unavoidable Adverse Impacts	4-37
Short-Term Uses and Long-Term Productivity	4-37
Irreversible/Irretrievable Commitment of Resources	4-37
 IMPACTS TO LAND USE	 4-37
Livestock Grazing	4-37
Continuation of Present Management: ALTERNATIVE 1	4-37
Elimination of Livestock Grazing: ALTERNATIVE 2	4-38
Multiple Resource Enhancement: ALTERNATIVE 3	4-38
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-39
Rangeland Management Recommendation: ALTERNATIVE 5	4-39
Livestock Optimization: ALTERNATIVE 6	4-40
Unavoidable Adverse Impacts	4-40
Short-Term Uses and Long-Term Productivity	4-40
Irreversible/Irretrievable Commitment of Resources	4-41
 IMPACTS TO SOCIOECONOMICS	 4-41
Impacts to Rancher Finances	4-41
Gross Incomes	4-41
Expenses	4-41
Net Income	4-43
Capital Value of the Permit	4-43
Impacts to the Region and its Communities	4-43
Impacts to Industry Revenues	4-43
Impacts to Support Industries	4-43
Impacts to Various Taxes and Miscellaneous Payments	4-43
Impacts to Attitudes and Expectations	4-44
Continuation of Present Management: ALTERNATIVE 1	4-44
Conclusion	4-45
Elimination of Livestock Grazing: ALTERNATIVE 2	4-45
Conclusion	4-46
Multiple Resource Enhancement: ALTERNATIVE 3	4-46
Conclusion	4-48
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-48
Conclusion	4-49
Rangeland Management Recommendation: ALTERNATIVE 5	4-49
Conclusion	4-50
Livestock Optimization: ALTERNATIVE 6	4-51
Conclusion	4-52

Unavoidable Adverse Impacts	4-52
Short-Term Uses and Long-Term Productivity	4-52
Irreversible/Irretrievable Commitment of Resources	4-53
IMPACTS TO WILDLIFE	4-53
Continuation of Present Management: ALTERNATIVE 1	4-53
Conclusion	4-58
Elimination of Livestock Grazing: ALTERNATIVE 2	4-58
Conclusion	4-60
Multiple Resource Enhancement: ALTERNATIVE 3	4-60
Conclusion	4-63
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-63
Conclusion	4-66
Rangeland Management Recommendation: ALTERNATIVE 5	4-66
Conclusion	4-69
Livestock Optimization: ALTERNATIVE 6	4-69
Conclusion	4-71
Threatened and Endangered Species	4-71
Unavoidable Adverse Impacts	4-71
Short-Term Uses and Long-Term Productivity	4-71
Irreversible/Irretrievable Commitment of Resources	4-72
IMPACTS TO FISHERIES	4-72
Continuation of Present Management: ALTERNATIVE 1	4-72
Conclusion	4-74
Elimination of Livestock Grazing: ALTERNATIVE 2	4-74
Conclusion	4-74
Multiple Resource Enhancement: ALTERNATIVE 3	4-74
Conclusion	4-74
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-75
Conclusion	4-75
Rangeland Management Recommendation: ALTERNATIVE 5	4-75
Conclusion	4-76
Livestock Optimization: ALTERNATIVE 6	4-76
Conclusion	4-76
Unavoidable Adverse Impacts	4-76
Short-Term Uses and Long-Term Productivity	4-77
Irreversible/Irretrievable Commitment of Resources	4-77
IMPACTS TO WILD HORSES	4-77
Continuation of Present Management: ALTERNATIVE 1	4-77
Conclusion	4-78
Elimination of Livestock Grazing: ALTERNATIVE 2	4-78
Conclusion	4-79
Multiple Resource Enhancement: ALTERNATIVE 3	4-79
Conclusion	4-79
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-79
Conclusion	4-80
Rangeland Management Recommendation: ALTERNATIVE 5	4-80
Conclusion	4-80
Livestock Optimization: ALTERNATIVE 6	4-80
Conclusion	4-80

Unavoidable Adverse Impacts	4-80
Short-Term Uses and Long-Term Productivity	4-81
Irreversible/Irretrievable Commitment of Resources	4-81
 IMPACTS TO CULTURAL RESOURCES	 4-81
Conclusion	4-81
 IMPACTS TO VISUAL RESOURCES	 4-82
Continuation of Present Management: ALTERNATIVE 1	4-82
Conclusion	4-82
Elimination of Livestock Grazing: ALTERNATIVE 2	4-84
Conclusion	4-84
Multiple Resource Enhancement: ALTERNATIVE 3	4-84
Conclusion	4-84
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-85
Conclusion	4-86
Rangeland Management Recommendation: ALTERNATIVE 5	4-86
Conclusion	4-87
Livestock Optimization: ALTERNATIVE 6	4-87
Conclusion	4-87
Unavoidable Adverse Impacts	4-88
Short-Term Uses and Long-Term Productivity	4-88
Irreversible/Irretrievable Commitment of Resources	4-88
 IMPACTS TO RECREATION	 4-88
Continuation of Present Management: ALTERNATIVE 1	4-91
Conclusion	4-91
Elimination of Livestock Grazing: ALTERNATIVE 2	4-92
Conclusion	4-92
Multiple Resource Enhancement: ALTERNATIVE 3	4-92
Conclusion	4-93
Adjustment to Grazing Capacity: ALTERNATIVE 4	4-93
Conclusion	4-94
Rangeland Management Recommendation: ALTERNATIVE 5	4-94
Conclusion	4-95
Livestock Optimization: ALTERNATIVE 6	4-96
Conclusion	4-97
Unavoidable Adverse Impacts	4-97
Short-Term Uses and Long-Term Productivity	4-97
Irreversible/Irretrievable Commitment of Resources	4-97
 IMPACTS TO WILDERNESS	 4-97
 IMPACTS TO AIR QUALITY	 4-98
Conclusion	4-99
 <u>LIST OF PREPARERS</u>	 2 pages
 <u>LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM</u> <u>COPIES OF THE STATEMENT ARE SENT</u>	 7 pages

APPENDIXES

APPENDIX 1 Multiple Use Management Framework Plan Recommendations . . . 29 pages
APPENDIX 2 Cultural Resources Memorandums of Understanding 10 pages
APPENDIX 3 Summary of Project Design Specifications 3 pages
APPENDIX 4 Summary of Expected Wildlife Forage Shortages on Federal . . 1 page
Land by Allotment and Alternative
APPENDIX 5 Multiple Use Allocations 5 pages
APPENDIX 6 Implementation Schedules by Allotment 8 pages
APPENDIX 7 Proposed Vegetation Treatments - Alternative 6 3 pages
APPENDIX 8 Livestock Forage Condition 1 page
APPENDIX 9 Methodology Used to Determine Suitability 4 pages
APPENDIX 10 Livestock Forage and Riparian Impact Summary 30 pages
APPENDIX 11 Methodology Used to Determine Apparent Trend for 2 pages
Vegetation
APPENDIX 12 Survey Procedures and Quality Determination for Forage . . . 5 pages
APPENDIX 13 Miles of Stream and Riparian Condition 8 pages
APPENDIX 14 Areas With Sediment Yields in High or Very High 1 page
Categories
APPENDIX 15 Improvement Expected by Alternative on BLM Acres in 1 page
Critical Erosion Condition With Greater than 60-Percent
Utilization
APPENDIX 16 Drainage Channels With Observed Erosion Problems 1 page
APPENDIX 17 Identified Floodplains That Would Remain Heavily 1 page
Grazed After Implementation of Alternatives
APPENDIX 18 Allotments With Livestock/Big Game Conflicts 3 pages
APPENDIX 19 Livestock and Recreation Season of Use and Conflicts 1 page
for Outstanding Natural Areas (Present Situation)
APPENDIX 20 Information Used to Assess Probable Impacts to 14 pages
Vegetation
APPENDIX 21 Rangeland Seeding Success Based on Edaphic Factors 6 pages
APPENDIX 22 Wildlife Forage Availability by Allotment 12 pages
APPENDIX 23 Vegetation Affected by Proposed Rangeland Developments . . . 9 pages
APPENDIX 24 Economic Methodologies 5 pages
APPENDIX 25 Methodology for Projecting Big Game Numbers and a 18 pages
Summary of Impacts to Wildlife Habitat

GLOSSARY 9 pages

LIST OF ABBREVIATIONS 1 page

REFERENCES CITED IN TEXT 11 pages

GENERAL REFERENCES 12 pages

INDEX 5 pages

SUMMARY

This grazing environmental impact statement (EIS) completed by the Bureau of Land Management (BLM) has been prepared to analyze the impacts of implementing a livestock grazing management program proposed for the Kanab/Escalante (K/E) area in southern Utah.



This area is located in parts of Kane, Garfield, and Washington Counties in Utah, and Coconino County in Arizona.

The K/E EIS area is primarily rural and has been dominated in character by livestock production. In recent years other interests such as recreation have played an increasingly important role. A high potential for change exists in some land use patterns within the area if the Kaiparowits and Alton coal fields go into full production. Land ownership in the K/E area is summarized below:

<u>Ownership</u>	<u>Acres</u>
Public lands	2,179,350
National Park Service (GCNRA)	388,116
State of Utah	258,799
State of Arizona	5,800
Private	65,930
TOTAL	<u>2,897,995</u>

Land ownership in the EIS area is dominated by Federal agencies, primarily BLM and the National Park Service. The State of Utah administers a little over 9 percent and the State of Arizona administers less than 1 percent of the acreage in the EIS area, consisting of generally scattered sections as well as various State forests and reserves. Private lands are usually located in the lower elevations along the major water drainages. This is especially true of the agricultural lands because water tends to be the limiting factor in the EIS area.

Agricultural production in the K/E area centers around the production of livestock. However, the acreage of agricultural land is declining. Most crop production is in support of the livestock industry. Production from BLM-administered lands totals approximately 40 percent of the forage consumed by livestock. Livestock operations are quite diversified, although most run a cow-calf type business utilizing private and public lands in year-round operations.

The effects of six alternative rangeland management recommendations developed by BLM have been analyzed. Based on this analysis and additional public involvement, a rangeland management program will be selected by BLM for its management responsibility of 2,567,466 Federal acres in the K/E area. This includes 388,116 acres of rangeland in the Glen Canyon National Recreation Area (GCNRA) administered by the National Park Service because BLM has been delegated the responsibility by agreement and law to manage livestock grazing in this area.

The need for action has been recognized by BLM. Recent inventories (1975-79) indicate that basic soils, vegetation, and wildlife resources are in poor to fair condition. One of the many causes is the present level and manner of livestock grazing on public land.

AFFECTED ENVIRONMENT

A description of the affected environment in the K/E area is characterized in the following sketch. A more detailed discussion can be found in Chapter 3.

The area is dominated by pinyon-juniper, desert shrub, and sagebrush vegetation types, although there is considerable species diversity because of unique physiographic and climatic features. Of the 2,567,466 Federal acres, 1,307,639 acres (51 percent) are suitable for livestock grazing. Rough and steep terrain render 1,124,725 acres (44 percent) unsuitable for livestock grazing, and 135,102 acres (5 percent) are considered potentially suitable but currently lack reliable water and access.

About 10 percent of the suitable area is in good livestock forage condition, 52 percent is in fair condition, and 38 percent is in poor condition. Apparent trend of this area is 90 percent static, 7 percent up, and 3 percent down. According to the BLM Range Survey (1975-79), approximately 68,298 animal unit months (AUMs) of forage are presently available for livestock, 69,253 AUMs are available for wildlife and other uses, and 314 AUMs are available for wild horses. These are the baseline figures used in the planning system to develop the allocations proposed in each alternative.

Although riparian vegetation is less than 1 percent of the area, it is unique and important to livestock and wildlife. Riparian vegetation is associated with permanent water and is found growing along streams, springs, and seeps. Presently 38 percent of the 349 miles (6,807 acres) of riparian vegetation is in fair condition, 44 percent is in poor condition, and the remainder is in very poor, good, or excellent condition.

Soil types are also diverse, reflecting the influence of climate and geology. Soils are characterized by low organic matter content and limited development and structure. Most soils are sandy, light-colored, and subject to frequent wind and water erosion. Currently 56 percent of the area is in moderate erosion condition, 12 percent is in critical to severe erosion condition, and 32 percent is in slight or stable erosion condition or has no data available.

The area is rural and lifestyles reflect a strong agricultural dominance, although agriculture's economic importance is declining. In terms of income and employment, government (local, State, and Federal), service and trade, transportation, and construction sectors dominate the economies of the EIS area. Residents of Kane and Garfield Counties are characteristically self-reliant people whose independence reflects the traditional western lifestyle of the Southwest.

Most of the 282 livestock operations using BLM rangelands run cow-calf operations. As mentioned, BLM rangeland constitutes 40 percent of the total

livestock forage supply, but the percent of seasonal dependency on BLM forage runs higher. Number and size of ranches in the EIS area and their seasonal dependency are:

<u>Size Class</u>	<u>Operations</u>	<u>Percent Seasonal Dependency on BLM</u>
Small (0 to 25 head)	80	51
Medium (26 to 100 head)	113	81
Large (over 100 head)	89	61

Over 415 species of wildlife are found in the area. Most important habitat types are riparian, pinyon-juniper, aquatic, sagebrush, and grassland.

About 40 percent of the area is considered to be important big game habitat for deer, elk, bighorn sheep, and pronghorn antelope. Currently 4 percent is in good condition, 41 percent is in fair condition, 54 percent is in poor condition, and 1 percent is in unknown condition. Approximately 19 percent of the important big game habitat is considered critical. The bald eagle and peregrine falcon are also found in the EIS area, although most concentration areas are on private lands.

Most of the 349 miles of streams are in poor to fair condition. Few stream sections (54 miles) support or have the capability of supporting populations of sport fish because of their present condition which limits productivity. Most streams are typically small, sandy-bottomed, intermittent, subject to high intensity flooding, and poor in water quality.

Important recreational activities include sightseeing, camping, picnicking, hunting, collecting, and off-road vehicle use. Visitor use is increasing and occurs year round.

There are 51,805 acres designated as Outstanding Natural Areas and Recreation Areas. These areas are managed for their high quality primitive hiking opportunities and outstanding natural features. Presently overlapping seasons of use between hikers and livestock grazing activities contribute to land use conflicts in these areas. The GCNRA, discussed earlier, is also important for recreation. Major activities in this area are associated with Lake Powell, although the Escalante River area is also popular.

BLM PLANNING AND SCOPING PROCESS

BLM has identified several alternatives for the rangeland management program through its multiple use planning process. The Rangeland Management Recommendation, Alternative 5, is currently the BLM preferred alternative.

As a part of the planning process, continuing public involvement has revealed significant issues which form the bases of the proposed alternatives. This public involvement served to scope down or sharpen the focus of this statement. It influenced not only the development of alternatives, but also the level of detail, depth of analysis, and degree of investigation that was used in analyzing the affected environment and the effects of implementing any one of the six alternatives. A more detailed discussion of the BLM planning and scoping process is presented in Chapter 1.

Most issues raised during the scoping process centered on socioeconomic concerns, such as level of grazing allowed, season of use, and the degree of management/control required to implement improved range management in the K/E area. Other issues of concern were wildlife habitat condition, recreation, visual resources, and wilderness values (as they relate to livestock grazing).

The following significant issues were identified during the scoping process.

1. Reduced rancher income due to reduction in AUMs authorized; a result of evaluating areas of public land for their suitability of livestock grazing and the availability of forage.

2. Increased cost of ranch operations due to combining allotments into larger units with multiple pastures.

3. Increased cost of ranch operations due to changes in seasons of livestock use.

4. Reduced wildlife forage created by authorizing livestock grazing in areas not now grazed.

5. Degradation of visual resources in the viewsheds of Bryce Canyon National Park because of increased rangeland developments and proposed vegetation treatments.

6. Decreased availability of wildlife forage due to dietary overlap between livestock and deer.

7. Decreased availability of forage and cover on critical sage grouse areas.

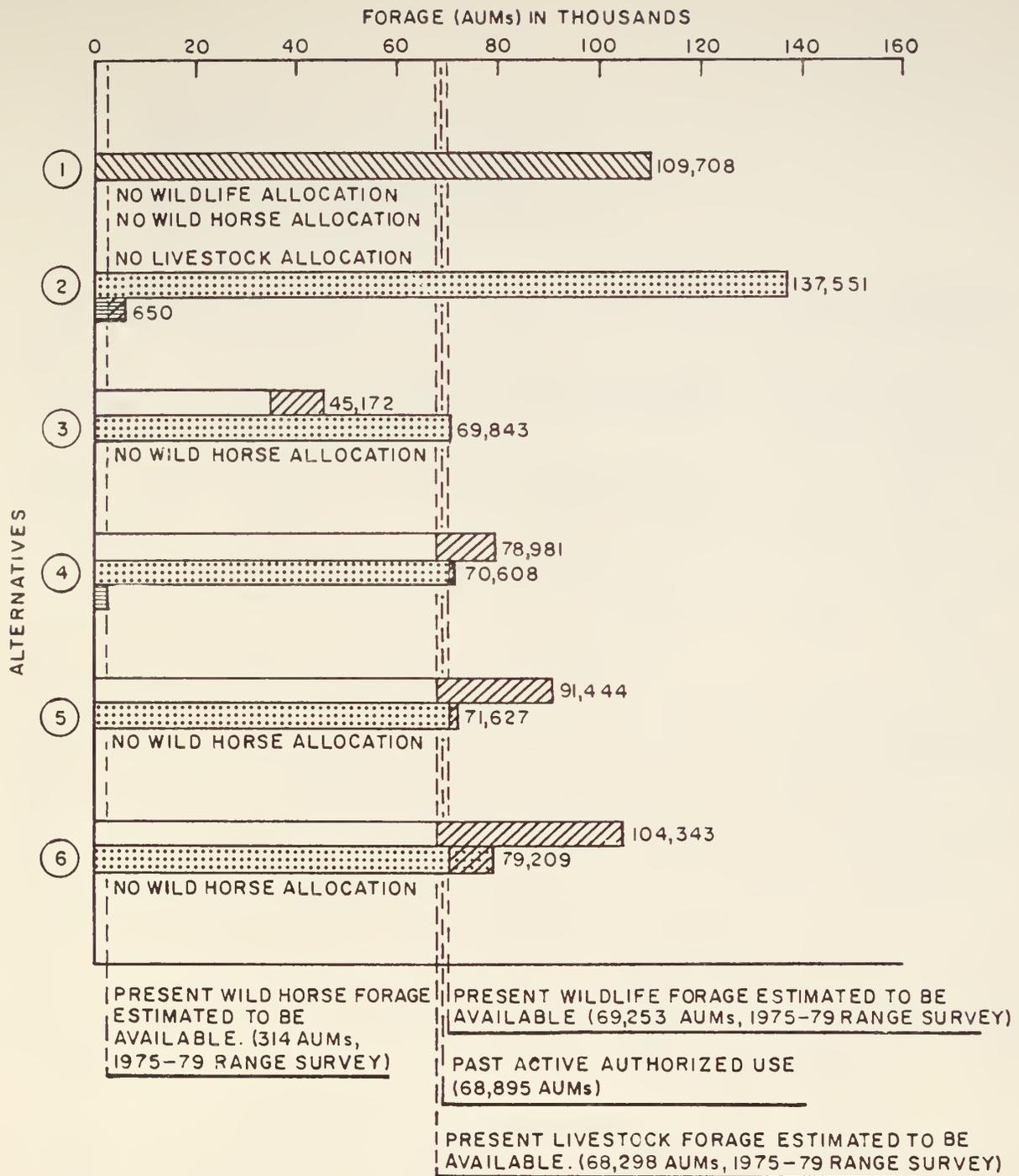
8. Competition between wild horses and bighorn sheep.

9. Decreased availability of cover and forage for wildlife due to increased grazing use on some riparian habitats.

10. Changes in sediment flow, vegetation composition, and water quality due to reduction or elimination of livestock grazing intensity on some riparian habitat.

ALTERNATIVES

Input from the planning and scoping processes was used to develop the following six rangeland management alternatives. The six alternatives vary in level, season, and kind of livestock management proposed. Figure S-1 shows proposed forage allocation levels for each alternative. Table S-1 summarizes the initial level of use and required developments for each alternative. Management objectives also vary from maintenance and protection to improvement of existing resource conditions. The six rangeland management alternatives are:



LEGEND

- INITIAL LIVESTOCK FORAGE
- ADDITIONAL LONG-TERM LIVESTOCK FORAGE
- INITIAL WILDLIFE FORAGE
- ADDITIONAL LONG-TERM WILDLIFE FORAGE
- INITIAL WILD HORSE FORAGE
- ADDITIONAL LONG-TERM WILD HORSE FORAGE
- PRESENT GRAZING PREFERENCE

Figure S-1
PROPOSED FORAGE ALLOCATION

TABLE S-1

Summary of Initial Level of Use and Required Developments for Alternatives

	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Initial livestock allocation (AUMs)	^a 109,708	0	35,224	68,298	68,298	68,298
Initial big game allocation (AUMs)	0	16,515	16,784	16,515	16,784	16,784
Initial other wildlife and resource allocation (AUMs)	0	121,036	53,103	52,738	52,469	52,469
Initial wild horse allocation (AUMs)	0	314	0	314	0	0
Allotments with specific management	21	0	0	21	129	129
Allotments with continuous seasonal management	183	0	118	^b 159	60	60
Allotments unallotted and/or eliminated	6	210	92	30	21	21
Miles of pipeline required	0	0	0	95	149	^c 149
Number of storage tanks	0	0	0	29	39	^c 39
Number of reservoirs	0	0	0	14	59	^c 59
Number of wells	0	0	0	8	17	^c 17
Number of spring developments	0	0	0	17	60	^c 60
Number of water catchments	0	0	0	8	38	^c 38
Number of cattleguards	0	0	0	6	12	^c 12
Miles of stocktrails	0	0	0	2	5	^c 5
Miles of fence	0	973	125	35	117	^c 117
Acres of burning and seeding	0	0	0	^d 8,078	^d 14,161	^d 31,388
Acres of spraying and seeding	0	0	0	^d 5,528	^d 19,975	^d 46,232
Acres of chaining and seeding	0	0	0	7,140	^d 12,144	^d 57,240
Acres of plowing and seeding	0	0	0	1,665	^d 5,607	27,835
Acres of burning	0	0	0	0	0	15,854
Acres of spraying	0	0	0	370	670	5,456
Treatment AUMs	0	0	0	2,614	3,360	16,259
Management AUMs	0	0	0	18,550	34,190	34,190
Water and access development AUMs	0	0	0	1,587	6,258	6,258

Source: Developed from BLM multiple use planning and scoping process.

^aPresent grazing preference, not grazing capacity.
^bIncludes 104 allotments with season of use restricted to after seed ripe.
^cThese would be the same facilities and developments proposed in Alternative 5.
^dAcres increased beyond planning system recommendation to balance pastures.

1. Continuation of Present Management
2. Elimination of Livestock Grazing
3. Multiple Resource Enhancement
4. Adjustment to Grazing Capacity
5. Rangeland Management Recommendation
6. Livestock Optimization

These alternatives have been analyzed by an interdisciplinary team of resource specialists at the Cedar City District Office. The assessment is based on the effects of these alternatives on the people and the existing environment. Results of this assessment, together with public input and scoping meetings held throughout the development of the statement, will be available to the BLM manager. The EIS is only a tool to assist the BLM manager in deciding upon a particular multiple use program. The livestock grazing program finally selected by the manager may be any one of the grazing alternatives or a combination of one or more alternatives.

A detailed description of the six alternatives is presented in Chapter 2. Key points of each alternative are summarized below:

Continuation of Present Management: ALTERNATIVE 1

Present grazing practices (season, level, and kind of management) would continue. The livestock forage allocation would remain at the present grazing preference of 109,708 AUMs and grazing permits would be the same as presently issued. Present average active authorized use over the past 5 to 10 years has been 68,895 AUMs; this level would be expected to continue. There would not be an allocation of forage to wildlife or wild horses as no allocation presently exists. Existing levels of forage utilization would continue and would result in an overallocation of livestock forage by 38 percent from the present grazing preference or 1 percent from the past average active authorized use. The BLM Livestock Forage Survey (1975-1979) indicates that 68,298 AUMs would be available for livestock and 69,253 AUMs would be available for wildlife and other resource uses. There would not be additional rangeland developments proposed to directly support the grazing program.

Elimination of Livestock Grazing: ALTERNATIVE 2

There would be no authorized livestock use on the entire 2,567,466 acres of public land. The 68,298 AUMs of available livestock forage would be available to wildlife and wild horses, resulting in an allocation of 137,551 AUMs to wildlife and other resources such as watershed, recreation, and aesthetics, and 314 AUMs to wild horses. Long-term wild horse forage allocation would be 650 AUMs in order to allow the two herds to increase to 50 head within 24 years. Fencing State and private lands intermingled with public lands or controlling livestock by other means to prevent trespass on public land would be required. All existing Allotment Management Plans (AMPs) would be terminated.

Multiple Resource Enhancement: ALTERNATIVE 3

There would be an additional deduction in forage made (beyond the amount determined available by the range survey) to reduce soil erosion, and to enhance other resources such as vegetation, wildlife habitat, water quality, floodplains, and riparian habitat. Livestock would be allocated 35,224 AUMs of forage initially and 45,172 AUMs after 2 years. Wildlife and other resources would be allocated 69,843 AUMs of forage. This alternative would require the elimination of livestock grazing on frail watersheds, stream and riparian zones, and in five Outstanding Natural Areas. Additionally, livestock grazing would be suspended on critical erosion areas for 2 years to restore sufficient cover to provide improvement. Fencing would be required to assure complete elimination of livestock grazing where proposed.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Livestock grazing would be initially limited to 68,298 AUMs (the available forage as determined by the BLM Range Survey, 1975-79 and allocated in the Management Framework Plan). This would result in a 38-percent reduction from the present grazing preference or a 1-percent reduction from the past active authorized use. Upon implementation of a limited amount of rangeland developments (fences, water facilities) and vegetation treatments (chemical spraying, burning, chaining, plowing, and seeding), livestock forage allocation would be at 78,981 AUMs. This development would occur only on 21 existing AMPs. Wildlife and other resources would be allocated 69,253 AUMs initially, and 70,608 AUMs upon full implementation. Wild horses would be initially allocated 314 AUMs to meet current needs. The long-term wild horse forage allocation would remain at 314 AUMs because management goals would be geared toward maintaining the stability of wild horse populations. Management on the 21 allotments with existing AMPs would continue. No grazing would be permitted during the growing season (April through June) on 104 allotments. Elimination of livestock grazing would occur on 24 allotments because of insufficient forage or other unsuitable grazing conditions. Continuous seasonal management (grazing scheduled to occur the same time each year) would be proposed on the remaining allotments.

Rangeland Management Recommendation: ALTERNATIVE 5

This is currently the BLM preferred alternative. Existing livestock use would be adjusted to the supply of available forage as determined by the range survey and allocated in the Management Framework Plan. There would be an initial allocation to livestock of 68,298 AUMs. This would be a 38-percent reduction from the present grazing preference or a 1-percent reduction from past active authorized use. Long-term forage allocations to livestock would be 91,444 AUMs once proposed rangeland developments and vegetation treatments (burning, chemical spraying, chaining, plowing, and seeding) would become established and specific grazing management systems would be implemented. Wildlife and other resources would be allocated 69,253 AUMs initially and 71,627 AUMs in the long term (once the above mentioned actions would be implemented). This would require adjustment in the present season and level of grazing. Specific management systems that would regulate the timing and frequency of livestock grazing would be developed on 129 allotments. Continuous seasonal management would occur on 60 allotments and

elimination of grazing would occur on 21 allotments because of unsuitable livestock grazing conditions.

Livestock Optimization: ALTERNATIVE 6

This alternative would involve the same management systems, rangeland developments, and vegetation treatments as proposed in Alternative 5. The initial forage allocation levels for livestock (68,298 AUMs) and wildlife and other resources (69,253 AUMs) would also be the same. However, the long-term forage allocation would be 104,343 AUMs for livestock and 79,209 AUMs for wildlife and other resources. This would be expected to result from implementing more vegetation treatments than those proposed in Alternative 5. This alternative would be implemented on an allotment basis. After developments proposed in Alternative 5 would be completed, additional vegetation treatments could be implemented as manpower and funding permit.

Table S-1 summarizes specific details for the six alternatives.

ENVIRONMENTAL CONSEQUENCES

An analysis of the potential impacts that would result from implementing any one of the six proposed alternatives was performed by an interdisciplinary team. The basis for comparison was the existing situation. The results of this analysis are shown in the following pages and are summarized from detailed discussions in Chapter 4.

SUMMARY OF IMPACTS

Continuation of Present Management: ALTERNATIVE 1

There would be an estimated 6-percent reduction in livestock forage production from the present average active authorized use. This would be a reduction from 68,895 AUMs to 64,786 AUMs after 24 years of present operations. Annual net income to the rancher is presently negative and it would continue to decline. Wildlife forage production would decline 5,476 AUMs. Riparian habitat would continue to be heavily impacted but would not change condition class.

There would not be a significant short-term change in the resources. In the long term the vegetation resource would continue to decline. Soil losses as a result of this alternative would be considered irretrievable and the 45,142-acre decline in critical erosion could result in an irretrievable loss.

Elimination of Livestock Grazing: ALTERNATIVE 2

An increase in livestock forage production would be anticipated. However, no forage would be available for livestock use. All forage production would be available to wildlife and other resources (137,551 AUMs). This would result in a severe economic impact to the ranchers, causing some operations to be terminated because of their dependency on public grazing lands. Critical erosion condition would be substantially reduced. No acres would increase in erosion, 98,153 acres would be unchanged, and 211,366 acres would

decrease in erosion. Wild horse populations would increase to about 50 head. Riparian habitat would show substantial improvement; areas in good condition improving by 40 percent.

All of the substantial improvements to the resources would be at the expense of the livestock operations. These economic losses to the rancher would be irretrievable in the K/E area.

Multiple Resource Enhancement: ALTERNATIVE 3

Available livestock forage would be 49-percent less than the present average active authorized use. However, in the long term there would be an increase of 9,948 AUMs. Rancher net annual income would continue to be negative for all sizes of operations, but would improve slightly in the long term with the availability of additional AUMs. Critical erosion condition would improve on 165,890 acres. Wildlife forage quality would improve and wildlife forage production would increase 590 AUMs. Elimination of livestock grazing in riparian habitats would result in a 40-percent improvement in riparian condition.

Long-term benefits to the resources would result in a serious economic decline for the ranchers in spite of the slight increase in AUMs. The losses of available livestock forage and the subsequent economic losses to the rancher would be irretrievable.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Livestock forage production would initially be at the Management Framework Plan level (Range Survey, 1975-79) of 68,298 AUMs, a reduction of 1 percent from the average active authorized use. Over 24 years there would be an increase of 10,683 AUMs. Annual net income to the rancher would continue to be negative for all sizes of operations and would remain the same over the long term. Critical erosion condition would improve on 143,972 acres. Wildlife forage would increase by 1,355 AUMs. Riparian habitat condition would decline because it would not be completely protected. There would be a 6-percent increase in poor condition areas.

The resources would show a very slight improvement in the short and long term. Any soil losses due to vegetation treatments would result in an irretrievable loss.

Rangeland Management Recommendation: ALTERNATIVE 5

Livestock forage production would initially be 68,298 AUMs and would increase about 23,146 AUMs over a 24-year period, reaching approximately 91,444 AUMs. Rancher net annual income would continue to be negative but would improve slightly as available forage increased. Critical erosion condition would improve on 104,726 acres. Wildlife forage would increase by 2,374 AUMs. Riparian habitat would decline with a 4-percent increase in poor condition.

The only short-term changes would be from vegetation treatments. Long-term changes would be positive for vegetation, but erosion would get worse on

13,525 acres in critical erosion condition due to the vegetation treatments. Soil losses due to vegetation treatments would be irretrievable.

Livestock Optimization: ALTERNATIVE 6

Livestock forage production would be about 19,786 AUMs more than in Alternative 5, and would increase an additional 16,259 AUMs in the long term as a result of 236,652 acres of seedings. Net annual income to the ranchers would continue to be negative but would improve as the seedings matured. There would be an improvement on 101,731 acres in critical condition. Wildlife forage would increase by 9,956 AUMs. Riparian habitat would decline, with a 4-percent increase in poor condition.

Generally resources would be improved in both short and long terms. However, there would be 86,432 acres in critical erosion that would decline in condition. Rancher net annual income would increase, but it would continue to be negative. This alternative would have the greatest potential for substantial irretrievable soil losses.

RANGELAND MANAGEMENT DECISION

This EIS is part of the BLM decision making process. An opportunity for additional public involvement will be available. There is a 45-day public comment period scheduled. Comments dealing with the adequacy of the analysis and other relevant matter may be made during the draft comment period and 30 days after the final statement is completed.

These comments will be considered by the district manager in the development of a rangeland management decision which will be made available to the public. This decision will basically establish the BLM rangeland management program for the K/E area.

Following the district manager's selection of a rangeland management plan, additional cooperation and coordination will be needed with the livestock operators to finalize grazing management systems and in determining locations of rangeland developments and/or vegetation treatments. The manager will then develop a decision document which will protect the resources and most nearly fit the livestock operator's needs. Implementation of the management plan for the K/E EIS area will take place at the beginning of the new grazing fee year (March 1981), approximately 6 months after filing the Final K/E EIS statement.

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

This grazing environmental impact statement (EIS) completed by the Bureau of Land Management (BLM) has been prepared to analyze the impacts upon the people and the environment of the Kanab/Escalante (K/E) EIS area.

The K/E EIS area is located in southcentral Utah and northern Arizona (fig. 1-1 at the end of this chapter). The area contains five planning units (Escalante, Paria, Vermilion, Zion, and the Canaan Mountain portion of Virgin River) and is administered by BLM from its District Office located in Cedar City, Utah. This area contains 2,897,995 acres and is extensively interspersed with private and State-owned land.

The land ownership pattern within the boundary of the K/E EIS area consists of approximately 75-percent public land, 13-percent National Park Service (NPS) land (Glen Canyon National Recreation Area [GCNRA]), slightly more than 9-percent State of Utah land, less than 1-percent State of Arizona land, and 2-percent private land. Figure 1-1 shows land ownership for the K/E EIS area. Land ownership acreages for this area are:

<u>Ownership</u>	<u>Acres</u>
Public lands	2,179,350
National Park Service (GCNRA)	388,116
State of Utah	258,799
State of Arizona	5,800
Private	65,930
TOTAL	<u>2,897,995</u>

The EIS addresses the effects of six rangeland grazing alternatives on 2,567,466 acres of Federal land (88 percent) in the K/E EIS area.

PURPOSE AND NEED

The purpose of the action, the implementation of a grazing management program on 2,567,466 acres of Federal land in the K/E Resource Area, is to overcome existing problems in livestock forage condition and production, wildlife habitat, watershed conditions, and other land use related problems.

Livestock forage on the 1,307,639 suitable Federal acres is in poor condition on 38 percent (500,465 acres), fair condition on 52 percent (682,830 acres), and good condition on 10 percent (124,344 acres). Important big game habitat is in good or fair condition on 45 percent of the land (451,096 acres), poor condition on 54 percent of the land (537,921 acres), and unknown condition on 1 percent of the land (12,344 acres). Approximately 77 percent of the watershed is in a slight or moderate erosion class (2,195,911 acres), 11 percent is in a critical or severe erosion class (309,519 acres), and the remaining 12 percent (322,080 acres) is in the barren or stable class or was not inventoried.

The main objective of the rangeland management program is to maintain and improve the vegetation resource. The rangeland management objectives relating to vegetation, soils, water quality, wildlife, and land use are indicated in table 1-1.

As required by law (Taylor Grazing Act, 1934; Classification and Multiple Use Act, Public Law 88-6071, 1964; and the Federal Land Policy and Management Act [FLPMA] of 1976), BLM is responsible for management "in a manner that will protect the land and its resources from destruction or unnecessary injury, stabilize the livestock industry dependent on public lands, and provide for the orderly use, improvement, development, and rehabilitation of the public lands for livestock grazing consistent with multiple use, sustained yield, environmental, economic, and other objectives" (4100.0-2 Grazing Regulations).

Further, this EIS is responsive to a suit filed in Federal Court, 1973, by Natural Resources Defense Council et al., alleging that BLM's programmatic grazing EIS did not comply with the National Environmental Policy Act (42 United States Code 4321 et seq.).

BUREAU OF LAND MANAGEMENT PLANNING PROCESS

The BLM planning system is a decision-making process using input from the public and resource specialists. The fundamental purpose of the planning system is to provide an objective and standardized process for developing land use plans which blend with multiple use programs. The system culminates in a final resource management program for a specific geographic area. These specific geographic areas are called planning units.

Resource management decisions are formulated with use of information contained in seven planning system components: (1) Preplanning Analysis, (2) Land and Resource Inventory, (3) Unit Resource Analysis (URA), (4) Social Economic Profile (SEP), (5) Planning Area Analysis (PAA), (6) Management Framework Plan (MFP, consisting of three steps), and (7) the EIS.

1. The Preplanning Analysis is a process used to determine what resource data is necessary to develop the MFP and the EIS.

2. The Land and Resource Inventories are designed to gather data on seven primary resource categories (Lands, Minerals, Forest Products, Rangeland Management, Watershed, Wildlife Habitat, and Recreation).

3. The URA contains descriptions of the physical profile of an area, present situation of these seven primary resource categories, and management opportunities for each category.

4. Social, economic, and demographic information is compiled in the SEP. The SEP information is compiled on a regional basis.

5. The PAA presents an analysis of social, economic, environmental, and institutional values for the resources in the planning unit.

TABLE 1-1

Rangeland Management Objectives

Objectives For Allotments	Suitable Federal Acres
<p><u>VEGETATION</u> Maintain existing livestock forage condition and trend. Provide for physiological needs and maintain vigor of key species.</p> <p>On allotments proposed for specific management, improve livestock forage condition and trend. Also provide for physiological needs and improve vigor of key forage species. Maintain composition of newly established seedings. Monitor and evaluate specific management tentative grazing systems (after seed ripe, deferred rotation, rest rotation) to ensure that livestock forage utilization would not exceed an average of 50 to 60 percent of key forage species by allotment.</p>	<p>332,808</p> <p>1,307,639</p>
<p><u>WATER QUALITY</u> Maintain or improve existing water quality by reducing livestock concentrations on stream areas. Maintain or improve streambank cover.</p> <p>Maintain or improve existing water quality by reducing livestock concentrations and maintaining or improving plant cover on frail watersheds. Locate rangeland developments where they would not degrade water quality.</p>	<p>6,807 (Includes 553 unallotted acres)</p> <p>144,229</p>
<p><u>SOILS</u> Maintain or improve existing plant cover. Maintain or improve soil productivity and reduce erosion from runoff.</p>	<p>1,307,639</p>
<p><u>LAND USE</u> Allow livestock use consistent with maintaining existing resource productivity.</p> <p>Maintain or increase existing forage productivity and allow maximum level of livestock and wildlife use consistent with maintaining this level.</p> <p>Maintain or improve existing visual/recreation values and manage livestock grazing consistent with preserving these values.</p>	<p>1,307,639</p> <p>1,307,639</p> <p>1,307,639 (continued)</p>

TABLE 1-1 (concluded)

Objectives For All Allotments	Suitable Federal Acres
<u>WILDLIFE</u>	
Reduce livestock use and concentrations in aquatic/riparian habitats. Improve or maintain riparian habitat on public lands for a variety of wildlife. The desirable vegetation target composition to be obtained from riparian habitat improvement is 50-percent cottonwood and willows, 30-percent perennial grasses, and 20-percent forbs. Desired percent cover (vegetation and litter) is 70 to 80 percent.	6,807 (Includes 553 unallotted acres)
On allotments proposed for seeding, manage for target compositions at 60-percent grass and forbs, and 40-percent browse to benefit wildlife.	51,887
Maintain or improve existing habitat conditions and forage quality on important big game habitat.	1,001,361
Restore, maintain, and protect desert bighorn sheep habitat to provide for a viable flock of native sheep.	22,854
<u>FORAGE PRODUCTION AND USE</u>	
Maintain the initial allocation of 68,298 animal unit months (AUMs) of livestock forage production on a sustained basis.	1,307,639
Maintain the initial allocation of 69,253 AUMs of forage production for wildlife and other resources on a sustained basis.	1,307,639
Increase livestock forage production through better management practices by 34,190 AUMs in the long term.	1,307,639
Increase livestock forage production through vegetation treatments by 3,360 AUMs in the long term.	52,557
Improve livestock distribution and achieve more uniform utilization.	1,307,639

6. The MFP is a land use plan developed from the management opportunities outlined in the URA. Step 1 of the MFP process involves the development of objectives and recommendations by specialists dealing exclusively with the seven primary resource categories. Objectives and recommendations are formulated for each of the seven primary resource categories in this same manner. Step 2 of the MFP is the area manager's multiple use management recommendation, a compilation of the Step 1 recommendations balanced with social, economic, and environmental factors. It is at this step that the area manager recommends the allocation of the vegetation resources within the surveyed capacity to meet the needs of livestock, wildlife (including big game and nongame species) wild horses, and other resources such as watershed, recreation, aesthetics, and maintenance of the vegetation community. This step was completed for the Canaan Mountain portion of Virgin River, Escalante, Paria, and Zion Planning Units in 1979, and for the Vermilion Planning Unit in 1978. These recommendations cover the entire K/E EIS area. Step 3 of the MFP is completed after the EIS is written.

7. The EIS contains an analysis of a range of potential management alternatives, including the MFP Step 2 multiple use recommendations (Appendix 1) on the social, economic, and natural resource environment. Table 1-2 identifies specific livestock grazing management program interrelationships with other BLM resource management programs and shows the development of alternatives through multiple use MFP Step 2 recommendations.

Using the information from the mentioned planning system components, the BLM manager will complete the planning process by making land use decisions for the seven resource categories (Step 3 of the MFP process). Decisions on other resource categories not affected by livestock grazing may be formulated prior to completion of this EIS; however, none have been formulated to date.

Once land use decisions are made, the MFP Step 3 is implemented through activity plans which detail how land use guidelines in the MFP should be carried out.

SCOPING

Scoping is a method of identifying significant issues which must be evaluated in planning and in the EIS. The primary purpose of scoping is to reduce the possibility of significant concerns being overlooked by encouraging the public and government agencies to identify important issues. The public is encouraged to participate in the planning process by providing information and expressing desires at open houses and scoping meetings. Coordination with the public begins early and continues throughout the planning process.

A notice of intent to prepare an EIS and hold scoping meetings for the K/E area was issued in the Federal Register (March 29, 1979).

As a result of the MFPs and prior to writing the EIS, 16 scoping meetings were held to provide the public and State and Federal agencies the opportunity to comment on the land use plan (Step 2, MFP) and to help identify critical issues to be addressed in the K/E EIS. The following presents information on these scoping meetings:

TABLE 1-2

Development of Alternatives Through Multiple Use MFP Recommendations

MFP 1 Recommendations	Other MFP 1 Recommendations That Conflict With Rangeland Management Recommendations	MFP 2 Recommendations	Rationale for Area Manager MFP Recommendations	Trade-Offs
<p>1. Allocate 68,258 AUMs of livestock forage on 1,307,639 suitable Federal acres. Adjust livestock stocking rate to surveyed capacity of 43,797 AUMs on 21 existing AKPs. Limit 104 allotments containing 19,675 AUMs to grazing period after seed ripe and no grazing during growing season. Continuous seasonal management would continue on 55 allotments containing 4,712 AUMs. Livestock grazing would be eliminated on 30 allotments containing 23 AUMs. Rangeland developments and vegetation treatments would be carried out on 21 AMPs only (Alternative 4).</p>	<p>1.1 <u>Wildlife</u>. Recommendation to protect 158 miles of stream and 6,807 acres of riparian grazing (Alternative 3).</p> <p>1.2 <u>Wildlife</u>. Rest 34 allotments containing 9,948 AUMs on 204,376 acres for a period of 2 years to improve vigor and production of livestock/wildlife competition forage (Alternative 3).</p> <p>1.3 <u>Wildlife</u>. Protect bighorn sheep area from livestock grazing on four allotments containing 590 AUMs on 61,408 acres (Alternative 3).</p> <p>1.4 <u>Wildlife</u>. Allocate 69,253 AUMs to wildlife and other resources.</p> <p>1.5. <u>Wild Horses</u>. Remove the wild horses and allocate 314 AUMs of forage to bighorn sheep.</p> <p>1.6. <u>Watershed</u>. Eliminate grazing from 38 allotments containing 4,241 AUMs on 144,229 acres to protect frail watersheds and saline soils (Alternative 3).</p> <p>1.7 <u>Watershed</u>. Eliminate grazing on 195,956 acres containing 7,579 AUMs to protect floodplains (Alternative 3).</p> <p>1.8 <u>Recreation</u>. Eliminate livestock grazing in five Outstanding Natural Areas in nine allotments containing 899 AUMs on 20,862 acres (Alternative 3).</p>	<p>1. Allocate 68,298 AUMs of livestock forage on 1,307,639 suitable Federal acres. Implement specific grazing management on 129 allotments containing 1,252,175 acres. Development of water and access on 139,102 acres would result in an increase of 6,258 AUMs available for livestock. Continuous seasonal management would be implemented on 60 allotments containing 1,030 AUMs on 55,037 acres. Livestock grazing would be eliminated from 21 allotments containing 23 AUMs on 427 acres (Alternative 5).</p> <p>Wildlife and other resources would be allocated 69,253 AUMs, divided as follows: 15,527 AUMs to deer, 35 AUMs to antelope, 632 AUMs to elk, 590 AUMs to bighorn sheep, 52,469 AUMs to other wildlife and resources.</p> <p>Remove the wild horses.</p>	<p>1. Season-long grazing during growing season every year has caused a decline in productivity of livestock forage species. Adjustments in season of use, reduction in livestock numbers, and periodic rest periods would be necessary to restore rangeland and maintain 1,252,175 acres in good productivity.</p> <p>Continuous seasonal management allotments are allotments where private land acreage dominates suitable acres for livestock grazing and public land acreage is fragmented or isolated so that specific management systems cannot be applied to 55,032 acres.</p> <p>Insufficient forage or lack of suitable acres to manage on 21 allotments resulted in eliminating livestock use on 427 acres.</p> <p>Allocation to deer and bighorn sheep is based on prior stable numbers supplied by UDR. Allocation to antelope and elk is based on existing numbers. Allocation to other wildlife and resources are the AUMs remaining after forage allocations to livestock and big game.</p>	<p>1.1 Riparian habitat would continue to deteriorate.</p> <p>1.2 Optimum habitat condition for wildlife would not be reached.</p> <p>1.3 Bighorn sheep would be protected and forage would be made available by removal of livestock.</p> <p>1.4 Wild horses would be removed to benefit of bighorn sheep.</p> <p>1.5 Livestock numbers may be reduced in the future if watershed conditions would not be maintained or improved.</p> <p>1.6 Watershed conditions may deteriorate further if livestock grazing would not be carefully managed.</p> <p>1.7 Livestock numbers would be reduced to accommodate the recreational pursuits in the five Outstanding Natural Areas.</p>

(continued)

TABLE 1-2 (concluded)

MFP 1 Recommendations	Other MFP 1 Recommendations That Conflict With Rangeland Management Recommendations	MFP 2 Recommendations	Rationale for Area Manager MFP Recommendations	Trade-Offs																																										
2. Initiate range development projects and practices to effectively implement specific grazing management systems. Rangeland developments include fences, pipelines, water developments, catchments and vegetation treatments such as spraying, chaining, burning, and seeding (Alternative 5).	<p>2.1 Visual Resource Management (VRM). The following rangeland developments conflict with VRM classes in 28 allotments (Alternative 5).</p> <table border="1"> <thead> <tr> <th>Development</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Springs</td> <td>8</td> </tr> <tr> <td>Pipelines (miles)</td> <td>34</td> </tr> <tr> <td>Fences (miles)</td> <td>52</td> </tr> <tr> <td>Reservoirs</td> <td>5</td> </tr> <tr> <td>Catchments</td> <td>12</td> </tr> <tr> <td>Wells and windmills</td> <td>6</td> </tr> <tr> <td>Storage tanks</td> <td>4</td> </tr> <tr> <td>Seedings (acres)</td> <td>6,165</td> </tr> </tbody> </table>	Development	Units	Springs	8	Pipelines (miles)	34	Fences (miles)	52	Reservoirs	5	Catchments	12	Wells and windmills	6	Storage tanks	4	Seedings (acres)	6,165	<p>2. Initiate rangeland developments and treatments to effectively implement specific management on 129 allotments as follows:</p> <table border="1"> <thead> <tr> <th>Range Developments</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Pipelines (miles)</td> <td>149</td> </tr> <tr> <td>Storage tanks</td> <td>39</td> </tr> <tr> <td>Reservoirs</td> <td>59</td> </tr> <tr> <td>Wells</td> <td>17</td> </tr> <tr> <td>Springs</td> <td>60</td> </tr> <tr> <td>Catchments</td> <td>38</td> </tr> <tr> <td>Cattleguards</td> <td>12</td> </tr> <tr> <td>Stock trails (miles)</td> <td>5</td> </tr> <tr> <td>Fences (miles)</td> <td>117</td> </tr> <tr> <td>Seedings (acres)</td> <td>39,379</td> </tr> <tr> <td>(Alternative 5)</td> <td></td> </tr> </tbody> </table>	Range Developments	Units	Pipelines (miles)	149	Storage tanks	39	Reservoirs	59	Wells	17	Springs	60	Catchments	38	Cattleguards	12	Stock trails (miles)	5	Fences (miles)	117	Seedings (acres)	39,379	(Alternative 5)		<p>2. Much of the suitable livestock grazing areas are producing forage below their full potential. Vegetation treatments and rangeland developments would bring forage production up to potential and control livestock distribution to facilitate implementation of specific grazing management</p>	<p>2.1 Conflicts with VRM classes would remain where treatment impacts would not be mitigated.</p>
Development	Units																																													
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(Alternative 5)																																														
	<p>2.2 Wilderness. Manage all areas with wilderness character so as not to impair their suitability for wilderness designation (Alternative 5).</p>	<p>Continue to permit livestock grazing in areas identified as lacking wilderness character (Alternative 5).</p>	<p>Proposed projects would be implemented only on areas lacking wilderness character. Projects on remaining areas would be delayed pending Congressional action on suitability recommendations.</p>	<p>2.2 If rangeland developments would be eliminated because of wilderness designation, it would be necessary to redesign specific management systems affected.</p>																																										
	<p>2.3 Watershed. Recommendations to protect frail watersheds and critical soil erosion conflicts with the following rangeland developments:</p> <table border="1"> <thead> <tr> <th>Development</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Fences (miles)</td> <td>4</td> </tr> <tr> <td>Troughs</td> <td>4</td> </tr> <tr> <td>Pipelines (miles)</td> <td>4</td> </tr> <tr> <td>Springs</td> <td>6</td> </tr> <tr> <td>Catchments and reservoirs</td> <td>8</td> </tr> <tr> <td>Storage tanks</td> <td>6</td> </tr> <tr> <td>(Alternative 5)</td> <td></td> </tr> </tbody> </table>	Development	Units	Fences (miles)	4	Troughs	4	Pipelines (miles)	4	Springs	6	Catchments and reservoirs	8	Storage tanks	6	(Alternative 5)		<p>3. Seed a total of 236,652 acres containing 16,259 AUMs in 66 allotments to optimize livestock management (Alternative 6).</p>	<p>3. Additional seedings would be needed to overcome reduction in carrying capacity on areas where management alone would not be able to restore the level of grazing preference.</p>	<p>2.3 Increased soil loss and deteriorating erosion conditions on frail soils unless mitigating measures would occur.</p>																										
Development	Units																																													
Fences (miles)	4																																													
Troughs	4																																													
Pipelines (miles)	4																																													
Springs	6																																													
Catchments and reservoirs	8																																													
Storage tanks	6																																													
(Alternative 5)																																														
3. Implement a total of 236,652 acres of vegetation treatments.	<p>3.1 VRM. Same conflicts as 2.1 above, but 176,971 acres of seedings (Alternative 6).</p> <p>3.2 Wilderness. Same conflicts as 2.2 above (Alternative 6).</p>	<p>3. Seed a total of 236,652 acres containing 16,259 AUMs in 66 allotments to optimize livestock management (Alternative 6).</p>	<p>3. Additional seedings would be needed to overcome reduction in carrying capacity on areas where management alone would not be able to restore the level of grazing preference.</p>	<p>Same as 2.1 above.</p> <p>Same 2.2 above.</p>																																										

Note: Because of the number of recommendations in the five planning units, this is a consolidation of recommendations. For more detail the planning documents are available for inspection at the Cedar City District Office.

<u>Date</u>	<u>Location</u>	<u>Individuals, Groups, or Agencies Attending</u>
April 19, 1979	Cedar City, Utah	Federal agencies
April 30, 1979	Salt Lake City, Utah	Open house
May 2, 1979	Kanab, Utah	Public
May 3, 1979	St. George, Utah	Public
May 3, 1979	Escalante, Utah	Public
May 16, 1979	Bryce Canyon, Utah	NPS
May 17, 1979	Escalante, Utah	Ranchers, Soil Conservation Service
June 5, 1979	Cedar City, Utah	U.S. Fish & Wildlife Service, Utah Department of Wildlife Resources
June 11, 1979	Cedar City, Utah	Utah State University
June 19, 1979	Page, Arizona	NPS
June 27, 1979	Kanab, Utah	District Grazing Advisory Board
September 12, 1979	Escalante, Utah	District Grazing Advisory Board
September 27-28, 1979	Escalante, Utah	District Grazing Advisory Board, Utah State Extension Service
October 12, 1979	Escalante, Utah	Ranchers
October 16, 1979	Kanab, Utah	Ranchers
November 1-2, 1979	Escalante, Utah	Ranchers

The following significant issues were identified during the scoping process.

1. Reduced rancher income due to reduction in animal unit months (AUMs) authorized as a result of evaluating areas of public land for their suitability for livestock grazing and the availability of forage.

2. Increased cost of ranch operations due to combining allotments into larger units with multiple pastures.

3. Increased cost of ranch operations due to changes in seasons of livestock use.

4. Reduced wildlife forage created by authorizing livestock grazing in areas not now grazed.

5. Degradation of visual resources in the viewsheds of Bryce Canyon National Park because of increased rangeland developments and proposed vegetation treatments.

6. Decreased availability of wildlife forage due to dietary overlap between livestock and deer.

7. Decreased availability of forage and cover on critical sage grouse areas.

8. Competition between wild horses and bighorn sheep.

9. Decreased availability of cover and forage for wildlife due to increased grazing use on some riparian habitat.

10. Changes in sediment flow, vegetation composition, and water quality due to reduction or elimination of livestock grazing intensity on some riparian habitat.

All of the above issues are addressed in the EIS. The only other issue involved developing potentially suitable land and delaying the reduction of stocking rates for 3 to 5 years to determine the accuracy of the vegetation inventory. This issue was not addressed in the EIS because it did not conform to the legal requirements of FLPMA. FLPMA requires that "in the development and revision of land use plans, the Secretary shall use and observe the principles of multiple use and sustained yield set forth in this and other applicable law" (FLPMA, Section 202.C.1); and "rely, to the extent it is available, on the inventory of public lands, their resources, and other values" (FLPMA, Sec. 202.C.4). The inventory procedures used in the K/E area complied with BLM Manual standards and indicated a definite need to adjust livestock stocking rates and change the season of use in some instances. If this were not done, the livestock forage condition would continue to deteriorate.

ALTERNATIVES

Input from the planning and scoping processes was used to develop the following six rangeland management alternatives:

1. Continuation of Present Management
2. Elimination of Livestock Grazing
3. Multiple Resource Enhancement
4. Adjustment to Grazing Capacity
5. Rangeland Management Recommendation
6. Livestock Optimization

These alternatives have been analyzed by an interdisciplinary team of resource specialists at the Cedar City District Office. The assessment is based on the effects of these alternatives on the people and the existing environment. The results of this assessment, together with public input and scoping meetings throughout the development of the statement, will be available to the BLM manager. The EIS is only a tool to assist the BLM manager in deciding upon a particular multiple use program. The livestock grazing program finally selected by the manager may be any one of the grazing alternatives or a combination of one or more alternatives.

Following the district manager's selection of a rangeland management plan, additional cooperation and coordination will be needed with the livestock operators to finalize grazing management systems and in determining locations of rangeland developments and/or vegetation treatments. The manager could then develop a decision document which would protect the resources and most nearly fit the livestock operator's needs. Implementation of the management plan for the K/E EIS area will take place at the beginning of the

new grazing fee year (March 1981) approximately 6 months after filing the Final K/E EIS.

INTERRELATIONSHIPS

Because public lands in the west are extensively interspersed with private and State-owned land, the use and management of land under one ownership has a strong influence on the use of adjacent land owned by others (CAST, 1974). Close coordination between the various land management agencies is required in order to accomplish common goals and avoid resource conflicts.

Federal and State agencies which have programs related to the rangeland management program include the Forest Service, Soil Conservation Service, U.S. Fish and Wildlife Service, National Park Service, Environmental Protection Agency, BLM (Arizona), Utah Division of Wildlife Resources, and the Utah Division of Lands. Private landowners would also be affected. Some important interrelationships are cited below.

Forest Service (FS)

In general, the FS has the same multiple use land management policies as BLM: long-term sustained use of the resource for public benefit. For this reason, management programs of the two agencies are similar and, to a degree, complementary. There are 49 BLM permittees with livestock operations in the planning unit who also graze on the adjacent Dixie National Forest. Use of BLM and FS land during spring, summer, and fall is an integral part of the operator's yearlong operation. Proposed adjustments in season of use and livestock numbers would relate to seasonal interdependence. As a result, although FS and BLM maintain separate rangeland management programs, close coordination must occur between the permittees and both agencies. Two such opportunities for coordination are provided in a Memorandum of Understanding between BLM, FS, and the Soil Conservation Service (January 1978) that addresses Coordinated Management of Rangelands and in the Experimental Stewardship Program established by the Public Rangelands Improvement Act of 1978, PL 95-514.

Soil Conservation Service (SCS)

SCS efforts are primarily directed toward stabilization of the soil and watershed resources and increasing the productive capability of private land. In the K/E EIS area, SCS has developed ranch plans for private lands. These plans are the joint ventures between SCS and individual ranchers and include grazing systems, brush treatment projects, fences, and water developments. There are presently 62 ranchers who have SCS ranch plans and are also BLM permittees. Changes in the management of public lands may alter existing ranch plan designs and change cost sharing programs.

U.S. Fish and Wildlife Service (USFWS)

The USFWS is responsible for the protection of migrating waterfowl, threatened and endangered species, and animal damage control programs. The protection of species and migrating waterfowl may be affected (positively or

negatively) depending on changes in the level of livestock use and location of rangeland developments. It is not likely that the present animal damage control program would be measurably affected by the proposed grazing management programs. Informal consultation has been initiated in accordance with Section 7 of the Endangered Species Act of 1973. This consultation began early in the multiple use planning stages and was used in the development of the alternatives. Information obtained through this consultation has been incorporated into the impact analysis (Chapter 4).

National Park Service (NPS)

The NPS is responsible for the administration of national parks, monuments, and GCNRA. BLM has responsibility for management of livestock grazing in GCNRA. The recreation resources of Bryce Canyon National Park and GCNRA could be affected, depending on livestock season and level of use adjustments and the location, type, and extent of vegetation treatments on public lands. On the other hand, the NPS has recently completed the GCNRA General Management Plan, Wilderness Proposal, Road Study Alternatives, Final Environmental Statement (1979). This document considers the effects of proposed wilderness designation for the GCNRA. Depending on the final decisions on wilderness designation, grazing management proposed by BLM could be affected. This would involve 19 allotments containing 175,175 acres in the GCNRA. The remainder of the acres in GCNRA (212,941 acres) are unallotted and would not be affected.

Environmental Protection Agency

Responsibilities of this agency under the Federal Water Pollution Control Act of 1972 (PL-92-500) include the control of pollution caused by runoff from agricultural activities, including livestock grazing. Section 208 of the act requires that procedures and methods be established to control such sources to the extent possible. BLM has a similar responsibility as outlined in the provisions of FLPMA, 1976; Executive Orders 11988 and 11990; and BLM Instruction Memorandum No. 78-410 dated August 3, 1978 relating to riparian floodplain management. The objectives to improve vegetation density and plant composition as well as reduce erosion would help meet the responsibilities of both agencies concerning runoff from livestock activities. Also, the proposed aquatic/ riparian habitat objectives (management to improve habitat condition) would be a complementary action.

Bureau of Land Management (Arizona)

Livestock grazing on 25,764 acres (six allotments) of public land in Arizona is administered by BLM Cedar City District Office in Utah through a Memorandum of Understanding and is included in this EIS. Arizona Strip District BLM in St. George, Utah is responsible for the management of other resources and land uses on this same land. The Arizona Strip District has recently revised the multiple use planning (Sept. 23, 1976) on this area. Changes in livestock management that could occur in this area as a result of this EIS would affect the revised multiple use planning of other resources and livestock operators in Arizona. Therefore, close cooperation is necessary during the land use planning process and in developing the rangeland management decision document.

Utah Division of Wildlife Resources (UDWR)

This agency is responsible for the protection, management, and conservation of wildlife in the K/E EIS area. Prior stable numbers for deer (17,044 head) and bighorn sheep (150 head) were supplied by UDWR and were used to allocate wildlife forage in the MFP (table 1-2). They are incorporated into the proposed forage allocations (Chapter 2) for the six alternatives. Additionally, wildlife population needs provided by UDWR were considered in the development of management objectives (table 1-1) and in the design of proposed vegetation treatments. The relationship between habitat management (BLM) and wildlife populations managed by UDWR could alter, depending on changes in livestock management and the location and extent of vegetation treatments in relation to key wildlife habitat areas. UDWR is considering a proposal to reintroduce desert bighorn sheep in suitable habitat in the Paria Planning Unit. The success of the reintroduction program would be dependent on BLM management and the condition of the habitat at the time of introduction.

Utah Division of Lands

Most State-owned rangeland that is eligible for grazing is leased from this agency by the rancher. Where the leased lands are located within or adjacent to BLM allotments and the permittee holds a current State lease, an Exchange of Use Agreement may be made with BLM for the State-lease lands. In these exchanges the State land is managed under the same practices as public land. There are currently 258,799 acres eligible for exchange of use, of which 41,923 acres are under exchange of use agreements.

Adjustments in season and level of use could affect existing leased State land.

Utah and Arizona State Historic Preservation Officers

A Rangeland Programmatic Memorandum of Agreement exists between BLM and the Advisory Council on Historic Places. This agreement (effective January 14, 1980) simplifies compliance with Section 106 of the National Historic Preservation Act as outlined in 36 CFR Part 800. The basic intent of this agreement is to reduce involvement with the Advisory Council on Historic Places while requiring close coordination with the State Historic Preservation Officer. Such coordination exists between BLM and the State Historic Preservation Officer for the States of Arizona and Utah. By cooperative agreement (Appendix 2), the Historic Preservation Officers are responsible for assuring that cultural values in the K/E area are protected.

Any action in the proposed alternatives (such as construction of rangeland developments and vegetation treatments) that could destroy cultural values must be approved and meet protection stipulations by the State Historic Preservation Officers prior to implementation.

Private Groups and Individuals

Private ranch operations utilize BLM-administered rangeland for part of the year-round operations. Private lands may also be grazed in conjunction

with public lands under an exchange of use agreement. BLM changes in livestock management would affect private livestock operations, especially those highly dependent on public lands for yearlong operations. There are currently 65,930 acres eligible for exchange of use privileges; 6,630 acres have exchange of use authorized.

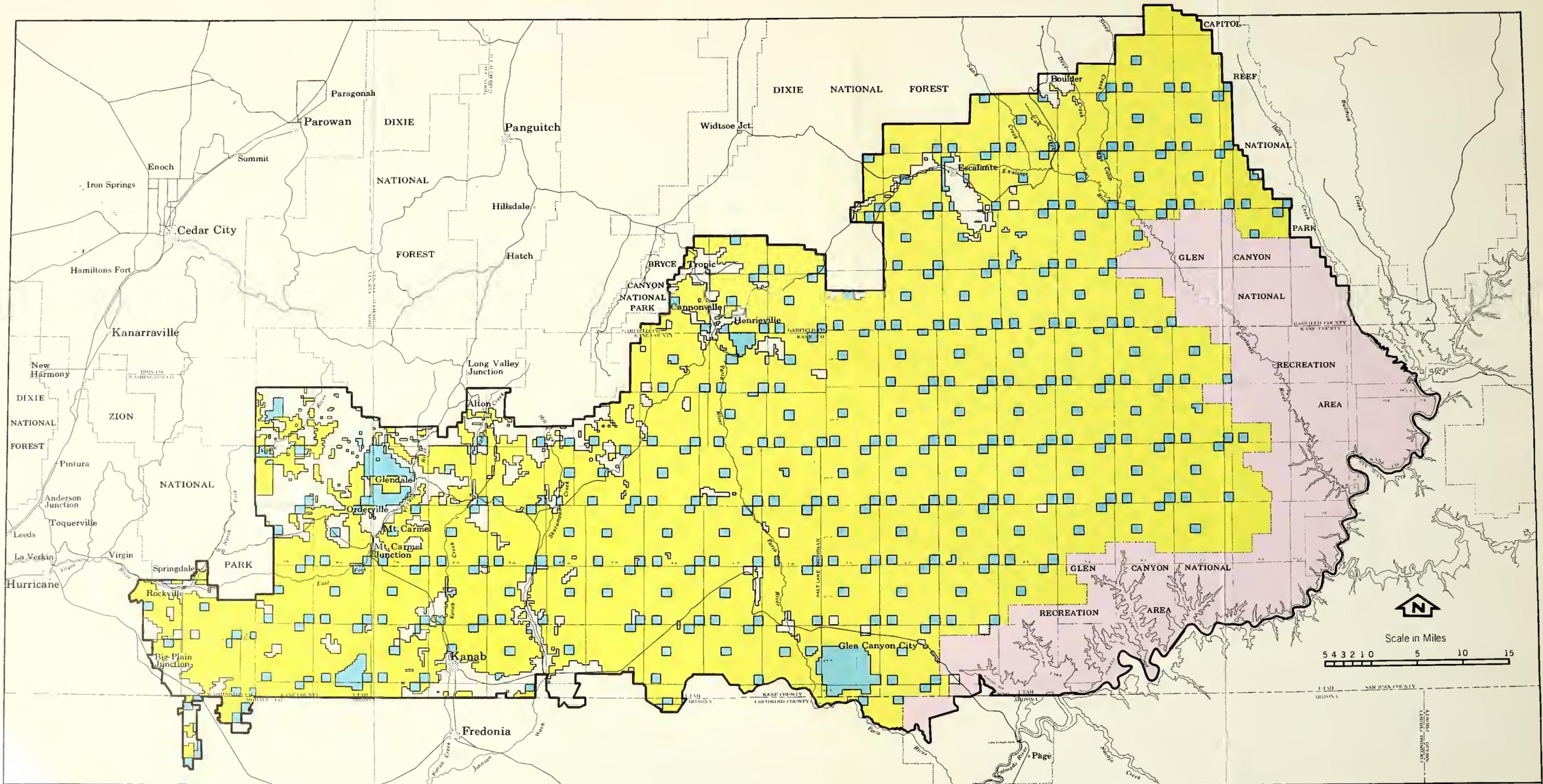
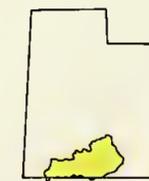


FIGURE 1-1

LAND OWNERSHIP

LEGEND

- Public Land (Administered by BLM)
- State Land
- Glen Canyon National Recreation Area (Administered by National Park Service)
- Private Land



Location Map
Kanab Escalante EIS Area

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

KANAB-ESCALANTE GRAZING ENVIRONMENTAL IMPACT STATEMENT

CHAPTER 2

ALTERNATIVES

INTRODUCTION

This chapter describes the six alternative rangeland management programs under consideration. It also discusses projected impacts of each alternative and identifies the Bureau of Land Management (BLM) preferred alternative.

Alternative descriptions focus on the kind, season, and level of livestock use proposed and the kind of rangeland management that would be applied. Specific levels of use and expected levels of forage output are identified. Initial forage allocations are shown in table 2-1 and in figure 2-1.

The BLM Ocular Reconnaissance Survey (1975-79) provides an estimate of the amount of forage presently available for livestock and wildlife. This forage was allocated in the BLM planning system as follows: 68,298 animal unit months (AUMs) to livestock, 16,515 AUMs to big game, and 314 AUMs to wild horses.

In computing the range survey, an additional 52,738 noncompetitive AUMs for other wildlife and resource uses were derived primarily from big sagebrush. A sagebrush winter proper use factor of 10 and 30 percent was assigned to cattle and deer respectively. Therefore, the rangeland surveyed allowed a total of 40-percent utilization on big sagebrush by cattle and deer combined. This is the percent of current year's growth of sagebrush that could be utilized by both cattle and deer during the winter without causing a decline in the rangeland condition.

All of the 10-percent sagebrush proper use factor was allocated to livestock. However, not all of the 30-percent sagebrush proper use factor was allocated to big game because it was not needed. These 52,738 AUMs could be available for big game if numbers were to increase. They are not available for livestock because if over 10-percent utilization on big sagebrush was allowed, overgrazing of desirable grasses and browse would occur. Refer to Appendix 12 for detailed information on how the AUMs were determined from the range survey.

The 210 existing grazing allotments (Existing Allotments, fig. 2-2 inserted at the back of this volume) are considered in each alternative discussion. In some cases these allotments would be managed separately, while in other cases they would be combined or would have livestock elimination proposed.

Following the district manager's selection of a rangeland management program from the alternatives, additional cooperation and coordination would be needed with the livestock operators to finalize grazing management systems, location of rangeland developments, and/or vegetation treatments. The manager could then develop a decision document which would protect the resources

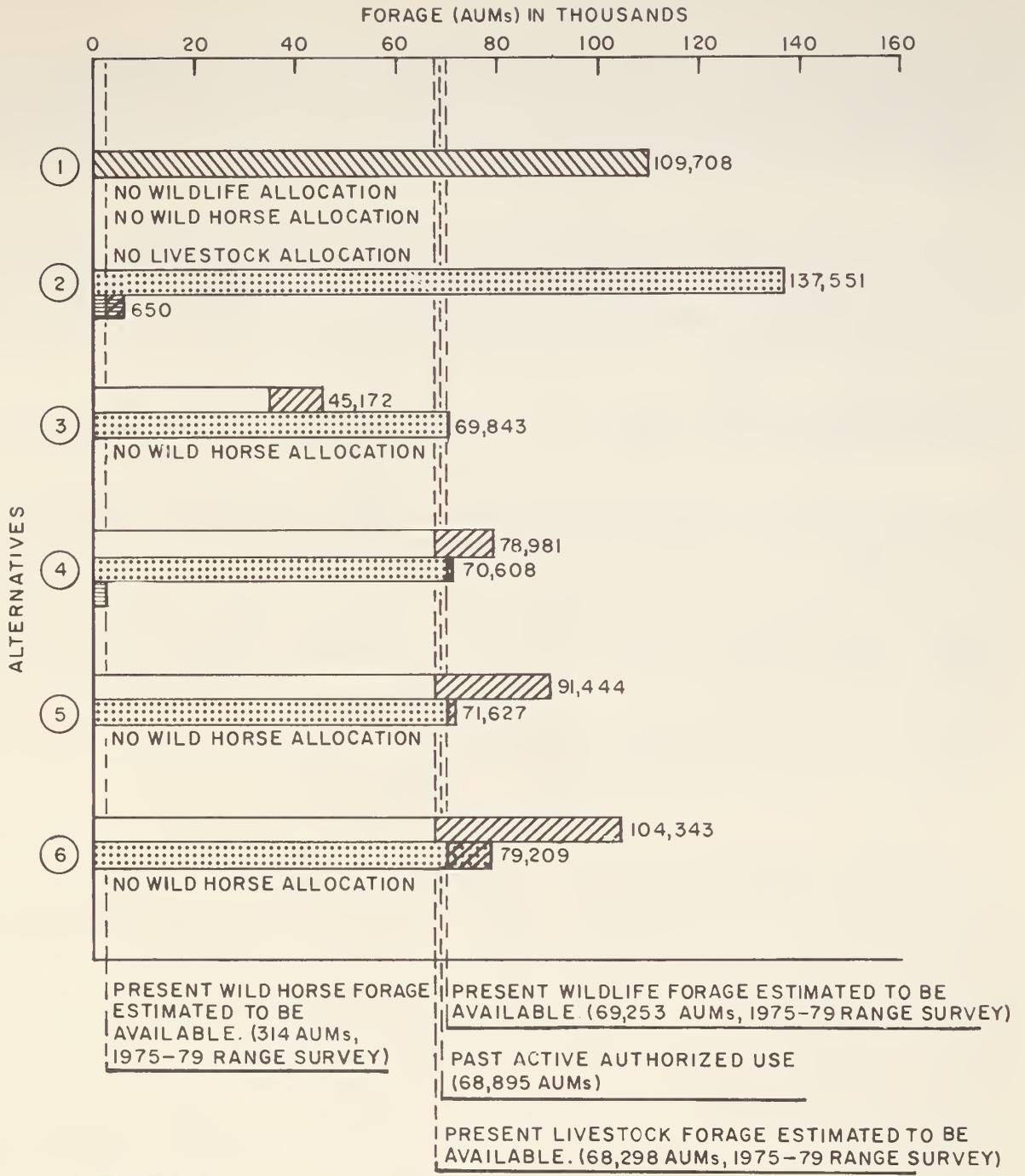
TABLE 2-1

Summary of Initial Level of Use and Required Developments for Alternatives

	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Initial livestock allocation (AUMs)	^a 109,708	0	35,224	68,298	68,298	68,298
Initial big game allocation (AUMs)	0	16,515	16,784	16,515	16,784	16,784
Initial other wildlife and resource allocation (AUMs)	0	121,036	53,103	52,738	52,459	52,469
Initial wild horse allocation (AUMs)	0	314	0	314	0	0
Allotments with specific management	21	0	0	21	129	129
Allotments with continuous seasonal management	183	0	118	^b 159	60	60
Allotments unallotted and/or eliminated	6	210	92	30	21	21
Miles of pipeline required	0	0	0	95	149	^c 149
Number of storage tanks	0	0	0	29	39	^c 39
Number of reservoirs	0	0	0	14	59	^c 59
Number of wells	0	0	0	8	17	^c 17
Number of spring developments	0	0	0	17	60	^c 60
Number of water catchments	0	0	0	8	38	^c 38
Number of cattleguards	0	0	0	6	12	^c 12
Miles of stocktrails	0	0	0	2	5	^c 5
Miles of fence	0	973	125	35	117	^c 117
Acres of burning and seeding	0	0	0	^d 8,078	^d 14,161	^d 31,388
Acres of spraying and seeding	0	0	0	^d 5,528	^d 19,975	^d 46,232
Acres of chaining and seeding	0	0	0	7,140	^d 12,144	^d 57,240
Acres of plowing and seeding	0	0	0	1,665	^d 5,607	27,835
Acres of burning	0	0	0	0	0	15,854
Acres of spraying	0	0	0	370	670	5,456
Treatment AUMs	0	0	0	2,614	3,360	16,259
Management AUMs	0	0	0	18,550	34,190	34,190
Water and access development AUMs	0	0	0	1,587	6,258	6,258

Source: Developed from BLM multiple use planning and scoping process.

^aPresent grazing preference, not grazing capacity.
^bIncludes 104 allotments with season of use restricted to after seed ripe.
^cThese would be the same facilities and developments proposed in Alternative 5.
^dAcres increased beyond planning system recommendation to balance pastures.



LEGEND

- INITIAL LIVESTOCK FORAGE
- ADDITIONAL LONG-TERM LIVESTOCK FORAGE
- INITIAL WILDLIFE FORAGE
- ADDITIONAL LONG-TERM WILDLIFE FORAGE
- INITIAL WILD HORSE FORAGE
- ADDITIONAL LONG-TERM WILD HORSE FORAGE
- PRESENT GRAZING PREFERENCE

**Figure 2-1
PROPOSED FORAGE ALLOCATION**

and most nearly fit the livestock operators' needs. Implementation of the management program for the Kanab/Escalante (K/E) Environmental Impact Statement (EIS) area would take place at the beginning of the new grazing fee year (March, 1981) approximately six months after filing the Final K/E EIS statement.

This discussion includes proposed rangeland developments that would be needed to support the alternatives and required administrative actions that would be needed to implement the rangeland management program finally selected. Measures that would mitigate environmental impacts (Appendix 3) have been included in the development of each alternative and considered in the analysis of impacts.

DESCRIPTION OF ALTERNATIVES

A summary of the proposed initial level of use and developments that would be required in each alternative is shown in table 2-1. Specific types of management that would be applied under each alternative are discussed in the Implementation section of this chapter. The BLM Range Survey (1975-79) provides an estimate of the amount of forage presently available for livestock, 68,298 AUMs; wildlife and other uses, 69,253 AUMs; and wild horses 314 AUMs. These are the baseline figures used in the planning system to develop the allocations proposed in each alternative.

SPECIFIC DESCRIPTION OF EACH ALTERNATIVE

Continuation of Present Management: ALTERNATIVE 1

Present grazing practices (season, level, and kind of management) would continue as shown by allotment in Appendix 1, Present Situation. The livestock forage allocation would remain at the present grazing preference of 109,708 AUMs and grazing permits would be the same as presently issued (fig. 2-1). Present average active authorized use over the past 5 to 10 years has been 68,895 AUMs and this level would be expected to continue. No adjustment to the season, level, or kind of management would be made. There would not be an allocation of forage to wildlife or wild horses as no allocation presently exists. However, the BLM Range Survey (1975-79) indicates that an estimated 69,253 AUMs are available for wildlife and other uses and an estimated 314 AUMs are available for wild horses. Existing levels of forage utilization would continue; for many areas this would exceed physiological limits of 50-percent utilization on desirable forage.

An analysis of this alternative is required by regulation. This alternative is used as a base from which to make comparisons of the other proposed actions. Specific actions would be:

1. Overallocation of livestock forage would continue by 38 percent over the present grazing preference or 1 percent over the past average active authorized use on 1,307,639 suitable Federal acres (based on a BLM Livestock Forage Survey, 1975-79 and subsequent forage allocations made in the Management Framework Plan).

2. Specific grazing management would continue, involving prescribed grazing systems and rangeland developments (Present Situation columns in the Interim tables, Appendix 1) at the present level on 21 existing Allotment Management Plans (AMPs). This would involve 659,819 suitable Federal acres, with a livestock forage allocation of 52,018 AUMs.

3. The present form of continuous seasonal management would continue and would consist of yearly grazing at the same time of year (Present Situation columns in Interim tables, Appendix 1) on 183 allotments. This would involve 629,947 Federal acres with a livestock forage allocation of 57,690 AUMs.

4. Six allotments would remain unallocated (no livestock grazing authorized now and none proposed) for livestock on 13,279 Federal acres because of an absence of available water.

5. AMPs would be monitored as manpower and funding would permit. This would consist of limited use supervision, trend data collection, and evaluation.

6. No additional rangeland developments would be implemented in direct support of the grazing program. However, limited construction of fences, soil retention structures, and water developments could occur to protect existing soil, water, and vegetation resources, or in connection with management of other resource programs such as the fencing of riparian vegetation to protect the fisheries resource, water quality, or wildlife habitat.

Elimination of Livestock Grazing: ALTERNATIVE 2

There would be no authorized livestock use on the entire 2,567,466 acres of public land in the K/E EIS area. The 68,298 AUMs of available livestock forage (determined from BLM Range Survey, 1975-79) would be available to wildlife and wild horses. All available forage (137,551 AUMs) would be allocated to wildlife and other resources as follows: wild horses 314 AUMs, deer 15,527 AUMs, elk 632 AUMs, antelope 35 AUMs, bighorn sheep 321 AUMs, and other wildlife species and resource uses 120,722 AUMs. Long-term wild horse allocation would be 650 AUMs because the elimination of livestock grazing would allow sufficient forage for the wild horses to increase to approximately 50 head within the 24-year period. Utilization of desirable forage species would be estimated to be 20 percent. The purpose of this alternative would be to promote a fast recovery of existing vegetation, water quality, wildlife, and wild horse habitat condition, and to reduce soil erosion. Specific actions would be:

1. State and private lands (330,529 acres) intermingled with public lands (fig. 1-1) would be fenced or livestock would be controlled by other means to prevent trespass on public land. An estimated 973 miles of fence around private lands would have to be constructed and maintained by adjoining land owners at a construction cost of approximately \$2,300,000. Maintenance costs on a 13-year depreciation schedule (the average life of a fence) would be approximately \$180,000 each year. Only large tracts of private lands would be proposed for fencing since it would not be feasible to fence scattered small tracts of private lands or isolated State lands, and it would be

assumed that the exterior boundary fence is presently constructed where it would be needed.

2. Only those developments necessary to protect or enhance wildlife or watershed values would be constructed. None are considered in this EIS at this time.

3. Rangeland use supervision would be limited to controlling livestock trespass in accordance with final grazing regulations (43 CFR 4150).

4. No new AMPs would be implemented and all existing AMPs would be terminated.

5. Fence construction would begin the first year. Completion of fence construction would be dependent upon availability of funds. Reductions in livestock would also begin the first year and would be scheduled for equal reductions over a 3-year period. Elimination would be complete the third year. Fence construction costs are shown in table 2-2.

TABLE 2-2

Development Cost Estimates (1979 Dollars) for Each Alternative

Alternative	Fences	Water Facilities	Vegetation Treatments	Total Cost
1. Continuation of Present Management	\$ 0	\$ 0	\$ 0	\$ 0
2. Elimination of Livestock Grazing	2,335,200	0	0	2,335,200
3. Multiple Resource Enhancement	300,000	0	0	300,000
4. Adjustment to Grazing Capacity	95,635	650,455	231,420	977,510
5. Rangeland Management Recommendation	312,435	1,747,557	508,774	2,568,766
6. Livestock Optimization ^a	\$312,435	\$1,747,557	\$3,729,272	5,789,264

^aCost of fences and water facilities would be the same as Alternative 5 because they would be the same developments.

Multiple Resource Enhancement: ALTERNATIVE 3

Allocation of livestock forage would be based on the adjustment to grazing capacity made from recent range survey data (BLM Livestock Forage Survey, 1975-79). There would be additional deductions of forage from the surveyed capacity to reduce soil erosion and to enhance other resources such as vegetation, wildlife habitat, water quality, floodplains, and riparian habitat. The purpose of this alternative would be to enhance those resource values mentioned above and to allow a moderate level of livestock grazing.

The proposed livestock grazing allocation would be 35,224 AUMs. For 2 years this would result in a 68-percent reduction from the present grazing preference of 109,708 AUMs, or a 49-percent reduction from the average active authorized use of 68,895 AUMs. After 2 years, 9,948 AUMs in 34 allotments would be restored to livestock management for a total allocation of 45,172 AUMs. This would be less than the 68,298 livestock AUMs determined available from the range survey. As a result, wildlife and other resources would be allocated 69,843 AUMs, which would be divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 590 AUMs, and other wildlife species and resource uses 53,059 AUMs. Utilization of desirable forage species would be estimated to average 30 percent. Specific actions would be:

1. Livestock grazing would be suspended on 144,229 acres of frail watersheds and saline soils by constructing 50 miles of fence in 38 allotments containing 4,241 AUMs.

2. Livestock grazing would be suspended for a 2-year period on 34 allotments containing 9,948 AUMs on 204,376 acres to improve the vigor and production of wildlife/livestock forage species. An additional purpose of this rest would be to restore sufficient cover and to improve the erosion condition from the critical class to the moderate class. After 2 years, livestock grazing would again be authorized on these 34 allotments and continuous seasonal management would be restored, providing 9,948 AUMs.

3. Livestock grazing would be eliminated on 158 miles of stream and riparian zones (6,807 acres). Livestock grazing allocations would be reduced by 7,579 AUMs on 195,956 acres for floodplain protection. This would require 75 miles of fencing.

4. Livestock utilization would be reduced to 50 percent on pastures grazed under rest rotation grazing systems in five allotments. This would require a reduction of authorized livestock grazing by 1,717 AUMs.

5. Approximately 590 AUMs of forage presently utilized by wild horses and livestock would be reallocated to bighorn sheep. Livestock grazing would be eliminated in certain areas in the Wagon Box, Moody, and Death Hollow Allotments, and wild horses would be removed from the EIS area.

6. Livestock grazing would be eliminated from nine allotments in five Outstanding Natural Areas. This would result in a reduction of 899 AUMs on 20,862 acres.

7. Livestock grazing would be reduced by 8,100 AUMs on 19 allotments (175,175 acres) to benefit outdoor recreation users in the Glen Canyon National Recreation Area.

8. Periodic monitoring and evaluation of proposed management actions would assure that management goals would be met and maintained. Management goals would be based on evaluation of key species that are representative of desirable forage plants. These key species include grasses (Indian ricegrass, crested wheatgrass, sand dropseed, big galleta grass) and shrubs (antelope bitterbrush, four-wing saltbush, winterfat). Monitoring and evaluation procedures are discussed in the Implementation section of this chapter. Appendix 5 shows the 103 individual allotments (33,074 AUMs) that would be affected by the first six actions proposed by this alternative and the number of AUMs that would be removed from livestock grazing. Proposed management on the 107 allotments (35,224 AUMs) not specifically covered under this alternative would consist of continuous seasonal management at the surveyed grazing capacity. The season and level of use are shown by allotment in Appendix 1.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Under this alternative no new grazing management systems would be proposed. Livestock grazing use would be initially limited to 68,298 AUMs (the available forage as determined by BLM Range Survey, 1975-79 and allocated in the Management Framework Plan), resulting in a 38-percent reduction from the grazing preference of 109,708 AUMs or a 1-percent reduction from the average active authorized use of 68,895 AUMs. The proposed long-term livestock forage allocation would be 78,981 AUMs. Wildlife and other resources would be initially allocated 69,253 AUMs, divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 321 AUMs, and other wildlife species and resource uses 52,738 AUMs. Wild horses would be initially allocated 314 AUMs to meet current needs. The long-term wildlife and other resources forage allocation would be 70,608 AUMs, divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 321 AUMs, and other wildlife species and resource uses 54,093 AUMs. Long-term wild horse forage allocation would be 314 AUMs because management goals would be geared toward maintaining the wild horse populations. The purpose of this alternative would be to manage the resources within the surveyed capacity but at a minimal cost; proposed developments and vegetation treatments (table 2-1) would be on only the 21 existing AMPs. Specific actions would be:

1. The existing 21 AMPs (43,797 AUMs) on 659,819 Federal acres would continue. Existing specific management systems would be followed to assure that forage use would not exceed an average of 50 percent on key forage species by allotment.

2. On 104 allotments containing 19,675 AUMs, livestock grazing would begin "after seed ripe" of key forage species; no grazing would be permitted during the growing season.

3. Continuous seasonal management would be implemented on 55 allotments containing 4,712 AUMs where scattered tracts of public land are interspersed with private and State lands.

4. Livestock grazing would be eliminated on 24 allotments containing 23 AUMs due to insufficient livestock forage or other unsuitable livestock grazing conditions. Six additional allotments containing 91 AUMs would continue to be unallocated.

5. Only those rangeland developments or vegetation treatments necessary to fully implement the existing 21 AMPs, benefit or enhance wildlife, or benefit watershed values would be constructed (table 2-1). For the 21 AMPs there would be an increase of 1,587 AUMs from water developments on potentially suitable areas. There would also be an increase of 2,614 AUMs from treatments and 18,550 AUMs from management, resulting in an increase of 22,751 AUMs in 24 years.

6. Vegetation treatment would be implemented by chemical spraying of sagebrush on 370 acres which have an adequate residual grass composition. This would increase livestock forage by 62 AUMs.

7. Periodic monitoring and evaluation of proposed management actions would assure that management goals would be met and maintained. Management goals would be based on evaluation of key species that are representative of desirable forage plants. These key species include grasses (Indian ricegrass, crested wheatgrass, sand dropseed, big galleta grass) and shrubs (antelope bitterbrush, four-wing saltbush, winterfat). Monitoring and evaluation procedures are discussed in the Implementation section of this chapter.

Table 2-1 identifies specific components in this alternative. Appendix 1 shows each allotment involved in this alternative and specific seasons and levels of use that would be proposed.

8. The implementation schedule for each allotment is shown in Appendix 6. Costs of proposed rangeland developments are shown in table 2-2.

Rangeland Management Recommendation: ALTERNATIVE 5

This alternative was developed by BLM through the planning process and evolved from specific multiple use recommendations made in the MFP (BLM Planning Process section, Chapter 1). This alternative is currently preferred by BLM.

Alternative 5 would provide an initial allocation of 68,298 AUMs of livestock forage on 1,307,639 suitable Federal acres. Proposed long-term livestock forage allocation would be 91,444 AUMs. The initial allocation would be a 38-percent reduction from the grazing preference of 109,708 AUMs and a 1-percent reduction from the average active authorized use of 68,895 AUMs. Wildlife and other resources would be initially allocated 69,253 AUMs, divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 590 AUMs (including the 314 AUMs as mentioned in specific action number seven under this alternative), and other wildlife species and resource uses, 52,469 AUMs. The long-term wildlife and other resources allocations would be 71,627 AUMs, divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 590 AUMs, and other wildlife species and resource uses 54,843 AUMs. Utilization of desirable forage species would average 50 percent by allotment. The purpose of this alternative would be to

balance the elements of the natural resources within the surveyed capacity of livestock forage and to develop all potentially suitable areas to optimize grazing animal distribution. Specific actions would be:

1. Livestock grazing would be adjusted to the supply of available forage as determined by the BLM Range Forage Survey of 1975-79 and allocated in the Management Framework Plan. The existing grazing preference of 109,708 AUMs would be reduced to 68,298 AUMs.

2. Specific management systems would be developed for 129 allotments containing 67,245 AUMs (Appendix 1). Before the management systems would be finalized, each of the proposed management systems would be worked out in greater detail with the rancher, Utah Division of Wildlife Resources (UDWR), Soil Conservation Service (SCS), National Park Service (NPS), Forest Service (FS), and others regarding the methods of livestock distribution, seasons of use, and location of proposed developments and vegetation treatments. This could entail changing the type of system from that presently proposed. However, provisions would be made for the physiological requirements of vegetation resources.

The draft management systems proposed, as shown in Specific Management tables in Appendix 1, consist of the following three basic types:

	<u>Allotments</u>	<u>Suitable Federal Acres</u>
After seed ripe	63	217,525
Deferred rotation	30	236,536
Rest rotation	36	798,114

The Implementation section in this chapter describes in more detail how these management systems would work. An additional 135,102 potentially suitable acres with 6,258 AUMs would have to be made suitable by the development of water and access in order to fully implement all management systems.

3. Rangeland developments and vegetation treatments (table 2-1) would be implemented to balance pastures and to improve grazing animal distribution. Proposed vegetation treatments would add 3,360 AUMs of livestock forage on 51,887 acres by burning/seeding, spraying/seeding, chaining/seeding, and plowing/seeding (table 2-1). Also, spraying would result in 99 AUMs on 670 acres, better management practices would result in 34,190 AUMs on all suitable acres, and water developments and access would add 6,258 AUMs on 135,102 acres.

4. Continuous seasonal management would be implemented on 60 allotments with 55,037 Federal acres containing 1,030 AUMs because public land is interspersed with private and State land in most of these allotments. Generally, this continuous seasonal management would consist of grazing during a predetermined season (Appendix 1) each year throughout the entire allotment.

5. Livestock grazing would be eliminated on 21 allotments with 427 acres containing 23 AUMs. Four of the 21 allotments would continue to be unallocated. This action would be proposed because of either insufficient

livestock forage or other unsuitable livestock grazing conditions on these allotments.

6. Rangeland developments (fences and water developments) would be constructed and vegetation treatment projects would be implemented to balance pastures and improve livestock distribution. The rangeland developments are discussed in greater detail in the Rangeland Development section of this chapter. Specific facilities and treatments for each allotment can be found in the Specific Management tables of Appendix 1.

7. Wild horses would be removed from the K/E EIS area and the 314 AUMs currently utilized by wild horses would be allocated to bighorn sheep.

8. Periodic monitoring and evaluation of proposed management actions would assure that management goals would be met and maintained. Management goals would be based on evaluation of key species that are representative of desirable forage plants. These key species include grasses (Indian ricegrass, crested wheatgrass, sand dropseed, big galleta grass) and shrubs (antelope bitterbrush, four-wing saltbush, winterfat). Monitoring and evaluation procedures are discussed in the Implementation section of this chapter.

9. The implementation schedule for each allotment is shown in Appendix 6. Costs of rangeland developments are shown in table 2-2.

Livestock Optimization: ALTERNATIVE 6

This alternative would initially have the same management systems, the same livestock and wildlife forage allocations, and would require the same coordination with ranchers, government agencies and others as Alternative 5. The initial livestock forage allocation would be 68,298 AUMs. However, this alternative would provide an additional 16,259 AUMs of livestock forage within 24 years by increased vegetation treatment (table 2-1) in addition to the AUMs reached in Alternative 5. Total long-term livestock forage allocation would be 104,343 AUMs. Wildlife and other resources would be allocated 69,253 AUMs initially, divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 590 AUMs, and other wildlife species and resource uses 52,469 AUMs. Wild horses would be removed from the K/E EIS area. Long-term wildlife and other resource allocations would be 79,209 AUMs, which would be divided as follows: deer 15,527 AUMs, antelope 35 AUMs, elk 632 AUMs, bighorn sheep 590 AUMs, and other wildlife species and other resource uses, 62,425 AUMs. This forage would be available from vegetation treatment projects and would not be usable by livestock. Utilization of desirable forage species would average 50 percent by allotment. The purpose of this alternative would be to develop increased livestock forage through an intensive rangeland development program. Specific actions (in addition to those in Alternative 5) would be:

1. There would be 236,652 acres of treatments carried out on 82 allotments (Appendix 7) for an increase of 16,259 AUMs. Seedings would follow vegetation treatments of chaining, spraying, plowing and burning on 214,582 acres (table 2-1).

2. Chemical spraying treatment of sagebrush would be implemented on 6,126 acres in seven allotments that have adequate residual grass composition. This would increase livestock forage by 660 AUMs.

3. Prescribed burning would be implemented on 15,854 acres in one allotment to reduce vegetation competition and to increase grasses. This would result in an increase of 1,919 AUMs.

4. Implementation would begin after all potentially suitable acres, vegetation treatments, and rangeland developments would be completed on an allotment, as proposed in Alternative 5. The specific implementation schedule by allotment is shown in Appendix 6. Costs of proposed rangeland developments are shown in table 2-2.

5. Periodic monitoring and evaluation of management actions would assure that management goals would be met and maintained. Management goals would be based on evaluation of key species that are representative of desirable forage plants. These key species include grasses (Indian ricegrass, crested wheatgrass, sand dropseed, big galleta grass) and shrubs (antelope bitterbrush, four-wing saltbush, winterfat). Monitoring and evaluation procedures are discussed in the Implementation section of this chapter.

GENERAL FEATURES NEEDED FOR IMPLEMENTATION

This section discusses general aspects of the BLM rangeland management program that would be required to implement any one of the six alternatives.

Grazing Management

Many seasons of use and several forms of management (table 2-3) are proposed in the six alternatives. Three basic management systems (after seed ripe, deferred rotation, and rest rotation) would be implemented as specific rangeland management programs in Alternatives 4, 5, and 6.

TABLE 2-3

Type of Grazing Management Proposed

Alter- native	SUITABLE FEDERAL ACRES				
	Elimina- tion	Continuous Seasonal	After Seed Ripe	Deferred Rotation	Rest Rotation
1 ^a	13,279	2,554,187	0	0	0
2 ^a	2,567,466	0	0	0	0
3	543,029	764,610	0	0	0
4	427	624,321	23,072	132,523	527,296
5	427	55,037	217,525	236,536	798,114
6	427	55,037	217,525	236,536	798,114

^aThese alternatives address the 2,567,466 total Federal acres. Suitability would not be considered under these alternatives.

Nearly all of these systems would involve allotments being divided into pastures, requiring additional development of fences, water facilities, and vegetation treatment projects. The overall objective of these management programs would be to improve condition and production of vegetation (table 2-4).

Alternatives 1, 3, 4, 5, and 6 contain allotments that would have the seasonal grazing management program. Livestock grazing would be prescribed for a specific season of use under this program of management, but because many allotments that would have this form of management contain interspersed private and State lands, management opportunities would be limited for public lands. Specific objectives of this type of management would be geared to meet the needs of key forage species within an allotment (table 2-4). Additional information relating to grazing management can be found in Appendix 20, Information Used to Assess Probable Impacts to Vegetation.

Rangeland Developments

Rangeland developments such as fences and water facilities (wells, springs, and pipelines) would be proposed in Alternatives 2 through 6. These developments would be needed to implement specific management actions contained in these alternatives and to accomplish management objectives. Fences and water developments would improve the control and distribution of livestock and would improve the use of key forage species. These structures would also be located so that livestock would not gather in habitual use areas and would not graze as heavily on key areas such as aquatic/riparian habitat. Normally sources of permanent water are required in each pasture. Figure 2-3 (Proposed Range Developments and Vegetation Treatments inserted at the back of this volume) shows the location of proposed developments.

Water developments would also be required to improve usability of available livestock forage. As discussed in the previous alternative descriptions, additional livestock AUMs would be made available by the development of water on areas now considered to be potentially suitable. Table 2-1 summarizes rangeland developments proposed for each alternative. Appendixes 1 and 7 show specific developments proposed for each alternative.

At this point in the BLM planning process, development of specific details relating to exact onsite location of rangeland developments has not been completed. This depends on the alternative rangeland management program finally selected. Details would be worked out jointly by BLM resource specialists, ranchers, UDWR, SCS, NPS, FS, and others during the AMP program.

Vegetation Treatments

Vegetation treatments would be proposed in Alternatives 4 through 6. The main objective of these treatments would be to remove less desirable vegetation made up of pinyon-juniper (1,412,937 acres) and sagebrush (242,227 acres) stands, and replace them with more desirable forage species. These less desirable stands cover about 65.6 percent (Chapter 3, Vegetation) of the K/E area and are a fire dependent ecosystem that is not responsive to grazing management systems alone. Removal requires either burning, chemical spraying (2,4-D), or mechanical treatment (chaining, plowing) followed by reseeding

TABLE 2-4

Rationale for Proposed Grazing Systems and Associated Treatments

SPECIFIC MANAGEMENT: Use above the forage surveyed capacity, undesirable seasons of use of desirable forage species (primarily spring grazing of grass, winter grazing of browse, and yearlong use of both), poor livestock distribution, and existing edaphic and climatic factors have resulted in much of the suitable rangeland being in poor to fair condition and producing forage below its potential. Adjustments in season of use, reduction in livestock numbers, and periodic rest periods would be necessary to restore and maintain the productivity of the rangeland.

<u>System</u>	<u>Resting Period</u>	<u>Treatments and Rationale</u>
1. After seed ripe (midsummer/fall)	Spring, winter	Defer grazing in spring to allow for food manufacture, storage, and improved vigor. Grazing would be deferred in winter to improve cover and litter accumulation. Defer grazing until after seed ripe to allow for seed production, maximum food storage, and to promote seed establishment by trampling. Rest in winter to improve vigor of browse. Graze in fall to provide livestock forage.
2. Deferred rotation (spring/summer/fall)	Winter	Defer grazing in spring to allow for food manufacture and storage, and to improve vigor, cover, and litter accumulation. Defer grazing until after seed ripe to allow for seed production, maximum food storage, and to promote seed establishment by trampling. Grazing would provide high quality forage for livestock. Rest for fall regrowth and improve vigor of browse.
3. Rest rotation (winter/spring, summer/fall)	Winter, spring, summer, fall	Graze in summer to provide high quality livestock forage and trample seed. Rest to improve vigor of all species. Rest in fall and spring to allow for manufacture and storage. Rest to improve cover and litter accumulation. Graze in spring and fall for high quality livestock forage. Rest in winter to improve vigor of grass. Rest in summer to allow for food storage and seed ripening. Graze in winter to improve grass vigor. Graze in spring to provide high quality livestock forage. Grazing would be in summer/fall to promote seed trampling. Rest in winter to restore browse vigor. Rest in spring to improve food production, storage, and vigor. Rest in summer to allow for food storage and seed ripening. Rest in fall to allow for regrowth, food storage, and seed production. Rest full year to promote seedling establishment of desirable species, especially browse.
<u>CONTINUOUS SEASONAL GRAZING:</u>	Fragmented and/or isolated and would be managed using continuous seasonal grazing.	Fragmented public rangelands do not lend themselves to specific or intensive management
Winter; Summer/fall	Spring, summer, fall; winter, spring	Graze in winter to improve vigor of grass and increase cover. Graze in summer to allow for litter accumulation, food storage, and improved grass vigor. Graze in fall to promote seed trampling of browse. Rest in spring to allow for food production and storage, litter accumulation, and improved vigor. Rest in fall to allow for regrowth, seedling establishment, and food storage. Rest in winter to restore browse vigor.

desirable wildlife and livestock forage species. The purpose of these treatments would be to improve forage productivity and quality for livestock and wildlife. The major criteria for choosing a particular method of treatment would be the effectiveness of achieving desired results and specific site factors. Choice of vegetation treatment would be dependent upon climate, slope, vegetation type, soil type, density of the stand, composition, and residual vegetation composition. Chaining or burning would be used to remove pinyon-juniper. Burning, spraying, or plowing would be used to remove sagebrush. The major limiting factors for burning would be climate, density of burnable fuel, and slope.

In order to avoid accelerated erosion through removal of vegetation by burning or plowing treatment, these treatments would be limited to areas of less than 15 percent slope and on soils with moderate to slight erosion condition.

In most cases spraying would occur on sagebrush areas of greater than 15 percent slope and particularly where a residual stand of preferred grasses exist in sufficient density to propagate the species.

Chaining of pinyon-juniper stands with slash left in place would be the preferred method if there would be such limiting factors as soil types or slopes that would accelerate erosion if the stand was burned. Excessive slopes (generally greater than 30 percent) of pinyon-juniper too steep to chain would not be treated. In most instances, slash would not be burned.

Design restrictions for vegetation treatments are further explained in Appendix 3. The basic emphasis of these restrictions would be to minimize disturbance associated with construction of rangeland developments and vegetation treatments.

Proposed seed mixtures would consist of grasses, forbs, and shrubs. Application would be by aerial means (helicopter, fixed wing airplane), or by drill seeding (tractor), depending upon site conditions, seed mixture, weather, and other variables. On areas where there exists a sufficient amount of desirable forage for natural plant establishment, treatment by burning or spraying would be carried out and not followed by artificial seeding as described above. As with rangeland developments, exact locations and methods of treatment would be worked out during AMP development.

The acreage of vegetation treatments for Alternatives 4 and 5 was recommended by the BLM planning system to meet the needs to balance pasture carrying capacities in specific management systems for each planning unit except Zion. In the Zion Planning Unit the recommended acreages exceeded the acreage necessary to balance pastures. However, soils analysis carried out after the planning process indicated the recommended treatments would be only 50 percent successful. Therefore, the recommended acreages in table 2-1 were increased to overcome unsuccessful or partially successful treatments and are not the same acreages as shown in Appendix 1, Specific Management tables. The AUMs expected from the treatments are the same as those recommended in Appendix 1, which were developed in the BLM planning system.

The location of proposed vegetation treatments is shown in figure 2-3 (Proposed Range Developments and Vegetation Treatments inserted at the back of this volume).

All treatment areas would require fencing to restrict livestock grazing for a minimum of two growing seasons. These areas would be included in the grazing management systems proposed for each alternative once forage becomes established.

Table 2-1 summarizes specific types of vegetation treatments proposed for Alternatives 4 through 6. Individual treatments proposed by allotment are shown in Appendix 1.

Design Restrictions and Standard Operation Requirements for Rangeland Developments

It is standard BLM policy to require the use of certain protective measures during the construction of rangeland developments and vegetation treatments. The purpose of these measures would be to ensure that legally required protection would be attained and to keep environmental damage to a minimum. If the final management plan would be modified or if significant new information on adverse impacts would be revealed in the future, a supplemental environmental assessment may be necessary.

Design restrictions and standard operation requirements are summarized in Appendix 3.

Monitoring and Study

Specific studies and monitoring programs would be proposed to assure that rangeland management objectives would be achieved. This monitoring would begin with the implementation of any one or part of the six alternatives.

The proposed monitoring would evaluate changes in plant composition and ground cover after grazing treatments. Four primary studies would be basic to this evaluation: (1) actual grazing use, (2) vegetation utilization, (3) forage condition and trend, and (4) climate analysis. In addition, data on wildlife habitat, riparian vegetation, aquatic habitat, and watershed condition would be collected as necessary for each allotment. The degree of livestock utilization of key plant species would be monitored in order to determine when livestock grazing would be terminated. It would be proposed that livestock grazing would be terminated once utilization would reach an average of 50 percent of the current annual growth by allotment. At this point, the livestock would have to be moved to other allotments, state, private or other Federal lands. This would be a stipulation in the AMPs and would be a provision upon which grazing permits would be issued.

Data from these monitoring programs would be used to assess the effectiveness of current management and the need for any modifications. If an evaluation would determine that a specific allotment is not achieving its objectives, then modifications could include changes in grazing treatments, livestock numbers, season of use, additional rangeland developments, or any

combination of these factors. Modifications would require preparation of an environmental assessment or a supplement to this EIS before significant changes could be made.

Administrative Options and Flexibility

Livestock forage condition, competition with wildlife, amount of available forage and water, and the time of year would also guide the BLM area manager in deciding when and where to move livestock in the event of drought or other temporary problems. Some management options would be:

1. Authorize movement of livestock from one pasture to another sooner than scheduled, due to lack of forage in one pasture and availability in another.

2. Hold livestock on an allotment or in a pasture longer than scheduled if proper utilization is not reached.

3. Reduce livestock numbers in the event of reduced forage production in any one season or growing year.

4. Increase livestock numbers in response to an unexpected abundance of forage in any particular year, authorized on a temporary basis determined yearly (43 CFR 4130.402).

5. Temporarily increase or decrease livestock numbers to achieve a predetermined degree of utilization. (For example, if achieving a degree of hedging on browse species would be desirable to benefit wildlife habitat, a temporary increase in livestock numbers may be warranted.)

Development Costs

The district rangeland management program would incur increased costs associated with implementation and management of any one of the six alternatives. The rangeland user would also have increased costs associated with maintenance of proposed rangeland developments, such as fences and water developments. The additional costs would occur primarily in the following areas:

1. Administrative costs of AMP development and on-the-ground management;

2. Design and construction of proposed rangeland developments, including vegetation treatments;

3. Maintenance of rangeland developments;

4. Supervision of livestock use and the monitoring and evaluation of the proposals once they have been implemented.

Actual costs of rangeland developments and vegetation treatments would not be available until project design and layout occurred, although estimated costs are shown in table 2-2 for each alternative.

IMPACTS OF EACH ALTERNATIVE

The third part of this chapter includes a summary of projected impacts that each alternative would have on the environment (table 2-5). This summary focuses on those environmental components which are considered to be most significant.

Impacts to these environmental components are concerns that have been expressed during public involvement/scoping sessions. Additionally, these components were considered in developing the alternatives. A more comprehensive discussion of impacts is presented in Chapter 4, Environmental Consequences. The impact analysis for proposed rangeland developments and vegetation treatments was made based on the standard design specifications shown in Appendix 3. No additional mitigating measures have been identified in the analysis, however, an opportunity for further mitigation would be available once the rangeland management program is selected and implementation begins. Projected impacts at a common point in time (upon full implementation, 24 years) have been evaluated for each alternative.

TABLE 2-5

Impact Summary of Alternative Management Plans

Resource Element and Present Situation	1		2		3		4		5		6	
	Continuation of Present Management (estimated 24 years)	Elimination of Livestock Grazing (estimated 24 years)	Multiple Resource Enhancement (estimated 24 years)	Adjustment to Grazing Capacity (estimated 24 years)	Rangeland Management Recommendation (estimated 24 years)	Livestock Optimization (estimated 24 years)						
VEGETATION												
Livestock Forage Condition (Suitable Acres)												
Good	124,344 (10%)	188,092 (10%)	124,344 (10%)	124,344 (10%)	164,384 (13%)	252,667 (19%)						
Fair	682,830 (52%)	632,494 (48%)	695,654 (53%)	695,654 (53%)	678,551 (52%)	596,936 (46%)						
Poor	500,465 (38%)	487,053 (38%)	487,641 (37%)	487,641 (37%)	464,704 (35%)	458,040 (35%)						
Total	1,307,639 (100%)											
Apparent Trend in Forage Condition (Suitable Acres)												
Improve	85,262 (7%)	1,049,123 (7%)	855,633 (65%)	594,398 (45%)	667,396 (51%)	664,087 (51%)						
Static	1,178,368 (90%)	258,516 (20%)	443,933 (34%)	699,287 (54%)	634,617 (49%)	637,926 (49%)						
Decline	44,009 (3%)	0 (0%)	8,073 (1%)	13,954 (1%)	5,626 (0%)	5,626 (0%)						
Forage Production (AUMs)												
Present	137,551	151,959 (increase of 14,408 AUMs)	137,947 (increase of 396 AUMs)	150,239 (increase of 12,688 AUMs)	163,071 (increase of 25,520 AUMs)	183,552 (increase of 46,001 AUMs)						
Acres of Riparian Vegetation Condition												
Excellent	20 (0%)	203 (3%)	203 (3%)	20 (0%)	20 (0%)	20 (0%)						
Good	571 (9%)	3,026 (49%)	3,026 (49%)	571 (9%)	571 (9%)	571 (9%)						
Fair	2,320 (37%)	2,388 (38%)	2,388 (38%)	2,464 (40%)	2,565 (42%)	2,565 (42%)						
Poor	2,756 (45%)	595 (10%)	595 (10%)	3,147 (51%)	3,046 (49%)	3,046 (49%)						
Very poor	545 (9%)	0 (0%)	0 (0%)	10 (0%)	10 (0%)	10 (0%)						
Total	6,212											

Threatened and Endangered Plant Species
 One endangered plant species occurs within the K/E EIS area (Pedicularis sileri).
 No indication that livestock grazing is detrimental to this plant.

SOILS
 Acres in Critical and Severe Erosion Condition
 There are presently 303,353 acres in critical and 6,166 acres in severe erosion condition, a total of 309,519 acres. Under Alternatives 4, 5, and 6, the sums of the columns differ because some moderate erosion condition acres would change to critical and severe conditions.

No impact. No impact. No impact. No impact. No impact. No impact.

211,366 (68%)
 98,153 (32%)
 0 (0%)
 165,890 (54%)
 142,204 (46%)
 1,425 (0%)
 104,725 (33%)
 202,281 (63%)
 13,525 (4%)
 101,731 (30%)
 150,744 (44%)
 86,432 (26%)

(continued)

TABLE 2-5 (continued)

Resource Element and Present Situation	1 Continuation of Present Management (estimated 24 years)	2 Elimination of Livestock Grazing (estimated 24 years)	3 Multiple Resource Enhancement (estimated 24 years)	4 Adjustment to Grazing Capacity (estimated 24 years)	5 Rangeland Management Recommendation (estimated 24 years)	6 Livestock Optimization (estimated 24 years)
Mule Deer Presently 5,539 deer winter in the area. Some deer inhabit the area yearlong. Forage is not a limiting factor.	Deer population decrease to 5,526 head.	Deer population increase to 5,672 head.	Same as Alternative 2.	Deer population increase to 5,898 head.	Same as Alternative 4.	Same as Alternative 4.
Elk Approximately 100 elk occasionally winter in the K/E area. Competition with livestock and human intrusions are limiting factors.	Elk population increase to 154 head.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Antelope Approximately 30 antelope inhabit the K/E area. Livestock presently overutilize critical fawning areas.	No change in antelope numbers would occur.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Bighorn Sheep Approximately 40 bighorn sheep inhabit the K/E area yearlong. Currently adequate food, cover, and water exist.	Bighorn sheep population increase to 150 head.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Threatened and Endangered Species The bald eagle and peregrine falcon are the only federally classified endangered species in the K/E EIS area. Little information on their populations or distribution is known.	No change in prey base. No adverse impacts would occur.	No significant change in prey base except in riparian areas, which would improve. No adverse impacts would occur.	Same as Alternative 2.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
FISHERIES Two species of game fish (brown and rainbow trout) are found in 54.2 miles of stream. There are 20.5 stream miles of riparian habitat not presently grazed, nor would they be grazed in any of the alternatives.	Fisheries habitat would remain unchanged on 33.3 miles of stream. Aquatic/riparian habitat along 0.4 mile of Deer Creek would decline.	Fisheries habitat would improve on 33.7 stream miles due to improvements in riparian condition.	Fisheries habitat would improve on 33.7 miles due to fencing of riparian areas.	There would be no change in the aquatic/riparian community along 26.8 stream miles. Fisheries habitat would decline on 6.9 miles due to increased livestock use.	Same as Alternative 4.	Fisheries habitat would decline in quality on 26.8 miles of fisheries habitat. Fish habitat would decline from fair to poor condition on 6.9 miles.

(continued)

TABLE 2-5 (continued)

Resource Element and Present Situation	1 Continuation of Present Management (estimated 24 years)	2 Elimination of Livestock Grazing (estimated 24 years)	3 Multiple Resource Enhancement (estimated 24 years)	4 Adjustment to Grazing Capacity (estimated 24 years)	5 Rangeland Management Recommendation (estimated 24 years)	6 Livestock Optimization (estimated 24 years)
WILD HORSES Approximately 24 wild horses inhabit the K/E EIS area. No forage is presently allocated to wild horses.	Wild horses would increase by five head. No forage would be allocated to wild horses.	Management for a population of approximately 50 wild horses would require allocation of 314 AUMs initially and 650 AUMs in the long term.	Wild horses would be removed.	Wild horses would be allocated 314 AUMs and would increase to 29 head.	Same as Alternative 3.	Same as Alternative 3.
CULTURAL RESOURCES Knowledge of existing cultural resources is limited. However, there have been 1,550 cultural sites recorded by BLM. Six sites have been determined by BLM to be eligible for listing in the National Register of Historic Places.	Site mitigation and avoidance would minimize impacts.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
VISUAL RESOURCES Of the five possible visual resource management classes, four have been identified in the EIS area.	Visual resources would not be significantly impacted.	Scenic qualities of riparian and riparian areas would improve. Slight adverse impact to visual resources due to 973 miles of fence.	Generally visual resources would not be impacted. Scenic quality of riparian areas would improve.	Development of rangeland improvements would have a very slight adverse impact on visual resources. Little noticeable improvement in riparian areas.	Same as Alternative 4.	Same as Alternative 4.
RECREATION Big Game Hunting The major big game species in the EIS area is mule deer. Hunting averages 4,587 visitor days.	Big game numbers would not change significantly. As a result, hunter use would not be expected to change.	Increase in projected deer numbers from 5,539 to 5,672 could increase hunter use by an additional 110 days.	Same as Alternative 2.	Increase in projected deer numbers from 5,539 to 5,898 could increase hunter use by an additional 294 days.	Same as Alternative 4.	Same as Alternative 4.
Sightseeing Sightseeing is the major activity in the EIS area. Numerous opportunities exist for viewing scenery, historical and archaeological resources, and wildlife.	No change in quality of sightseeing opportunities would be expected.	Aesthetic appearance of EIS area would improve slightly.	General quality of sightseeing would improve. Scenic quality of riparian areas would improve.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

(continued)

TABLE 2-5 (continued)

Resource Element and Present Situation	1 Continuation of Present Management (estimated 24 years)	2 Elimination of Livestock Grazing (estimated 24 years)	3 Multiple Resource Enhancement (estimated 24 years)	4 Adjustment to Grazing Capacity (estimated 24 years)	5 Rangeland Management Recommendation (estimated 24 years)	6 Livestock Optimization (estimated 24 years)
Fishing Trout fishing occurs on 54.2 miles of stream. The streams include Death Hollow, Mamie Creek, Pine Creek, Boulder Creek, Calf Creek, and Deer Creek.	There would be no change in fishing potential on 33.3 miles of trout stream. Opportunities on 0.4 mile of Deer Creek would decline.	Opportunities would improve on 33.7 miles of stream.	Same as Alternative 2.	Opportunities would remain unchanged on 26.8 miles of stream.	Same as Alternative 4.	There would be a slight long-term decline in opportunities on 26.8 miles of stream. Opportunities would decline on 6.9 miles.
Off-Road Vehicles (ORV) Usually occurs in association with hunting or sightseeing.	No change.	There would be a slightly unfavorable impact to ORV use due to construction of 973 miles of fence.	Generally no change.	ORV use would be restricted on 22,411 acres of vegetation treatments.	ORV use would be restricted on 51,887 acres of vegetation treatments.	ORV use would be restricted on 162,695 acres of vegetation treatments.
Special Management Areas These areas include the Escalante Canyons, Devil's Garden, The Gulch, Phipps-Death Hollow, and the North Escalante Canyons Outstanding Natural Areas (ONAs). Calf Creek and Deer Creek Recreation Areas are also included as special management areas.	Quality of recreation opportunities would not change. Present livestock/recreationist season of use conflicts would continue to exist.	All livestock/recreationist conflicts would be eliminated.	Same as Alternative 2.	Slightly unfavorable impact on North Escalante Canyons and Phipps-Death Hollow ONAs. Existing conflicts would continue in The Gulch ONA and Deer and Calf Creek Recreation Areas.	Reduction in quality of recreation in Phipps-Death Hollow and North Escalante Canyon ONAs and Calf Creek Recreation Area.	Same as Alternative 5.
Glen Canyon National Recreation Area (GCNRA) About 388,116 acres of GCNRA are included in the K/E EIS area. Major recreational activities include backcountry camping and hiking.	No change in quality of recreational activities would be expected. Livestock/recreationist season of use conflicts would continue to exist.	All livestock/recreationist conflicts would be eliminated.	Same as Alternative 2.	Unfavorable impact on recreation quality along Escalante River in GCNRA.	Same as Alternative 4.	Same as Alternative 4.

(continued)

TABLE 2-5 (concluded)

Resource Element and Present Situation	1 Continuation of Present Management (estimated 24 years)	2 Elimination of Livestock Grazing (estimated 24 years)	3 Multiple Resource Enhancement (estimated 24 years)	4 Adjustment to Grazing Capacity (estimated 24 years)	5 Rangeland Management Recommendation (estimated 24 years)	6 Livestock Optimization (estimated 24 years)
<p>WILDERNESS Six Instant Study Areas containing 54,056 acres have been identified. There have been 35 units containing 1,260,771 acres identified for intensive inventory.</p>	<p>Implementation of any part of an alternative not meeting requirements of Section 603 of FLPMA or the interim management policy would be deferred pending Congressional action on the suitability recommendations.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Implementation of any part of an alternative not meeting requirements of Section 603 of FLPMA or the interim management policy would be deferred pending Congressional action on the suitability recommendations. If plans for specific management would be eliminated due to designation of wilderness areas, it would be necessary to redesign specific management systems.</p>	<p>Same as Alternative 4.</p>	<p>Same as Alternative 4.</p>

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environment in the Kanab/Escalante (K/E) environmental impact statement (EIS) area that would be affected by the six alternative management programs under consideration. Data is commensurate with the significance of the expected impact with less important material summarized, consolidated, or simply referenced. Detailed technical reports were prepared for each resource and were used to develop the descriptions presented herein. These technical reports are located at the Bureau of Land Management (BLM), Cedar City District Office.

Resource data is described in relation to the existing situation on public lands since these lands would be directly affected by implementing any of the alternative management programs under consideration. Additionally, BLM inventory and data collection procedures are normally restricted to public lands, and therefore, little specific data is available for the intermingled private and State lands in the area. It has been assumed that conditions on these lands are similar to the surrounding public lands.

3

VEGETATION

Extensive vegetation data is available and was used by BLM throughout the planning process and development of each alternative. This section describes key vegetation characteristics that are needed to evaluate and understand the possible effects on vegetation in the K/E EIS area.

Vegetation Types

Vegetation types were determined on the basis of specific plant dominance, visibility, and desirability as forage species. Since the K/E area is quite diverse in terms of climate, geology, topography, soils, and past management practices, there were approximately 125 vegetation subtypes delineated. For purposes of clarity and ease of description, vegetation on these specific subtypes is summarized in the following type categories:

<u>Type</u>	<u>Percent of Area</u>
Desert shrub	21.0
Sagebrush	9.6
Perennial grass	3.0
Mountain shrub	2.0
Pinyon-juniper	55.0
Riparian	0.3
Annual	0.1
Barren	9.0

Although not a vegetation type, the barren category characteristically supports a sparse stand of vegetation. These barren areas are usually rocky, rough, and unproductive. Vegetation on these areas was not specifically inventoried. Figure 3-1 (at the end of this chapter) shows each of these vegetation types in the K/E EIS area. Table 3-1 shows the acreage for each type and dominant characteristics.

Phenology

Plant phenology (the cycle of plant growth in relation to climate), varies in the K/E EIS area. One of the most important variables is elevation, since this relates to climatic conditions that influence growing seasons. Generally plants in the higher elevation areas begin growth later and have a shorter growing season than do plants in lower elevation areas. Another variable affecting phenology is the vigor or health of a plant. Cook (1966, 1971) conducted studies in western Utah that indicate plants in poor vigor begin growth later, produce less forage, and terminate growth sooner than do plants in a higher state of vigor.

Important phenology dates for select forage species in the K/E EIS area are shown in table 3-2.

TABLE 3-2
Plant Phenology

Species	Start Growth	Flowering	Peak of Seed Ripe	Disseminate	Regrowth
<u>GRASS</u>					
Agcr	3/1 to 4/15	5/1 to 5/25	6/1 to 7/15	7/10 to 9/30	9/1 to 10/1
Hija	4/1 to 5/20	5/10 to 7/15	6/15 to 8/10	6/15 to 8/20	9/1
Orhy	3/1 to 4/1	4/15 to 5/20	5/1 to 6/15	6/1 to 6/30	8/15
Spcr	4/1 to 4/25	6/1 to 7/25	7/20 to 9/1	7/10 to 10/15	9/20
<u>SHRUBS</u>					
Atca	3/1 to 5/1	4/25 to 5/25	6/11 to 10/1	9/30 to 2/15	.....
Eula	3/10 to 4/10	5/1 to 5/25	6/1 to 9/15	6/15 to 10/15	.....
Putr	4/15 to 6/1	5/25 to 6/10	6/15 to 7/1	6/15 to 7/20	.....

LEGEND:

- | | |
|---------------------------|-----------------------------|
| Agcr = Crested wheatgrass | Spcr = Sand dropseed |
| Hija = Big galleta grass | Atca = Fourwing saltbush |
| Orhy = Indian ricegrass | Putr = Antelope bitterbrush |
| Eula = Winterfat | |

TABLE 3-1

Vegetation Types

Vegetation Types	Total Federal Acres	Typical Percent Composition	Elevation (feet)	Percent Ground Cover	Annual Precipitation (inches)	Soil	Common Name	MAJOR PLANT SPECIES Botanical Name	Vigor of Desirable Forage Species
Annuals	2,045 a 260	Grass 10 Shrubs 20 Forbs 70	5,000 to 7,000	5 to 15	8 to 12	Moderate to well-drained. Sandy loam shallow to deep.	Cheatgrass Russian thistle	<u>Bromus tectorum</u> <u>Salisola kali</u>	Poor
Barren	138,137 a 94,375	Grass ... Shrubs ... Forbs ...	3,000 to 7,000	0 to 10	6 to 12	Slick rock and unproductive soils.	None	None	None
Desert Shrub	346,080 a 197,309	Grass 8 Shrubs 72 Forbs 20	3,000 to 5,000	5 to 30	6 to 8	Silty clay loam to very stony, sandy loam; shallow to deep. Poor to well-drained.	Greasewood Blackbrush Snakeweed	<u>Sarcobatus vermiculatus</u> <u>Coleogyne ramosissima</u> <u>Gutierrezia sarothrae</u>	Poor
Grass	60,454 a 6,809	Grass 60 Shrubs 25 Forbs 15	5,000 to 7,000	18 to 30	8 to 12	Stony sandy loam to sandy loam, moderately deep. Moderate to well-drained.	Wheatgrass Indian ricegrass Sand dropseed Galleta	<u>Agropyron</u> spp. <u>Orhizopsis hymenoides</u> <u>Sporobolus</u> spp. <u>Hilaria jamesii</u>	Poor to good
Mountain Shrub	60,026	Grass 5 Shrubs 85 Forbs 10	7,000 to 9,000	10 to 30	10 to 17	Stony, sandy to clay loam, shallow to moderate. Moderate to well-drained.	Serviceberry Gambel's oak Antelope bitterbrush Big sagebrush	<u>Amelanchier utahensis</u> <u>Quercus gambelii</u> <u>Purshia tridentata</u> <u>Artemisia tridentata</u>	Fair
Pinyon-Juniper	1,325,747 a 87,190	Grass 5 Shrubs 80 Forbs 15	5,000 to 7,500	10 to 30	8 to 15	Well-drained, gravelly, sandy and silty loam, shallow to deep.	Single leaf pinyon Utah juniper Big sagebrush Pinyon pine	<u>Pinus monophylla</u> <u>Juniperus osteosperma</u> <u>Artemisia tridentata</u> <u>Pinus edulis</u>	Poor to fair
Riparian	6,549 a 258	Grass ... Shrubs ... Forbs ...	3,000 to 9,000	.....	7 to 17	Moderate to poorly drained. Stony, sandy loam to clay generally shallow.	Salt cedar Cottonwood Willow Sedge Rush	<u>Tamarix gallica</u> <u>Populus fremontii</u> <u>Salix</u> spp. <u>Carex</u> spp. <u>Juncus</u> spp.	Poor to good
Sagebrush	240,312 a 1,915	Grass 15 Shrubs 75 Forbs 10	5,000 to 8,000	15 to 20	7 to 16	Deep, well-drained on benches and valley bottoms. Silty clay loams to very stony, sandy loam.	Big sagebrush Sand sagebrush Rabbitbrush Snakeweed Black sagebrush	<u>Artemisia tridentata</u> <u>Artemisia filifolia</u> <u>Chrysothamnus</u> spp. <u>Gutierrezia sarothrae</u> <u>Artemisia arbuscula</u>	Poor to fair
Totals	2,179,350 a 388,116								
TOTAL	2,567,466								

^aGlen Canyon National Recreation Area.

Condition

Livestock forage condition is the present state of livestock forage in relationship to what the given area is capable of producing. The existing condition of livestock forage in the K/E EIS area is described as good, fair, or poor in terms of relative abundance of the present quality and quantity of livestock forage, not in terms of the ecological condition. This description is only made for those areas (1,307,639 acres) considered suitable for livestock grazing. A more detailed discussion of methodology used to determine livestock forage condition is contained in Appendix 8. The methodology used to determine range suitability can be found in Appendix 9.

A livestock forage condition rating was made for each writeup area in the K/E EIS area. The data was obtained from recent range surveys. In addition, current watershed erosion conditions were taken into consideration (see Soils section, this chapter). The results of this rating are shown in table 3-3 for the K/E area and in vegetation impact tables by allotment, Appendix 10.

TABLE 3-3

Livestock Forage Condition

Condition Rating	ACRES	
	Public Land	Glen Canyon National Recreation Area
Good	108,849	15,495
Fair	513,224	169,606
Poor	457,988	42,477
Unsuitable ^a	<u>1,099,289</u>	<u>160,538</u>
TOTAL	2,179,350	388,116

^aNo condition was determined on areas considered unsuitable for livestock grazing.

There are limiting factors to these ratings. For example, a poor condition may be the consequence of past management or the result of endemic site factors such as low soil productivity and shallow soils. Without ecological site data it is not possible to determine the extent to which these variables contribute to the present condition of the area.

Trend in Rangeland Condition

Trend in rangeland condition is the direction of change from the current condition of a specific area. This direction of change is described as up, down, or static. It is usually determined by making measurements and

observations of permanently established plats and/or transects over a period of time. This is done in selected key areas that are representative of trend over a larger area. In the K/E EIS area this procedure has been completed on some, but not all allotments. Definitive data for each allotment is incomplete, although "apparent" trend observations have been made on all areas. These apparent trend observations are made at only one point in time, and therefore do not accurately reflect actual trends; however, it is the best data currently available. These observations consider vigor of desirable species, quantity of new seedlings established by desirable forage species, apparent movement of surface litter, and degree of erosion as portrayed by gully formation. Apparent trend observations were made in the field by BLM range specialists while conducting the range survey. Appendix 11 discusses apparent trend methodology.

The result of these observations is shown below for acreage considered suitable for livestock grazing.

<u>Apparent Trend</u>	<u>Suitable Federal Acres</u>	<u>Percent of Area</u>
Up	85,262	7
Down	44,009	3
Static	1,178,368	90

Specific trend data is shown for each allotment in vegetation impact tables, Appendix 10.

The relationship between apparent trend data and long-term trend determinations is not known, and therefore, should be considered a subjective estimate.

Production

Production estimates for vegetation in the K/E EIS area are restricted to livestock and wildlife forage. The existing forage available to livestock is 68,298 animal unit months (AUMs) and 69,253 AUMs are available to wildlife. These estimates were made from inventories conducted from 1975 through 1979 and cover the entire EIS area. The ocular reconnaissance forage survey was the principal method used. This method considers the existing vegetation composition, density, and relative value of each species for livestock and wildlife forage. Extensive field work was required, involving vegetation mapping and specific field examinations made on 1,833 writeup areas representative of each vegetation type. For a more detailed discussion, refer to the BLM Range Management Manual section 4412.11A. Appendix 12 discusses methodology used to calculate forage availability and quality in the K/E EIS area. These estimates are not absolute values for existing production. They are more properly a starting point for management and would be used to determine initial adjustments in stocking rates (BLM Manual section 4412.11A) and should be followed by subsequent monitoring and study.

Estimates of potential forage production were made by conducting a range survey on good condition areas in the K/E EIS area using the reconnaissance method described above. Approximately 53 sites were sampled for forage production potential during the period 1975-79. The results of these

inventories were used to determine realistic potential production figures on similar vegetation areas that are presently in a lower forage condition. This comparison led to the potential production estimate of 34,190 AUMs of livestock forage and 14,408 AUMs of wildlife forage, made possible through natural plant improvement on 1,307,639 acres of Federal land. It can be assumed that if proper range management would be applied, these potential AUMs could take as long as 20 to 24 years to be realized.

An additional 6,258 AUMs of livestock forage are presently available, but not immediately usable until water and access are provided on 135,102 acres.

Riparian Vegetation

Riparian vegetation is considered to be vegetation that is associated with permanent water. It is found growing along streambanks, bodies of water, and around moist areas such as springs and seeps.

Within the study area there are 86 streams passing through 66 allotments on public lands. There is a total of 349 miles of stream and 6,807 acres of riparian vegetation. Major riparian vegetation species are shrubs such as willows (Salix), salt cedar (Tamarix), grasslike plants such as rushes (Juncus) and sedges (Carex), trees such as cottonwood (Populus), and aquatics such as watercress (Nasturtium) and cattails (Typha). Species composition and ground cover vary with the location and abundance of water.

Riparian communities in good condition exhibit an abundant and diverse assortment of plants and animals. Healthy communities show good age distribution, the soil is mostly covered with vegetation, bank erosion is generally lacking, and vegetation provides cover for animals and shades the water during most of the day.

The condition of riparian vegetation in the study area has been classified as follows:

<u>Riparian Condition</u>	<u>Miles of Stream</u>	<u>Acres</u>
Very poor	15.8	265.0
Poor	162.4	4,031.9
Fair	104.95	1,548.9
Good	63.16	840.4
Excellent	<u>3.1</u>	<u>121.0</u>
Total	349.41	6,807.2

Source: Unit Resource Analysis (URA), Wildlife, all planning units, 1975-79.

Appendix 13 indicates present riparian condition by stream and allotment.

Livestock and wildlife use riparian areas for watering, cover, and forage. The riparian vegetation along the banks is in poor condition in areas where use is concentrated and where vegetation begins growth earlier in the spring and continues growth later into the fall than most upland range plants. During this time the plants are more palatable than dried range plants and are actively sought by cattle (Platts and Rountree, 1972).

Noxious and Poisonous Plants

There are 42 plants in the K/E area known to be noxious or poisonous to livestock. These plants are a minor component of the total plant composition. Some are found only on private cultivated areas.

Very few cases of livestock poisoning have been reported; however, when poisoning has occurred, the plants that have generally been responsible were whorled milkweed (Asclepias subverticillata) on private land, and scrub oak (Quercus gambelii) on Federal land. A more complete list of the noxious and poisonous plants found in the area is available in the planning documents, BLM, Cedar City District Office.

Threatened and Endangered Species

A survey consisting of a literature search and field investigation conducted by a qualified botanist identified one plant species as having official Federal status as threatened or endangered: siler pincushion cactus (Pediocactus sileri). This species has been found in only one location of the K/E EIS area, about 10 miles east of Kanab along the Utah-Arizona State line.

This perennial cactus grows more exclusively on the Moenkopi Formation in sandy, gypsiferous, seliniferous, calciferous soils high in soluble salts and is associated with the desert shrub communities.

Informal consultation (according to Section 7 of the Endangered Species Act, 1972) with the U.S. Fish and Wildlife Service has been initiated to determine the requirement needs and distribution of this species.

SOILS

Soils in the K/E EIS area exhibit the influence of climate and geology. Low average annual precipitation (refer to Climate section) and subsequent low organic matter content are reflected in the limited development of soil profiles. This limits soil productivity and potential yields of livestock forage.

Specific soil surveys conducted by the Soil Conservation Service are available for 210,260 acres, 8 percent of the K/E EIS area. Information on the remaining 92 percent of the area is limited to a general bulletin and map published by Utah State University (Wilson et al., 1975) and two countywide soil association publications for the Arizona portion (1974, 1977). BLM has augmented this general information by conducting additional inventory (1977-78) on approximately 1.7 million acres, mapping soil associations, depth, texture, and productivity. The following discussion is a summary of a technical report available at the BLM, Cedar City District Office. It utilizes the best data available; however, the absence of comprehensive soil data precludes a more detailed description and will restrict impact assessment in Chapter 4.

Soil Associations

Within the K/E EIS area, six general soil associations predominate (fig. 3-2 at the end of this chapter). There are also major soil-rock groups consisting of Rock Land and the Badland-Rock Land soils, which account for 40 percent of the total area. Table 3-4 lists descriptions of the six soil associations. This information is useful as a general guide and is not applicable to specific tracts. This table also delineates several of the soil parameters important in soil erosion and land treatment success, and will be used in the subsequent analysis of proposed management actions.

Additional characteristics of soil associations are:

1. Sandy Soils. Sandy soils are extensive in Kane County north, east, and south of Kanab, and along the Coyote Wash tributary of the Escalante River. These soils make up approximately 15 percent of the EIS area. Runoff and sediment production from these soils are low.

2. Highly Erodible Soils. Highly erodible soils comprise 10 percent of the K/E area. These soils are located between the towns of Tropic and Escalante and outcrop on the Kaiparowits Plateau. They are primarily associated with the Straight Cliffs Formation. Runoff from these soils is moderate to high and sediment production is high (Wilson et al., 1975).

3. Light-Colored Soils of Valleys, Terraces, and Mesas. These soils are usually dry, but are moist in some parts during the summer. They are found south and east of Kanab and south of Escalante in the Kaiparowits Plateau. Average annual precipitation on these soils ranges from 8 to 14 inches and produces medium to rapid runoff and moderate to low sediment yields. Slightly saline soils within this grouping are found northeast of Kanab in the Ustic Torrifluvents-Ustic Torriorthents Association (fig. 3-2). Approximately 20 percent of the EIS area has these soils.

4. Dominantly Dark-Colored Soils of Upland Plains and Terraces. These soils are found in a broad crescent band stretching from Orderville to Tropic. They are found between 5,500 and 7,000 feet above sea level and receive approximately 12 to 14 inches of precipitation per year. Runoff is medium to rapid and sediment production is moderate. If vegetation is removed from these soils, wind erosion could be a problem.

5. Dark-colored Soils of Mountains and Plateaus. These soils receive approximately 14 to 22 inches of rainfall annually and are located south, east, and west of Boulder and Bryce Canyon National Park. Only 4 percent of the EIS region contains these soils. Runoff is classified as medium to rapid and sediment production is low to moderate.

6. Other Minor Soil Associations. Other minor soil associations in the EIS area include the high mountain soils on Canaan Peak and scattered areas of light-colored desert soils on valleys, terraces, and fans.

Rock Land and Badland areas have minimal soil development and surface cover. Bare rock is estimated to be from 50 to 75 percent of this land type. Shallow and very shallow soils make up 20 to 40 percent of this type and are

TABLE 3-4

Description of Soil Associations

Grouping	Association Number	Soils	Depth ^a	Permeability ^b	Surface Texture	Surface Runoff	Surface ^c Sediment ^d Production	Wind ^e Erosion	POTENTIAL YIELDS (years)		Characteristic Vegetation
									Favorable	Unfavorable	
1. Sandy soils	65	Typic Torripsaments-Typic Torriorthents Association	Deep	Rapid	Loamy fine sands	Slow to medium	Low	Critical	900 to 1,000	500 to 700	Sagebrush, blackbrush
	67	Ustic Torripsaments Association	Deep	Rapid	Fine sands	Very slow to slow	Low to moderate	Moderately critical	1,200	800	Big sagebrush
2. Highly erodible soils	63	Typic Torriorthents (Shallow)-Lithic-Calciorthids-Lithic Natrargids Association	Shallow	Moderate to slow	Loams, silt loams, silty clay loams	Rapid	High	No serious wind erosion	200 to 1,300	100 to 600	Shadscale, saltbush
	64	Ustic Torriorthents (Shallow)-Badland-Rock Outcrop Association	Shallow to moderately deep	Moderate to very slow	Loams, silt loams, silty clay loams	Moderate to high	High	No serious wind erosion	900 to 2,000	500 to 1,200	Pinyon-juniper, sagebrush
3. Light-colored soils of valleys, terraces, and mesas	36	Ustic Torriorthents-Ustic Torriorthents Association	Deep	Slow to moderately rapid	Fine sandy loams to silty clay loams	Slow to medium	Moderate to high	Moderately critical	2,300	1,400	Sagebrush, bluebunch wheatgrass
	37	Ustollic Haplargids-Ustic Torriorthents Association	Deep	Slow to moderately rapid	Fine sandy loams and loams	Slow to medium	Moderate to low	Moderately critical	900 to 2,000	400 to 850	Sagebrush, Indian ricegrass
	41	Lithic Ustollic Calciorthids-Lithic Ustic Torriorthents Association	Shallow to moderately deep	Moderate to rapid	Fine sandy to coarse, gravelly loams	Medium to rapid	Moderate to low	No serious wind erosion	600 to 1,250	276 to 900	Pinyon-juniper, sagebrush
4. Dark-colored soils of upland plains and terraces	18	Aridic Arguistolls-Typic Arguistolls Association	Moderately deep to deep	Moderate	Loams and fine sandy loams	Medium to rapid	Moderate	No serious wind erosion	1,250 to 1,500	800 to 900	Pinyon-juniper, sagebrush
5. Dark-colored soils of mountains and plateaus	5	Typic Argiborolls-Lithic Argiborolls-Typic Haploborolls Association	Shallow to deep	Slow to moderate	Gravelly loams to silty clay loams	Medium to rapid	Low	No serious wind erosion	1,200 to 2,000	600 to 900	Pinyon-juniper, sagebrush
	6	Typic Argiborolls-Typic Ustorthents Association	Shallow to deep	Slow to very slow	Gravelly loams to silty clay loams	Medium to very rapid	Moderate	No serious wind erosion	1,600	825	Pinyon-juniper, oakbrush

(continued)

TABLE 3-4 (concluded)

Grouping	Association Number	Soils	Depth ^a	Permeability	Surface Texture	Surface Runoff	Sediment ^d Production	Wind ^e Erosion	POTENTIAL YIELDS (years) ^f (pounds per acre per year)		Characteristic Vegetation
									Favorable	Unfavorable	
	11	Lithic Haploborolls- Lithic Argiborolls- Typic Haploborolls Association	Shallow to moderately deep	Slow to moderately rapid	Cobbly and sandy loams	Slow to rapid	Moderate to low	No serious wind erosion	1,250 to 2,000	500 to 1,200	Pinyon-juniper, bluebunch wheatgrass
6.	Light and dark colored mountain soils	Argic Cryoborolls- Pachic Cryoborolls- Cryic Paleoborolls Association	Mod-erately deep to deep	Slow to rapid	Silt loams and clay loams	Medium to slow	Moderate to low	No serious wind erosion	2,600 to 5,300	1,200 to 2,000	Aspen, spruce, fir, pine
	52	Typic Torriflorents- Typic Torriorrhents Association	Deep	Slow to rapid	Sandy and silty clay loams	Slow to rapid	Moderate	No serious wind erosion	725 to 800	200 to 326	Shadscale, snakeweed
	51	Aquic Xeroflorents- Aquic Ustiflorents- Typic Torriflorents Association	Deep	Slow to moderately rapid	Fine sandy loams and silty clay loams	Slow to rapid	High	No serious wind erosion	725 to 4,200	325 to 2,000	Sagebrush, greasewood, rabbitbrush
7.	Rock Land and Badland	Rock Land	None to shallow	Not applicable	Bare rock to sandy soils	High	Moderate	No serious wind erosion	* * * * * NOT DETERMINED	* * * * *	Not applicable
	69	Badland-Rock Land Association	None to shallow	Not applicable	Barren to shale to sandy soils	Rapid to very rapid	Very high	No serious wind erosion	* * * * * NOT DETERMINED	* * * * *	Not applicable

Source: Wilson, et al., 1975, Soils of Utah, Utah State University Agricultural Experiment Station, Bulletin 492, Logan, Utah.

^aDepth: Deep >36 inches
Moderately deep 20 to 36 inches
Shallow 10 to 20 inches
Very shallow <10 inches

^bPermeability: Very slow <0.06 inches per hour
Slow 0.06 to 0.2 inches per hour
Moderately slow 0.2 to 0.6 inches per hour
Moderate 0.6 to 2.0 inches per hour
Moderately rapid 2.0 to 6.0 inches per hour
Rapid 6.0 to 20 inches per hour
Very rapid >20 inches per hour

^cSurface runoff: The rate that water flows over the land surface. Relative terms used are: very rapid, rapid, medium, slow, very slow, and ponded. Classification defined in USDA, 1951, Soil Survey Manual, Agriculture Handbook 18, pg. 169.

^dSediment Production: Low <0.5 acre-feet per mile² per year
Moderate 0.5 to 1.0
High 1.0 to 3.0
Very high 3.0

^eWind Erosion: Critical areas have sparse or no vegetation cover to hold the soil and are predominantly salt flats, playas, and sandy soils. Moderately critical areas are predominantly sandy soils with 14 to 16 inches of precipitation. Vegetation has been reduced or changed by heavy grazing, and erosion is a continuing problem.

^fPotential Yields: Expressed as pounds of air dry annual production per acre. Favorable years are determined to be those with growing conditions near the top from the standpoint of total annual yield. Unfavorable years are those where plant growth was near the lowest production on record. These figures should be used as ranges of potential production under the most beneficial and adverse climatic conditions.

often slightly to moderately saline due to the chemical composition of their parent materials (fig. 3-2). The remaining 5 to 10 percent are deep to moderately deep soils. Runoff is high in this association due to the lack of soil development and surface cover (Wilson et al., 1975).

Erosion Condition

The present erosion condition of soils in the EIS area was based on field observations of seven surface features on representative sites in each allotment during the years 1975 to 1979. Soil movement, surface litter, pedestalling, surface rock, rills, flow patterns, and gullyng were evaluated and assigned numerical values. For each site all factors were totaled. This number determined one of five erosion condition classes established by the BLM soil surface factor (SSF) methodology (BLM Manual 7317.12).

From observations made on several thousand writeup areas (Range Survey, 1975-79), approximately 12 percent of the EIS area is within either the severe or critical erosion condition class, 56 percent is within the moderate class, 21 percent is within the slight class, and 11 percent is within the barren or stable class or was not inventoried. The acreage below includes 259,764 acres of private and State lands inventoried in four planning units.

<u>Erosion Condition Class</u>	<u>SSF Number</u>	<u>Acres</u>
Slight	21 to 40	606,242
Moderate	41 to 60	1,589,669
Critical	61 to 80	303,353
Severe	81 to 100	6,166
Barren, stable, or unclassified	0 to 20	322,080

The SSF categorization provides a relative guide to erosion conditions within the EIS area and has not been carefully tested or correlated with other areas. It should only be used with this consideration in mind.

Sediment Yields

Sediment yield data collected in conjunction with range survey inventories between 1975 and 1979 was based on Pacific Southwest Interagency Committee (PSIAC, 1968) methodology (Wilson et al., 1975). PSIAC methodology is best used as a means of delineating boundaries between sediment yield areas and in the extrapolation of existing data to areas where none is available (PSIAC, 1968). In essence, it gives a ball park figure of approximate sediment yields.

Five categories of sediment yield were defined by this system: very low (less than 0.2 acre-feet per square mile per year [ac-ft/mi²/yr]), low (0.2 to 0.5 ac-ft/mi²/yr), moderate (0.5 to 1.0 ac-ft/mi²/yr), high (1.0 to 3.0 ac-ft/ mi²/yr), and very high (greater than 3.0 ac-ft/ mi²/yr). Present acreage in each category (URA, Watershed, all planning units, 1975-79) is shown below for the K/E EIS area. The acreage below includes 259,764 acres of private and State lands inventoried in four planning units.

<u>Yield Category</u>	<u>Percent of Area</u>	<u>Acres</u>
Very low	5.1	145,308
Low	58.0	1,640,763
Moderate	21.5	608,717
High or very high	4.5	123,346
Barren or not rated	10.9	309,376

Sediment yields on 1.2 million acres were estimated using BLM Phase I Watershed Conservation and Development Inventory (1977) and converted to PSIAC sediment yields using a method developed by the BLM Denver Service Center.

Salt production and high sediment yields in many areas of the K/E EIS area are the result of natural geologic erosion processes rather than accelerated erosion processes which occur primarily from the activities of man or animals. Appendix 14 identifies allotments with high sediment yields.

Important Soil Characteristics and Areas of Concern

Generally, soil characteristics that lead to high runoff and sediment yields are fine-textured soils with low permeabilities, low forage production, slopes exceeding 10 percent, and that are within highly intense consecutive storm regions (Wilson et al., 1975; Branson et al., 1972). Wind erosion is primarily a problem in sandy to loamy soils with sparse or no vegetation cover. Runoff on these soils is usually low, due to high permeability rates.

Of particular concern are soils in critical or severe erosion classes (Existing Situation, Appendix 15) which have livestock forage utilization of 60 percent or greater in 19 allotments (URA, Watershed, all planning units, 1975-79). There is a total of 14,500 Federal acres involved. Livestock grazing would be authorized on these allotments because during the BLM Range Survey (1975-79) range specialists judged the critical erosion areas as being capable of realizing improved erosion conditions due to better rangeland management practices (Appendix 9, Methodology Used to Determine Suitability).

Based on Soil Conservation Service soil salinity condition maps for Utah (1973), only two soil associations in the EIS area are considered moderately or slightly saline (fig. 3-2). These two associations generally coincide with areas of high sedimentation as described previously. All other soil associations are considered nonsaline.

An additional area of special concern, especially in terms of sedimentation, is streambank sloughing. In the K/E EIS area, approximately 315 streambank miles are in poor erosion condition. Appendix 16 lists the streams, allotments, and streambank mileage with observed erosion problems. These figures are based on field observations made on the streams listed. They are not inclusive of all area streams. Quantitative information relating to the magnitude of this problem is lacking. However, concentrated livestock and wildlife use along streamsides is believed to be the primary cause for the collapse and deterioration of these areas (Thomas et al., 1979). Specific drainages with major erosion problems are Escalante River, Harris Wash, The Gulch, and Deer Creek.

Floodplains in the EIS area are also of concern. Presently these areas are major sediment transport channels. They are heavily grazed but have the potential to improve cover and greatly reduce peak flood volume and erosion (Escalante, Paria Management Framework Plans [MFP], 1979). Peak flows normally occur during the period March 1 to September 30. Appendix 17 lists acreages by allotment where floodplains with heavy utilization have been delineated by BLM personnel. However, site specific information on these areas by alternative is lacking, so only a cursory review of impacts on these areas can be addressed. Generally speaking, floodplains are the relatively flat alluvial depositions adjacent to water channels that are covered with flood waters during certain magnitude runoff events (BLM Manual 7221 specifies 100-year floodplains). Due to these characteristics (i.e., better soils, higher subsurface water tables, and lower slopes), these areas tend to be very conducive to vegetation production and subsequent livestock utilization. Thus, with changes in livestock numbers in these areas, a relative condition rating can be estimated. Analysis of these areas will be based on relative change from the existing situation.

Riparian and floodplain zones are treated separately in the EIS because of differences in vegetation, resource management objectives, and resource impacts due to livestock grazing. For example, because of the presence of permanent water, vegetation would respond much more rapidly in riparian zones than in the adjacent drier floodplains when livestock grazing is eliminated (Thomas et al., 1979).

WATER RESOURCES

Water resources in the K/E EIS area are limited. The area is typically dry with few permanent water bodies. The following discussion will address surface water availability, existing uses, and water quality.

Water Availability

The K/E EIS area is located within the Colorado River hydrologic region and contains parts of the Upper and Lower Colorado regions. Major drainages in this area include the Escalante River, Paria River, Kanab Creek, and Virgin River. There are numerous small streams that flow into these major drainages; most average less than 1 to 2 miles in length. Appendix 13 shows the existing 349 miles of permanent water by allotment.

Streamflows within the EIS area are highly dependent upon precipitation events or snowmelt and might only flow during early spring or late summer. This latter period is significant in terms of sediment yields because intense convective storms often produce the highest peak discharges and sediment yields (Branson et al., 1975).

Spring discharges fluctuate throughout the year in response to water table changes and precipitation, but generally they are less than 15 gallons per minute (URA, all planning units, 1975-79).

Several aquifers exist in the area, but most studies have focused on the extensive Navajo Sandstone aquifer. Goode (1966, 1969) estimated that the formation could contain upwards of 20 million acre-feet of storage per square mile in the Zion region and storage of 50,000 to 60,000 acre-feet per square mile near the town of Escalante. Depth to water in the Navajo Formation in the EIS area varies from less than 500 feet between Vermilion and White Cliffs to around 800 feet on Clark Bench (Goode, 1966; Harshbarger et al., 1967).

Water Use

Present water use on public lands in the K/E area primarily consists of livestock consumption (102.4 acre-feet per year), wildlife consumption (deer consumption: 2.6 acre-feet per year), and recreation (URA, all planning units, 1975-79).

There are nine public wells in the EIS area. They are essentially used for wildlife and livestock. Additional public waters are used for domestic and municipal supplies. The city of Fredonia has appropriative rights to 907.5 acre-feet annually.

BLM presently has appropriations for 620 acre-feet annually in the EIS area as recorded by the Utah State Engineer's Office, although sufficient water to fulfill this water right might not be available each year. Additional water rights are in adjudication in the Canaan Mountain area (URA, all planning units, 1975-79).

Water Quality

Past sampling and water quality studies indicate that water quality in the EIS region is generally suitable for livestock consumption and could be treated where needed to meet recommended human consumption standards (URA, all planning units, 1975-79).

The two most significant water quality problems in the EIS area are the large sediment loads and the high total dissolved solids in streams. According to the Five-County Association of Government 208 Water Quality report (Vaughn Hansen and Associates, 1977), these problems are "essentially natural occurrences rather than man caused." Large sediment loads inhibit use of streamflows for irrigation, drinking, recreation, and can decrease storage capacity in reservoirs. For example, both "Wide Hollow and North Creek reservoirs near Escalante are filling up with sediment" (USDA Escalante River ES, 1974). Dissolved solids concentrations greater than 500 milligrams per liter can cause physiological effects in humans (EPA, 1976). Additional detrimental effects include encrustation problems and effects on fish and wildlife. Other water quality problems in the EIS area include high coliform bacteria counts due to municipal sewage treatment discharges (e.g., East Fork Virgin River and Kanab Creek below the treatment plant) and chemical problems which are primarily the result of natural geologic conditions (i.e., Paria River and Henderson Creek). Little data is available on specific areas having water quality problems related to livestock grazing. The exceptions are Indian and Water Canyons, which have occasional coliform bacteria and total dissolved solids problems. These two canyons supply water for the town of Fredonia, Arizona.

LAND USE

The K/E EIS area is primarily rural and has been dominated in character by livestock production. In recent years, other interests such as recreation have played an increasingly important role. There exists a high potential for change in some land use patterns within the area if the Kaiparowits and Alton coal fields go into full production.

Land Ownership and Predominant Management

Land ownership in the EIS area is dominated by Federal agencies, primarily BLM, Forest Service, and the National Park Service (fig. 1-1 at the back of Chapter 1). The following table depicts general ownerships in the two most affected counties.

<u>Land Ownership</u>	<u>Garfield County (Acres)</u>	<u>Kane County (Acres)</u>	<u>Totals^a (Acres)</u>
BLM	1,632,634	1,672,062	3,304,696
Forest Service	1,036,581	123,081	1,159,662
National Park Service	284,331	375,060	659,391
Water and Power Resources Service	183	30,371	30,554
State of Utah	222,712	217,996	440,708
Roads and Railroads	8,662	6,346	15,008
Private	132,337	145,288	277,625
County Totals ^b	<u>3,318,400</u>	<u>2,570,240</u>	<u>5,888,640</u>

Source: Utah Agricultural Statistics, 1978 (pp. 13 and 15).

^aTotals do not add because of omission of small water bodies.

^bTotals include county acreages not contained in the EIS area.

Federal lands under the administration of BLM and the Forest Service are managed to provide for multiple use and sustained production of many different resources, including grazing, timber and woodlands products, recreation, water, and minerals.

National Park Service administered lands in the area are Zion National Park, Bryce Canyon National Park, Cedar Breaks National Monument, Capitol Reef National Park, and the Glen Canyon National Recreation Area (GCNRA). They are managed predominantly for preservation and recreational purposes and exclude many other uses such as grazing, logging, and in most instances, mining. An exception occurs in certain portions of GCNRA where grazing was continued after formation of the recreation area and is administered by BLM.

The State of Utah administers a little over 9 percent and the State of Arizona administers less than 1 percent of the acreage in the EIS area, consisting of generally scattered sections as well as various State forests and reserves. Access to scattered State sections is limited and management is usually similar to that of the surrounding ownership. The State reserves and forests in the EIS area are all recreation sites (Coral Pink Sand Dunes, Kodachrome Basin, and Escalante Petrified Forest).

Private lands are usually located in the lower elevations along the major water drainages. This is especially true of the agricultural lands because water tends to be the limiting factor to agricultural production. Harvested agricultural lands are devoted almost exclusively to the production of livestock feed, primarily hay, but also some feed grains such as corn and wheat. Other lands are largely devoted to pasturage and are irrigated.

Land Production

Agricultural Lands

Agricultural production in Garfield and Kane Counties centers around livestock production. A 1977 estimate by the Utah Industrial Development Division shows 193 farm operations with 129,391 acres in Garfield County and 128 farm operations with 229,228 acres in Kane County. Total value of agricultural production for the two counties in 1977 was estimated at \$2,995,000. Since the late 1960s, both the number of farms and the acreage in agricultural production for both counties have been on a gradual but steady decline. In both counties the acreage of agricultural land is declining at a greater rate than the number of farms. Such declines are indicative of the declining role which agriculture plays in the aggregate county economies.

Agricultural Products

According to the 1974 Census of Agriculture, there were 16,079 head of cattle on inventory in Garfield County and 11,031 head in Kane County. Sales of stock for the same period was estimated by the census at 6,297 head (at \$997,000) for Garfield County and 6,055 head (at \$803,000) for Kane County. Most crop production in the county is in support of the livestock industry.

As shown in the following table, most acreage is devoted to hay production.

	<u>Garfield County</u>	
<u>Type of Crop</u>	<u>Acres</u>	<u>Quantity Harvested</u>
Hay Crops	8,616	22,100 (tons)
Other Small Grains	584	.....
Wheat	785	15,339 (Bu)
Corn (for all purposes)	239	.....
	<u>Kane County</u>	
<u>Type of Crop</u>	<u>Acres</u>	<u>Quantity Harvested</u>
Hay Crops	1,727	2,878 (tons)
Other Small Grains	72	.....
Wheat	10	430 (Bu)
Corn (for all purposes)	8	.....

Source: 1974 Census of Agriculture - County data. Garfield and Kane Counties.

Irrigation of agricultural lands is also predominantly oriented toward supporting livestock needs. The following table shows the top three major uses of irrigated lands (in terms of devoted acreage).

<u>Category</u>	<u>Garfield County</u>		<u>Quantity (tons)</u>
	<u>Acres</u>		
Cropland Used Only For Pasture	11,927		.....
Improved Pasture	8,321		.....
Hay Crops	<u>7,340</u>		<u>19,650</u>
TOTAL ACRES	<u>27,588</u>		.....

<u>Kane County</u>		
Cropland Used Only For Pasture	6,283	.....
Improved Pasture	7,795	.....
Hay Crops	<u>1,492</u>	<u>2,581</u>
TOTAL ACRES	<u>15,570</u>	.....

Source: Bureau of the Census, 1977 - County data for Garfield and Kane Counties.

Livestock Grazing

Currently the K/E area has 210 allotments being used by 282 permittees. The size of livestock operations has been identified as 80 small operations (up to 25 head), 113 medium operations (25 to 100 head) and 89 large operations (100 to 500+ head). There are 109,708 AUMs of grazing preference in the K/E area. Average active authorized use over a 5 to 10-year period has been 68,895 AUMs.

Most of the permittees utilize public land in conjunction with national forests, private lands, and State lands in order to conduct a year-round operation. Of the 210 allotments, 14 are grazed yearlong by livestock, although the average grazing season is approximately 6 months long.

Forage utilization is highly dependent on livestock distribution. Topography, water, and salt directly control forage use. Currently 38 percent of the K/E area is in poor livestock forage condition, 52 percent in fair condition, and 10 percent is in good condition. However, due to some limiting distribution factors, some livestock forage is underutilized.

Rangeland Production

Approximately 342,300 livestock (cattle, sheep) AUMs were produced in Garfield and Kane Counties as shown below. Production from BLM-administered lands totals approximately 132,300 AUMs or nearly 40 percent of the consumed countywide totals.

<u>Rangeland Production</u>	<u>Garfield County</u>	<u>Kane County</u>	<u>Total</u>
County Totals (AUMs)	231,400	110,899	342,299
BLM Forage (AUMs)	46,230	86,023	132,302
BLM Percentage of Total	20%	78%	39%

Source: Planning Area Analysis, Garfield and Kane Counties, 1978-79.

The existing estimated forage available to livestock in the K/E area (which does not include all of Garfield County) is 68,298 AUMs (Vegetation Production, Chapter 3).

Livestock Production Characteristics

The livestock industry in Garfield and Kane Counties is quite diversified and generalizations are unreliable. However, a preliminary Rancher Socioeconomic Survey (Carlson, 1979), indicates that most ranches run a cow-calf type of operation, although some retain yearlings. The breeding season followed by most operators extends from about May or June through November or December. Most operations run one bull to 30 cows and attain an 80-percent calving ratio. Very few operators employ pregnancy testing. Most operations replace breeding stock (generally out of the calf crop) at an age of 10 or 11 years. Bulls are replaced after 5 years (or less) and are purchased outside the herd in order to maintain or improve the strain. On a seasonal basis, operations in the medium size class (25 to 100 head) depend on BLM forage to the greatest extent (about 80 percent). Small operations (0 to 25 head) and large operations (100 to 500+ head) are less dependent on BLM forage (59 and 50 percent respectively).

SOCIOECONOMICS

The following description of economic conditions associated with the management of rangeland resources and the ranching industry is based on a stratified sample of the financial and operational set-ups of industry members. An initial survey of selected ranchers was conducted by BLM personnel and the Grazing Advisory Board from December 1978 to January 1979. The summaries of this survey were then reviewed and revised by both Garfield and Kane County Cattlemen's Associations review panels. The results of these reviews formed the foundation for this discussion and economic analysis.

This section tracks the interdependency of economic and sociological processes from the rancher level to the community and regional levels. The base of all such analyses is the ranch unit, as depicted by three separate sizes of operation: small size ranches (0 to 25 head of livestock), medium size ranches (25 to 100 head of livestock), and large size ranches (100 to 500+ head of livestock). For analytical purposes, each existing BLM livestock grazing permit is considered to be a separate operation in this EIS area. On this basis there are some 282 operations in the K/E area, of which 80 are small, 113 are medium, and 89 are large. According to the home town residences of permittees, there are 23 communities within the immediate region with a direct or indirect interest in the economic health of the ranching industry.

Livestock Industry

Operational Setups

Most operations in the EIS area now run cattle, although historically, sheep operations were more prevalent. Most cattle setups run a cow-calf

operation with only a few ranchers retaining calves to sell as yearlings. Cows are usually replaced from calf crops, except in some of the larger sized operations where calves are also purchased from outside the herd. Replacement age in most cases is around 10 to 11 years, resulting in an approximate 10-percent annual turnover rate. Most operations replace their bulls every 2 to 8 years, averaging a 20-percent annual turn-over rate. In general, replacement bulls are purchased from outside to maintain or improve the herds' characteristics. Most ranches run 20 cows per bull and attain around a 75-to-85-percent calving ratio. The breeding season for most operations runs from May (or as late as July) to October. The use of range bulls is the prevailing breeding method.

Average herd compositions for the three size classes are:

<u>Category</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Cows	16	99	301
Bulls	1	4	15
Calves	12	84	234
Yearling heifers	3	8	29
Yearling steers	2	1	45

Selling weights attained by the three sizes of operation are:

<u>Category</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Calves	435	380	370
Yearling heifers	800	870	650
Yearling steers	800	900	740
Cull cows	920	900	910
Bulls	1,800	1,600	1,500

Dependence on BLM Forage

There are two direct methods of assessing the level of dependence that a ranch unit has on BLM forage: (1) the percent of its total annual forage requirements obtained from BLM, and (2) the percentage of the herd that utilizes BLM forage during its normal season of BLM rangeland use. The average percent of annual forage requirements supplied by Cedar City District BLM to the three scales of operation are:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Percent of annual AUMs	35	63	42

The seasonal dependency of the three ranch size classes on BLM forage is:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Percent of base herd on BLM during season of use	51	85	61

These breakdowns indicate that the medium size operation is generally the most dependent on BLM forage supplies. It is also evident, however, that all three sizes of operation have a very substantial level of dependence, both annual and seasonal, on forage supplied by BLM.

Another indicator of general dependence on BLM grazing is the relatively high capital value of the permits. Although the Taylor Grazing Act expressly disallows BLM from recognizing a sales value for grazing permits, other individuals and institutions do. Private lending institutions such as Production Credit Association and Federal Land Bank do lend, at least partially, on the basic grazing permits. Also (although it is difficult to directly compare private grazing with BLM rangeland), there is some financial advantage in paying \$1.89 per AUM (1979 rate) to BLM rather than paying \$5 to \$8 per AUM for private grazing. Therefore, for a number of reasons, ranchers place a high sales value on BLM grazing permits.

Economic Conditions

The primary means of analyzing and displaying economic information in this EIS is through: (1) partial ranch budget analysis, which addresses the cash flows of a ranching enterprise to demonstrate the relationships of incomes and expenses, and (2) break-even analysis, which utilizes cost and revenue information from the ranch budgets to demonstrate the relative level of economic viability of a ranching unit; that is, how well a ranch unit is able to service its debts at its normal level of operation.

The present economic conditions are summarized from information obtained in the survey of affected ranchers. Ranch budget analysis and break-even analysis techniques were used to arrive at the following interpretations.

The relative economic health of the livestock industry in the EIS area does not appear to be strong. For the most part, all sizes appear to be operating at close to or below their break-even points. This becomes important when considering the proportion of total income that ranchers derive from their livestock operations.

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Ranch income as a percent of total income	25	75	90

Table 3-5, Ranch Budget Sheets, shows the cash flows for each of the three scales of operation. Care is necessary in interpretation of these figures. They are properly used only as general indicators rather than precise answers to any particular question.

As can be seen in the table, none of the three size classes actually appear to be making a profit. Since the ranch budget approach does not consider such things as certain tax advantages and land value appreciation, and that figures used in the tables represent averages, some operations may be running profitably. However, the primary conclusions of the analyses are that the livestock industry in the EIS area is in a tenuous position.

TABLE 3-5

Ranch Budget Sheet

	Small	Medium	Large
RANCH INCOMES			
Stock sales			
Calves	\$1,976.00	\$ 9,375.00	\$17,975.00
Yearling heifers	267.00	.....	5,143.00
Yearling steers	267.00	728.00	15,286.00
Culled cows	583.00	2,754.00	4,914.00
Bulls	130.00	518.00	2,400.00
Other Income			
Pasture rental	267.00	.....	.....
Grain	.....	.....	.....
Feed (hay)	146.00	.....	.....
Other	25.00	.....	.....
	<u>\$3,661.00</u>	<u>\$13,375.00</u>	<u>\$45,718.00</u>
RANCH EXPENSES			
Fixed costs			
Taxes	\$ 462.00	\$ 1,275.00	\$ 3,220.00
Repairs (buildings, fences, etc.)	533.00	518.00	3,464.00
Fertilizer and herbicides	250.00	435.00	1,000.00
Seed	123.00	250.00	700.00
Irrigation	196.00	812.00	657.00
Rent	150.00	889.00	1,259.00
Utilities	33.00	242.00	671.00
Interest (loans and mortgages)	133.00	2,855.00	11,429.00
Depreciation	264.00	5,415.00	2,236.00
Other	325.00	584.00	2,201.00
	<u>\$2,469.00</u>	<u>\$13,275.00</u>	<u>\$26,837.00</u>
VARIABLE COSTS			
Death loss (percent)	13	3 to 5	3 to 10
Grazing fees			
BLM	\$ 127.00	\$ 954.00	\$ 3,529.00
Forest Service	98.00	.....	286.00
Other	8.00	250.00	1,209.00
Purchased feed	150.00	432.00	2,671.00
Purchased livestock	33.00	722.00	900.00
Vet fees	18.00	101.00	171.00
Freight and trucking	52.00	86.00	3,327.00
Fuel and oil	138.00	1,595.00	1,200.00
Ranch labor	67.00	236.00	5,143.00
Machinery (purchase and maintenance)	1,750.00	1,891.00	2,929.00
Other	25.00	.....	.....
	<u>\$2,466.00</u>	<u>\$ 6,267.00</u>	<u>\$21,365.00</u>
NET INCOME	(-\$1,274.00)	(-\$6,167.00)	(-\$2,484.00)

Calculating the break-even point (that level of gross revenues that just covers expenses) for each size class also points to the same conclusion:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Gross revenues	\$3,661	\$13,375	\$45,718
Break-even point	7,564	24,979	50,381

Within the same general cost structures, both the small and medium size classes would have to nearly double their sales just to break even. The large scale would need to attain a 10-percent increase in its sales to break even.

Conclusion

The implications of these calculations are of pivotal economic importance. One concern is that a large proportion of the industry is experiencing cash flow difficulties which could result in either drains on capital reserves or increased indebtedness. Another major concern is that under such conditions there exists a limited resilience in the industry, leaving a high potential for economic failure in the face of such adversities as grazing reductions, droughts, market failures, etc. With such a marginal position being presented by the industry, it may become increasingly difficult for individuals to service their existing debt loads. This could eventually lead to some operators selling out or otherwise leaving the industry.

Communities and The Region

The second focus of economic concern is at the community/regional level, and includes the interactions of the livestock industry with support industries, employment levels, and local tax revenues. This description focuses on the role of agriculture in the larger economic picture in order to place ranching in perspective with other industries of the region, all of which bear on the region's economic health. Sources of information for this level of discussion were derived from the ranch budgets as well as from a variety of agricultural and business publications.

Although there are some 23 communities directly connected with the EIS, over 70 percent of the permittees are located in the following seven communities: Boulder, Escalante, Glendale, Kanab, Orderville, Panguitch, and Tropic. Therefore, the majority of community level analyses concentrate on these towns, although any conclusions drawn would apply (in kind, though not necessarily in the same degree) to the other 16 areas.

Overview of the Economy

Since there is not sufficient data to perform meaningful economic analysis at the community level, all analysis is at the county level.

Employment and income tabulations in tables 3-6 and 3-7 provide a basic view of the economic structures of Garfield and Kane counties and the relative importance of the various sectors. The top five employers for Garfield County are: (1) government (Federal, State, and local), (2) services, (3)

TABLE 3-6
Regional Employment (1977)

Source	Number of Persons Employed	
	Garfield	Kane
Total employment	1,741	1,329
Number of proprietors	325	292
Farm proprietors	207	122
Nonfarm proprietors	118	170
Total wage and salary employment	1,416	1,037
Farm	27	27
Nonfarm	1,389	1,010
Private	932	704
Agricultural services, forestry, fisheries, etc.	D	L
Mining	65	16
Construction	47	17
Manufacturing	250	55
Transportation and public utilities	69	93
Wholesale trade	L	25
Retail trade	181	303
Finance, insurance, and real estate Services	D	37
Services	305	156
Government	457	306
Federal, civilian	129	22
Federal, military	21	21
State and local	307	263

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 1977.

D = Not recorded to avoid disclosure of confidential information.

L = Less than 10 persons employed.

TABLE 3-7
Regional Income (1977)

Source	Garfield (Figures x 1,000)	Kane (Figures x 1,000)
Farm	\$ 853	\$ 162
Nonfarm	12,787	8,159
Private	8,868	5,871
Agricultural services, forestry, fisheries, etc.	D	L
Mining	1,445	181
Construction	1,122	531
Manufacturing	2,254	323
Transportation and public utilities	925	986
Wholesale trade	66	256
Retail trade	1,106	1,821
Finance, insurance, real estate	D	302
Services	1,799	1,451
Government	3,919	2,288
Federal, civilian	1,308	295
Federal, military	47	49
State and local	\$2,564	\$1,944

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 1977.

D = Not recorded to avoid disclosure of confidential information.

L = Less than \$50,000; amount included in totals.

manufacturing, (4) agriculture (proprietorships plus employment), and (5) retail trade. For Kane County the top employers are: (1) government (Federal, State, and local), (2) retail trade, (3) services, (4) agriculture (proprietorships plus employment), and (5) transportation and public utilities. The major income sources for Garfield County are: (1) government, (2) manufacturing, (3) services, (4) mining, and (5) retail trade. The top five income sources for Kane County are (1) government, (2) retail trade, (3) services, (4) transportation and public utilities, and (5) construction.

Dependence/Diversity

Agriculture provides less than 15 percent of the total employment in the region, and most of that figure reflects the employment of the farm proprietor or owner. Hired agricultural labor within the region is relatively insignificant, comprising approximately 2 percent of the total labor force and being highly seasonal in nature. Regionally, agriculture yields less than 5 percent of the total personal income, indicating the existence of a low return to labor relative to other sectors of the economy.

Although Garfield and Kane counties are rural/agricultural in appearance and character, they are actually fairly diverse economically and not particularly dependent on agriculture as the economic mainstay. Garfield County's economy appears to be mainly dominated by the government (primarily State and local), manufacturing, and service sectors. Kane County is less oriented toward manufacturing, and more oriented toward retail trade (primarily in connection with the tourist industry of southern Utah).

Sociocultural Conditions

Grazing management plans elsewhere in the western States have not effected measurable changes in population trends, age groupings, or similar measures. Therefore these are not discussed here. Issues of special concern within the region involve the more intrinsic personal values, such as the ability to pursue a chosen lifestyle, independence from outside interference, the ability to pass a business to heirs, and the maintenance of community character. Most of these factors fall under the general heading of lifestyle and are analyzed in that context.

Figures for the region indicate that it is experiencing some socio-economic stagnation. Garfield County experienced an 11.7 percent population decline in the period 1960 to 1970. Kane County, for the same period, experienced a 9.2 percent decline in population (UTAH! County Economic Facts, 1978). There is also a very low proportion of the population in the young adult age groups (17 to 25 years), indicating that the job opportunities in the immediate area are insufficient to absorb all of the emerging labor force.

Lifestyle

The region's style of living and its basic sociological institutions are characterized by the predominant rural disposition. Settlement and land use patterns were originally centered around agricultural endeavors. This still persists as a dominating influence on lifestyles. Residents are staunchly

independent; their self-reliant western lifestyle is associated with livestock and ranchers, and even though these are less important sectors in the current economy, this strong-willed character dominates individual and community views.

WILDLIFE

The K/E EIS area supports a diverse wildlife community. A total of 415 different species has been recorded in this area, including 81 species of mammals, 277 species of birds, 33 species of reptiles, 9 species of amphibians, and 15 species of fish (URA, Wildlife, all planning units, 1975-79).

Of the eight vegetation types delineated in the EIS area, those supporting the greatest species diversity are riparian, pinyon-juniper, sagebrush, and grassland.

The following discussions will focus on key wildlife species that use public lands in the K/E EIS area and their habitat components. Figures 3-3 and 3-4 (at the back of this chapter) identify the location of this habitat. This discussion is limited to those species that are of economic value, threatened or endangered, or that might be influenced by implementation of any of the proposed alternatives. Other wildlife species not specifically mentioned utilize habitats similar to those described. In some cases existing conflicts have been identified, usually with livestock grazing activities (URA, Wildlife, all planning units, 1975-79). However, specific data indicating the extent and significance of present conflicts is not available for all cases.

Important Big Game Habitat

Of all the habitat on public lands in the K/E EIS area, 139 allotments (1,001,361 acres) are considered to be important for big game (deer 89 percent, elk 4.4 percent, bighorn sheep 1 percent, pronghorn antelope 5.6 percent) (URA, Wildlife, all planning units, 1975-79). Habitat conditions for these species are similar and occasionally overlap. Table 3-8 identifies important characteristics of big game habitat and figure 3-3 shows the existing habitat for each big game species found in the K/E area. Overall conditions of big game habitat are:

<u>Condition</u>	<u>Acres</u>	<u>Number of Allotments</u>
Good	39,555	5
Fair	411,541	47
Poor	537,921	78
Unknown	12,344	9
TOTAL	<u>1,001,361</u>	<u>139</u>

Mule Deer

The mule deer is the most numerous big game species in the K/E EIS area. Historically, mule deer were scarce in Utah prior to this century (Julander

TABLE 3-8
Habitat Conditions of Important Big Game Habitat Areas

Species and Important Habitat	Existing Condition	Notable Characteristics
<u>MULE DEER</u> Important winter range	Deer migrate into these areas in mid-October and stay until March or April. Nearly all important big game habitat areas include deer winter range. Water availability is adequate, although riparian areas are used heavily.	BLM administers 85 percent of all deer winter range. This involves 139 allotments (1,001,361 acres). Pinyon-juniper type comprises about 70 percent of the deer winter range, providing greatest quantity of cover and forage. Important browse species for deer are also presently utilized heavily by live-stock.
<u>Critical winter range</u>	Deer tend to concentrate in these areas. Most are in poor condition as many areas are heavily grazed by cattle and deer. The result is overutilization on key browse species (bitterbrush, big sagebrush, and cliffrose).	These areas are the most important limiting factor of deer populations since they contribute needed forage during critical winter months.
<u>DESERT BIGHORN SHEEP</u> Yearlong habitat	Most habitat is in fair to poor condition (1977 Habitat Inventory). Currently adequate food and cover exists on 39,618 acres of habitat on federal lands. According to Wilson (1968), important forage species include galleta grass, blackbrush, Brigham tea, and Indian ricegrass.	There are 18,129 acres (46 percent) of habitat on Federal land administered by NPS in GCNRA. Approximately 1,680 acres of habitat occur on public land. Bighorn sheep usually occupy the same areas yearlong. Most limiting factor in southern Utah is availability of water (Wilson, 1968). Adult rams occupy high elevations while ewes, lambs, and young rams remain at lower elevations in pinyon-juniper/desert shrub types.
<u>PRONGHORN ANTELOPE</u> Yearlong habitat	Habitat is concentrated in East Clark Bench area. Most habitat (97 percent) is in desert shrub, grassland, and pinyon-juniper types. Generally habitat is in good to fair condition.	Antelope tend to inhabit the same areas yearlong. This pattern is broken during dry periods when more dependent on riparian areas. Riparian areas (1 percent of habitat acreage) are important during late spring and early summer. Reproduction is closely associated with these areas. There are seven allotments involving 56,612 acres.
<u>ELK</u> Winter habitat	Most habitat is in fair condition. Moderately dense pinyon-juniper stands with open parks provide good cover (Short, et al., 1977). Loss of understory species in pinyon-juniper areas has reduced quality of available forage. Most important vegetation types include pinyon-juniper, sagebrush, riparian, and grass. Available water is adequate.	Major limiting factors appear to be human intrusion and grazing competition. Approximately 19,404 acres of elk habitat exist in the K/E area.

Source: URA, Wildlife, all planning units, 1975-79.

et al., 1976). With changing vegetation composition (from grass to browse dominant), predator control, and buck-only hunts, deer numbers greatly increased in southern Utah and soon reached huge proportions. Eventually populations stabilized and remained static until 1971-72 when severe drought and cold winters resulted in high fawn losses and deer numbers rapidly declined (Julander et al., 1976; UDWR, 1976). Deer numbers have remained very low since that time (Murdock et al., 1974). There are presently an estimated 5,539 deer in the EIS area (URA, Wildlife, all planning units, 1975-79). Prior stable deer numbers are estimated at 17,044 head (UDWR, 1977-79). Results of the 1975-79 Range Survey (BLM, Cedar City District Office) indicate that 69,253 AUMs of deer forage are presently available. Prior stable deer forage demand was 15,527 AUMs, indicating that more than adequate forage is available for UDWR prior stable populations (Appendix 22, Wildlife Forage Allocations). An additional 4,707 AUMs occur in allotments where no deer presently exist, making this forage available to other uses. Appendix 12 discusses the quality of the available wildlife forage.

Currently little improvement has been realized in deer habitat recovery, due to existing livestock grazing and periodic drought. According to the 1977 Habitat Inventory (BLM, Cedar City District Office), much of the deer range is in poor to fair condition.

Presently there are 335,799 acres of yearlong and 122,108 acres of summer deer habitat. These are not included in the important mule deer habitat classification. Yearlong and summer habitat is generally in fair condition, and would not be significantly affected by the proposed alternatives. These areas are generally high elevation areas typically dominated by dense stands of pinyon-juniper and sagebrush.

Pronghorn Antelope

Pronghorn antelope were common in the area until 1900, when they were totally eliminated, possibly due to over hunting (Murdock et al., 1974). In 1970-71, 125 antelope were released in the East Clark Bench area. From this point the herd dispersed over a larger area.

The herd gradually declined until 1975 when a slight increase was noticed. At present the antelope population is estimated at 30 head. Poaching and undefined limiting factors are thought to be limiting population increases (Kanab BLM Antelope Transplant File, 1970 to present). According to the 1975-79 Range Survey (BLM Cedar City District Office), 2,521 AUMs are available to antelope (Appendix 22).

Elk

Historically, elk inhabited the northern portions of the K/E EIS area. However, the last native elk was killed in the early 1900s in Willis Creek (Murdock et al., 1974). In 1977-78, UDWR transplanted 159 elk into the Boulder elk herd unit (23). Reproduction has been fair and the herd is increasing. During 1978 and 1979 heavy snowfall accumulations in the higher elevations caused approximately 100 elk to move into the EIS area. It has not been determined if this migration will occur during mild winters. If it does recur, elk numbers wintering in the area should increase. Elk numbers

are expected by UDWR to reach at least 200 head. A population of this size would require 632 AUMs. According to the 1975-79 Range Survey (BLM Cedar City District Office) 632 AUMs of forage are available to elk, although some shortages of forage may occur under present management practices (Appendix 22).

Desert Bighorn Sheep

The earliest record of desert bighorn sheep in the area comes from prehistoric Indian pictographs dating back 1,500 to 1,900 years. According to Wilson (1968), there is no question that the bighorn was found in the EIS area in substantial numbers. However, a major decline has occurred, apparently caused by a number of factors associated with the effects of advancing civilization (Dalton et al., 1971; Wilson, 1968).

During 1975-76, 23 bighorn sheep were transplanted into the Moody Canyons by the Utah Division of Wildlife Resources (UDWR). The population is doing well and has increased to approximately 40 animals. Results of the 1975-79 Range Survey (BLM Cedar City District Office) indicate that 261 AUMs of forage are presently available to bighorn sheep (Appendix 22) in the Moody Allotment. Projected bighorn sheep population demand is 321 AUMs for the Moody and Escalante River allotment area. This information suggests that as bighorn sheep numbers increase, they would have to disperse into other areas.

Critical Habitat (Potential and Existing)

There are 178,796 acres of important big game habitat that are considered to be critical. Conflicts exist or have the potential to exist on these areas with big game, wild horses, and livestock grazing activities. Critical habitat for deer and antelope overlap in some instances. Present condition in these areas is shown below:

<u>Critical Habitat Condition</u>	<u>Acres</u>	<u>Number of Allotments</u>
Good	2,389	5
Fair	67,187	22
Poor	103,710	44
Unknown	5,510	2
TOTAL	178,796	73

Table 3-9 describes conflict areas of each big game species. Appendix 18 identifies specific allotments where these conflicts exist.

Threatened and Endangered Species

The peregrine falcon and bald eagle are two Federally classified endangered species which occur in the K/E EIS area. There is very little information on the past distribution or population of these species, although the peregrine falcon was undoubtedly more common in the past. A few historical sightings of the peregrine falcon have taken place near Kanab (Behle, 1958). Recently six sightings occurred near Kanab, and one sighting was made along the Escalante River (Kanab BLM, Wildlife Observation Reports, 1978). There are no nesting records for the EIS area, however, peregrine falcon sightings

TABLE 3-9

Critical Habitat: Present and Potential Big Game Conflict Areas

Species	Extent of Conflict
<u>MULE DEER</u>	<p>Two primary conflicts have been determined on 66 allotments (176,817 acres). One is the utilization of important deer browse species (bitterbrush, mountain mahogany, and cliffrose) and forbs by livestock at existing levels of use. These species are presently utilized by livestock in the spring, summer, and fall. This use may exceed allowable proper use by the time deer need the browse during the winter, resulting in poor quality forage in limited quantity. The second conflict occurs in riparian areas, utilized by deer in the spring to raise their young and in the winter for protection. Livestock tend to concentrate in these areas and heavily utilize vegetation, especially succulents (Thomas et al., 1976) which are required by lactating does.</p>
<u>DESERT BIGHORN SHEEP</u>	<p>The existing bighorn sheep conflicts are with wild horses. In the Moody Canyon bighorn sheep presently conflict with wild horses for water. According to McQuivey (1978), wild horses may limit bighorn sheep, as bighorn sheep do not use areas heavily used by wild horses. As bighorn sheep numbers increase, this conflict would force bighorns to use water sources in the Escalante River Allotment. UDWR has proposed a transplant of 25 to 30 bighorn sheep in the Spencer Bench-Rock Creek areas, which involves the Spencer Bench and Harvey's Fear Allotments. The success of this transplant may be dependent upon the availability of water in this area. Another potential conflict is with livestock and will occur if livestock are allowed to graze the benches or valleys of the Moody Canyons area during the summer seasons. Currently most of the benches are inaccessible to livestock, and what small amount of grazing that occurs is during the winter and presents no conflict. According to Wilson (1968), bighorn sheep will not inhabit areas grazed by cattle, even if desirable forage is present.</p>
<u>PRONGHORN ANTELOPE</u>	<p>Existing pronghorn conflicts are with livestock. Conflict areas occur on five allotments containing 1,979 acres. These conflicts occur when livestock graze the riparian areas prior to or during antelope fawning periods. According to the 1975-79 Range Survey (BLM Cedar City District Office) forage availability is not a factor limiting antelope numbers; however, livestock tend to remove succulent forage, which appears to be critical to reproductive success. This conflict has been reduced with the implementation of the Cottonwood Allotment Management Plan which excludes livestock from portions of riparian areas. These riparian areas are now improving and may account for a slight increase in herd numbers although other undefined limiting factors still exist.</p>
<u>ELK</u>	<p>There are six allotments which have existing elk conflicts. Important browse species to both elk and livestock are heavily utilized during the same time period, thereby causing direct competition for forage.</p>

Source: URA, Wildlife, all planning units, 1975-1979.

from Kanab were made during the nesting season, suggesting that nests could be in the area.

Bald eagles were first reported in the EIS area on December 20, 1950 (Behle, 1958). Numerous scattered sightings have been reported since that time.

Habitat and Seasonal Use

Threatened and Endangered Species. Informal consultation (according Section 7 of the Endangered Species Act, 1972) with the U.S. Fish and Wildlife Service (John Gill, personal communication, 1979) were initiated to determine the presence of threatened and endangered species, their habitat requirements, and locations of critical habitat.

The peregrine falcon is most often seen in the vicinity of reservoirs and fields on private land in the Kanab area, usually during spring and fall (Behle et al., 1958). Cliffs provide good cover for peregrine falcon roosting and nesting sites. Food (primarily small birds) is available throughout the EIS area. Good quality water is available at various springs, reservoirs, and perennial streams.

Bald eagles are present in the area during the winter months, utilizing the pinyon-juniper and ponderosa pine habitat areas. The pinyon-juniper is used as a feeding area and the ponderosa pine areas are used for roosting.

Eagles feed primarily on rabbits and other small mammals during the winter. Food does not appear to be a limiting factor.

Three winter concentration areas are located in the EIS area. Two are located in the ponderosa pine habitat type and contain only a few birds. Another concentration area is located near the mouth of the Escalante River at Lake Powell. Reasons for concentration in this area are not clear, but may be a result of fish being preferred over rodents (Escalante Wildlife URA, 1979).

Upland Game Birds

Upland game birds presently occupy 139,417 acres in the K/E area (URA Wildlife, all planning units, 1975-79). Table 3-10 identifies key upland game bird species important in the area and describes existing habitat conditions.

FISHERIES

The K/E EIS area contains 349 miles of stream (fig. 3-4 at the end of this chapter). Most of the streams are small, sand bottomed, intermittent, and subject to high intensity flooding. The 6,807 acres of riparian area associated with these streams are generally in a poor to fair condition. Stream miles and the existing condition of adjacent riparian habitat are shown by allotment in Appendix 13. In areas where streams flow across

TABLE 3-10

Key Upland Game Bird Species and Their Habitat

Species	Existing Situation	Habitat Condition	Notable Characteristics
<u>UPLAND GAME BIRDS</u>			
1. Sage grouse	Loss of sagebrush habitat over past 30 years appears to be main cause for low but stable populations. Present population is estimated to be about 30 to 50 birds inhabiting area near Alton. These may be part of transplant stock released near there.	Sage grouse habitat on public lands involves 3,160 acres. Due to low numbers, little is known of critical areas and no strutting grounds are known to occur on public lands. Current habitat is in fair condition.	Sage grouse have specialized digestive systems. Adult birds consume up to 98-percent plant material of which 77 percent is sagebrush. Juvenile birds' diet normally consists of 75-percent forbs until 12 weeks old, then shifts to sagebrush. Nest sites are in sagebrush habitat.
2. Blue grouse	Utilize higher elevation areas year-long. Water is readily available at springs and streams.	There are about 40,700 acres of habitat on public lands. Most habitat is in fair to good condition; adequate food and cover exists. No known conflicts exist.	Blue grouse most often utilize pinyon-juniper, mountain shrub, and ponderosa pine types.
3. Wild turkey	Transplanted into Lydia's Canyon area in 1957. Since release, populations have grown to an estimated 150 birds.	There are about 34,285 acres of habitat, mainly pinyon-juniper, mountain shrub, and ponderosa pine types utilized primarily during winter. Habitat is in fair to good condition and provides adequate food, cover, and water.	Most important and heavily utilized type is large stands of ponderosa pine that are roosting sites.
4. Gambel's quail	Once common in EIS area, especially along riparian areas. Overhunting and severe winters resulted in gradual elimination of quail from original range.	Present habitat now about 5,340 acres of public land; mainly riparian and sagebrush. Currently sagebrush habitat is in fair to good condition and supplies added diversity to the diet.	Riparian areas are utilized as cover, nesting and brooding habitat, and as a source of water. Squawbush and Apache plume are two species highly preferred but normally absent from riparian areas.
5. Chukar partridge	An exotic species introduced from Europe and Asia. Numerous releases in EIS area made during 1950-60s.	These birds currently inhabit 86,789 acres yearlong in the EIS area. Habitat consists of steep, rocky, pinyon-juniper and desert shrub areas adjacent to riparian types. Most areas are in poor to fair condition.	Presently suitable riparian habitat appears to limit chukar distribution. Also precipitation is irregular, which regulates amount of food and water available.

private land, much of the flow may be diverted for irrigation purposes, thus reducing stream flow on public lands. In some areas sufficient water is lacking to support fish populations. As a result, relatively few species of fish are found in the area. Table 3-11 lists species, streams in which they are known to exist, relative abundance, and origin (URA, Wildlife, all planning units, 1975-79). Due to a lack of stream surveys in the area, fish populations and numbers are not known.

TABLE 3-11

List of Fish Species Which Occur in the K/E EIS Area

Species	Stream	Relative Abundance and Status
Speckled Dace	Unit-wide	CN
Carp	Kanab Creek, Three Lakes, Escalante River	UX
Bluegill	Johnson Canyon, Three Lakes	CN
Green Sunfish	Johnson Canyon	CN
Largemouth Bass	Lower Escalante River	CN
Rainbow Trout	Death Hollow, Calf Creek, Deer Creek, Boulder Creek, Pine Creek, Varney Griffith and Wide Hollow Reservoirs	CX
Cutthroat Trout	Calf Creek	RN
Brown Trout	Death Hollow, Calf Creek, Boulder Creek, and Deer Creek	CX
Desert Sucker	East Fork Virgin River	CN
Roundtail Chub	Lower Escalante River	CN
Red Shiner	Escalante River	UN
Flathead Minnow	Escalante River	UX
Flannelmouth Sucker	Escalante River, East Fork Virgin River	CN
Bluehead Sucker	Escalante River, Deer Creek	CN
Channel Catfish	Escalante River	UX

Source: URA, Wildlife, all planning units, 1975-79.

LEGEND:

Relative Abundance: C = Common U = Uncommon R = Rare
Origin: N = Native X = Exotic

The most important game fishes occurring on public lands in the EIS area are rainbow and brown trout. Only 54.2 miles of stream (with headwaters originating in the Boulder Mountains) support trout populations. They are North Creek, Death-Hollow, Mamie Creek, Boulder Creek, Pine Creek, Deer Creek, and Calf Creek. Rainbow and brown trout are not native to this area and have been introduced at various times by UDWR. The State of Utah does not currently stock any of the streams on BLM administered land on a regular basis. Current trout populations appear to be stable but information concerning reproductive rates is lacking. None of these streams receive substantial fishing pressure and harvest information is nonexistent (Escalante, Wildlife URA, 1979).

The Colorado River cutthroat trout was native to this area but has probably become extinct. The upper falls area of Calf Creek has been identified by BLM as suitable habitat for this species. During 1978 UDWR stocked the area between the upper and lower falls of Calf Creek with the Strawberry Lakes strain of cutthroat trout.

A conflict between trout habitat and cattle grazing currently exists in the riparian zones. The removal of streamside vegetation results in water temperature increases due to the lack of shade, (Minckley, 1973), an increase in streambank sloughing due to both physical trampling (Kennedy, 1977) and erosion by the stream itself, resulting in increased sedimentation. The sediment introduced covers spawning gravels and gravel riffles which support aquatic insect populations. There is also a loss of protective cover to the fish when overhanging vegetation is removed (Boussu, 1954).

WILD HORSES

The two wild horse herds in the K/E EIS area were first observed by BLM personnel in 1969. The Escalante herd (numbering nine horses) was located in the Wagon Box, Moody, and Death Hollow Allotments. An additional four horses were located in the Spencer Bench, Harvey's Fear, and Navajo Bench Allotments. It is believed that these horses were abandoned by permittees who ran livestock in the area.

Although the Escalante horses increased to 35 head by 1973, winter loss in 1978-79 reduced the herd to its present number of 17 head. The Spencer Bench-Harvey's Fear herd, numbering four animals in 1969, increased to seven when counted in 1978 by BLM personnel. Approximately 24 wild horses currently exist in the K/E EIS area.

Due to the remote location of these herds, there is limited information on their condition and habitat. It is thought that they inhabit the same areas yearlong. The availability of water, especially during dry periods, appears to be a factor limiting habitat use because springs appear to be the only reliable source of water. Water use is also a source of conflict between wild horses and bighorn sheep.

The 1977 Forage Condition Evaluation (BLM, Cedar City District Office) lists the forage condition as fair to poor in areas utilized by wild horses.

The area appears to be lacking desirable forage species and there is only a limited potential to increase rangeland condition to a higher class.

No livestock or bighorn sheep currently graze the Spencer Bench-Harvey's Fear area and no conflicts between these species presently exist. UDWR has proposed a bighorn sheep transplant for this area, however, which could result in future conflicts.

Information concerning the degree of water and forage competition between livestock, bighorn sheep, and wild horses in the Moody Canyon area is not available, although bighorn sheep usually disassociate themselves from other animals (Wilson, 1968). Seasonal livestock grazing occurs in the Wagon Box, Moody, and Death Hollow Allotments, which reduces the amount of forage available to wild horses.

CULTURAL RESOURCES

Because of the size included in the K/E area grazing study (2,567,466 acres), a comprehensive survey to identify all historic and cultural properties that might be eligible for inclusion in the National Register of Historic Places is impossible. However, the BLM has completed an existing data (Class I) inventory of the entire area and identified six sites and two trails that appear to meet the criteria for inclusion in the National Register. In addition, a field sample (Class II) inventory was conducted in the following areas in 1978 and 1979: Zion Planning Unit and Escalante Planning Unit. There have been 1,550 cultural sites recorded by BLM in the K/E EIS area. In order of most frequent occurrence, they are: open sites (indicative of limited activity areas), architectural sites (storage and habitation), and petroglyph and pictographic sites. The open sites include chipping stations, seasonal campsites, explorative quarry sites, and burial sites. Architectural sites are characterized by cists, granaries, pithouses, kivas, pueblos, and rock shelters.

Data on the cultural affiliation associated with these sites is limited, but it is assumed that cultures represented are: Anasazi, Virgin/Kayenta, Fremont, Southern Paiute, Pueblo, Ute, Shoshone, and Navajo.

The interpretive and scientific values of sites in the area are high. Site densities might range from 6.4 per square mile in the Zion area to 10 to 12 sites per square mile in the remaining areas: an average of 10 is not unrealistic. All sites are considered important and have the potential to yield information regarding historical, cultural, and natural aspects of our heritage.

More information about these inventories can be obtained upon request from Cedar City District Office; however, specific site information on archaeological sites is confidential and will only be made available to State archaeologists. The inventories were conducted in accordance with the Programmatic Memorandum of Agreement between BLM and the Advisory Council on Historic Places, dated January 14, 1980 (Appendix 2).

VISUAL RESOURCES

Visual landscapes in the K/E EIS region were identified and classified using the following criteria: scenery quality, visual sensitivity, and visual zones (distance zones). These form the basis for the visual resource management classes. Each of these criteria was evaluated in the field. The management class designation is a composite value obtained from each of these factors. (BLM Manual 8400). The following discussion addresses these criteria and subsequent management class designations.

Scenery Quality

Scenic evaluations are a method of classifying landscapes according to their scenic qualities. The physical features of a landscape determine whether an area's scenic character is distinctive, common, or minimal. Landscapes are differentiated into three scenic quality classes - A, B and C. The delineation of scenery quality units is based on the presence of key landscape characteristics in scenic resources. Key characteristics are landform, color, water, vegetation, uniqueness, and intrusions.

Class A scenery refers to areas within a region that have unique or very rare physiographic characteristics. Class A scenery comprises approximately 18 percent of the K/E EIS region (URA, Recreation, all planning units, 1975-79). Typical Class A scenery within the region includes vertical or near vertical cliffs, highly eroded formations, and massive rock outcroppings which provide rich color and varying contrasts. Examples in the EIS region are: Vermilion Cliffs, Coral Pink Sand Dunes, and Kaiparowits Plateau.

Class B scenery encompasses 50 percent of the landforms in the EIS region. These areas contain a variety of size and shapes in landform, and variations in color, texture, and vegetation patterns. Lesser canyons, cliff lines, and hilly topography typify Class B scenery in the region. Pinyon-juniper, sagebrush, and mountain shrub are the dominant vegetation types. Critical Class B scenery is located below the key observer positions of Bryce Canyon National Park and the landforms surrounding Zion National Park (Paria, Zion, Vermilion, and Virgin River Recreation URAs, 1978-79).

Class C scenery comprises approximately 32 percent of the EIS region. These areas provide little variation in color, line, texture, or form, and tend to be monotonous. Rolling hills, benchland, and flats with vegetation dominated by pinyon-juniper and sagebrush are common.

Riparian areas in the K/E EIS region are important from a recreational and aesthetic viewpoint. Riparian zones receive much more recreational use per unit area than other vegetation type areas (Thomas et al., 1979). Recreational uses include hiking, camping, hunting, fishing, and general sight-seeing. Recreational quality is strongly correlated with the visual quality of riparian landscapes (Litton, 1977).

The visual quality of riparian areas in the K/E area has been affected by grazing factors such as reduction of riparian vegetation, streambank destabilization, and widened stream channels. These factors affect the variety, contrast, and harmony of riparian color along with the patterns,

forms, and textures created by vegetation. Most of the streams are in poor to fair condition and are of minimal scenic quality (Chapter 3, Vegetation).

Visual Sensitivity

Visual sensitivity is a measure of viewer importance for landscapes. It is determined by the number of people viewing a landscape from a travel route or observer position and their concern for the area's scenic qualities. Sensitivity levels are classified as high, medium, or low. High sensitivity areas include Canaan Mountain, viewsheds leading to Zion and Bryce Canyon National Parks, Fifty-Mile Mountain, Escalante River drainages, and the Kaiparowits Plateau.

Medium sensitivity areas include Johnson Canyon, Skutumpah, and Cottonwood Canyon.

Visual Resource Management Classes

Visual Resource Management Classes determine minimum management objectives. Each visual resource management class describes a different degree of modification allowed for basic landscape elements. Generally, the degree of modification allowed increases with the increase of class number. (More specific definitions for each class are found in BLM Manual 8400.) The primary character of the landscape will be retained regardless of the degree of modification (BLM Manual 8400).

Class I zones (degree of modification most restricted) include the Paria Primitive Area, The Gulch, Escalante Canyons, Phipps-Death Hollow, Devil's Garden, and North Escalante Canyons, which are outstanding natural areas. Class II zones occur along major clifflines, the viewsheds of Bryce Canyon National Park, upland areas surrounding Zion National Park, and lands adjacent to primitive and natural areas. Class III zones occur along the visual corridors of travel routes. Class IV zones (minor restrictions on degree of modification) are primarily located away from travel routes in seldom seen areas. No class V zones have been identified.

Figure 3-5 shows Visual Resource Management Classes found in the area.

RECREATION

Recreation is an important activity in the K/E area. There are numerous opportunities for dispersed and site oriented recreation. Recreation areas are managed by BLM, National Park Service and Utah State Department of Parks. Respective acreages are shown below (URA, Recreation, all planning units, 1975-79):

<u>Agency</u>	<u>Recreation Area Management (acres)</u>
BLM	55,205
National Park Service	388,116
Utah State Department of Parks	14,733
	<u>485,054</u>

Activities

Recreational activities include sightseeing, camping, picnicking, hunting, fishing, collecting (rockhounding and vegetation), and off-road vehicle use.

Visitor use is increasing and occurs year round in the EIS area, especially sightseeing. Hunting activities are seasonal and are set by UDWR. Most backcountry use occurs in the spring and fall months, but summer and winter use is increasing. Camping and picnicking are essentially summer activities.

Table 3-12 indicates visitor use activity estimates for recreational activities and most predominant user group. Tables 3-13 and 3-14 discuss recreational activities in more detail.

TABLE 3-12
Recreation Visitor Use Activity Estimates 1975-1978

<u>Activity</u>	<u>Predominant User Group</u>	<u>Visits Per Year</u>	<u>Visitor Days Per Year</u>
Big game hunting	Local, regional	7,451	4,587
Small game hunting	Local	8,265	4,934
Upland game hunting	Local	675	516
Waterfowl hunting	Local	450	57
Vegetation collecting	Local	2,772	2,623
Rock and mineral collecting	Local, regional	1,310	267
Off-road vehicle use	Local, regional	7,524	1,789
Camping and picnicking	Local, regional, national	11,654	7,423
Sightseeing (historical, other cultural, geological, botanical)	Local, regional, national	285,655	17,718

Source: URA, Recreation, all planning units, 1975-79; PAA for Garfield and Kane County, 1979.

NOTE: Visitor use activity estimates for each specific recreational activity are based on data available from 1975 to 1978. It is assumed that these indicate yearly averages.

TABLE 3-13

Major Recreational Activities

Activity	Opportunities	Significance
Big game hunting	Mule deer hunting is most significant, although some cougar hunting occurs. Present hunting opportunities are limited due to low deer numbers, limited access to public lands and dense pinyon-juniper stands which limit shooting opportunities (URA, Recreation, all planning units, 1975-79).	During 1978 deer season, about 7,451 hunter visits and 4,587 hunter days were attributed to the EIS area; average success was about 20 percent, while 23 percent was Statewide average (Utah Big Game Harvest, 1978). Local residents account for 42 percent, nonresident for 24 percent, and other Utah residents for 34 percent of hunters during 1977 (Utah Big Game Investigations and Management Recommendations, 1978).
Small game hunting	Principal animals hunted include rabbits, coyotes, and occasionally fox. Low populations are common, however, highest densities occur on agricultural lands and vegetation treatment areas.	Compared to Statewide data, hunting and harvest pressure is low for the EIS area. Coyote hunting is perhaps most common activity. Some county residents received as much as \$40 to \$60 for coyote pelts on commercial market (Kane County PAA, 1979).
Sightseeing	Major activity in EIS area. Although often associated with other forms of recreation, auto-sightseeing offers unlimited opportunities. Variety of landscapes offered are: rolling grasslands, pinyon-juniper woodlands, massive cliffs, and colorful limestone breaks. Historical and wildlife sightseeing opportunities also exist. Two herds of wild horses totaling 24 animals occur in two extremely remote locations in the K/E EIS area (Wild Horses, Chapter 3).	The EIS area is located in a region of national significance. Zion, Bryce Canyon, and Capitol Reef National Parks are located on the periphery of the EIS area. Glen Canyon National Recreation Area and five outstanding natural areas are found within the EIS area. Due to the remote location of wild horse herds, sightseeing is extremely limited. Recreational sightseeing involving wild horses is not a significant activity.

TABLE 3-14

Other Recreational Activities

Activity	Opportunities	Significance
Waterfowl hunting	Limited, due to lack of suitable habitat and low populations.	Most hunting on small water bodies located on private land. Most important areas are Johnson Canyon and Kanab Reservoir.
Upland game hunting	Native game includes mourning dove, band-tailed pigeon, sage grouse, wild turkey. Introduced game includes pheasant and chukar, some quail. Limited opportunities, low hunter turnout and harvest.	Accounted for 0.5 percent of hunting pressure and harvest for Utah in 1978.
Fishing	Few perennial streams with game fish; brown and rainbow trout are major species.	Not a major activity on public lands. Primary streams are Death Hollow, Mamie Creek, Calf Creek, Boulder Creek, and Deer Creek. Also, Varney Griffin and Wide Hollow Reservoirs.
Collecting	Limited to vegetation products (fuel wood and Christmas trees), and mineral specimens.	Restricted to localized areas. Primarily involves local residents although mineral collection may involve regional populations.
Off-road vehicles	Primarily associated with hunting and sightseeing. Some cross-country use, but most on existing roads and trails. Several off-road closure areas exist, totaling 99,146 acres.	Good access throughout unit. Some specialized use at Coral Pink Sand Dunes (dune buggies). State land in Alvey Wash area proposed for intensive off-road vehicle use.

Special Management Areas

Special management areas include all areas designated under the Classification and Multiple Use Act. These areas are managed to provide the maximum amount of recreational use possible without damaging the natural features that make the area outstanding. Escalante Canyon, Devil's Garden, The Gulch, Phipps-Death Hollow, and North Escalante Canyons were designated as Natural Areas on December 23, 1970 (Garfield County Planning Area Analysis [PAA], 1979; Escalante URA, 1979). These areas qualify as Instant Wilderness Study Areas because they were designated as "natural" or "primitive" areas prior to November 1975. Other special management areas include Calf Creek and Deer Creek Recreation Areas. These areas include 51,805 acres and possess outstanding scenic qualities. They are managed for their high quality hiking opportunities. Also there are other small recreation sites, containing 3,400 acres (Escalante URA, 1979).

Land use conflicts are occurring between hikers and livestock due to overlapping use periods (Appendix 19). In 1977, 13,262 visitor days of use occurred in these areas. Backcountry recreationists have indicated a number of problems concerning livestock degradation of the recreational experience: presence of livestock in confined canyons, livestock feces and associated odors, trampling of vegetation and streambanks, and decreased water quality which makes it necessary for hikers to carry or purify existing water sources. Livestock permittees have emphasized that some recreationists have vandalized range improvements, left gates open, and scattered livestock (Escalante URA, 1979; Escalante MFP, 1979).

Glen Canyon National Recreation Area (GCNRA)

The GCNRA contains approximately 1,255,000 acres, of which 388,116 acres are in the K/E EIS area. Approximately 99 percent of the recreation area's acreage is in an undisturbed condition (GCNRA General Management Plan, Wilderness Proposal, and Road Study Alternatives Environmental Statement, 1979).

The major recreational activities occurring in the EIS portion of the recreation area include backcountry and lakeshore camping, picnicking, boating, and fishing. Backcountry and lakeshore camping are the dominant recreational activities and have shown the most consistent and rapid growth.

The Wahweap Bay and Escalante River areas receive the heaviest visitor use. The recreational opportunities associated with Lake Powell constitute the majority of the Wahweap Bay area's recreational use (GCNRA General Management Plan, Wilderness Proposal, and Road Study Alternatives Environmental Statement, 1979). The canyons of the Escalante River are popular hiking and backpacking areas. Access to the canyon system can be achieved through a number of washes with trail heads situated on public lands.

There were approximately 317,695 backcountry camping visits in 1978 in the Wahweap Bay area. Escalante River areas had approximately 6,110 visits (National Park Service, 1979).

Conflicts between backcountry use and livestock grazing are occurring in the canyon areas of the Escalante River and Chimney Rock Allotments located

in the GCNRA. Portions of the high use recreation season overlap with the present livestock grazing season (Escalante URA, 1979). Most use occurs during the periods March through June and August through September. Conflicts are similar to those previously noted.

WILDERNESS

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), BLM has been mandated the responsibility of reviewing all public land roadless areas of 5,000 acres or more to determine their suitability for wilderness designation.

BLM's role in the wilderness review process involves three phases: inventory, study, and reporting its recommendation to Congress on which wilderness study areas are suitable or unsuitable for wilderness designation. Only Congress can designate areas for inclusion to the National Wilderness Preservation System.

Until Congress determines which regions are designated as wilderness, areas under review will be managed in a manner that will not impair their suitability for inclusion. Existing grazing uses may continue in the same manner and degree as they were conducted on October 21, 1976.

Six Instant Study Areas (areas designated as "natural" or "primitive" prior to November 1975) have been identified within the boundaries of the EIS area. The National Park Service has recommended two areas for wilderness designation within GCNRA: the Escalante unit (253,105 acres) and the Kaiparowits unit (58,755 acres), both located within the EIS area and adjacent to public lands (GCNRA General Management Plan, Wilderness Proposal, and Study Alternatives, Environmental Statement, 1979).

The intensive wilderness characteristics inventory of the K/E EIS region has not been completed. However, the initial inventory has been completed and approximately 683,096 acres were identified as clearly and obviously not meeting the criteria for identification as wilderness study units. Maps identifying these study units are located in the Cedar City District Office and are available for public review. These lands will continue under multiple use management (BLM Utah Final Initial Wilderness Inventory, 1979). Thirty-five units, totaling 1,260,771 acres, have been identified for intensive inventory. These units will require further field study to determine if they possess wilderness characteristics.

All Utah BLM Districts completed intensive inventories prior to March 1, 1980. Wilderness study areas (WSAs) will be proposed by the Utah State Director in April, followed by a 90-day public comment period. After designation, the WSA's will be evaluated and a recommendation developed as to the suitability or non-suitability of each. This process will be completed through use of the BLM's planning system and must be completed prior to 1991, although specific schedules have yet to be developed.

CLIMATE

The climate of the K/E EIS area varies considerably. The lowest precipitation levels are in the lower elevations. The amount of precipitation generally increases with the increase in altitude. The greatest amounts of precipitation occur during two periods of the year: summer and early fall when thunderstorms from the Gulf of Mexico move into the area; and winter and early spring when precipitation usually occurs as snow or ice from storms originating over the Pacific Ocean.

The frost-free (greater than 30°F) period for the EIS area ranges from about 60 days at the highest elevations to over 180 days at the lowest elevations. The majority of the EIS area has over a 120-day frost-free period.

Annual potential evapotranspiration for the EIS area ranges from below 18 inches in the higher elevations to around 33 inches in the lower elevations. Most of the area has greater than 24 inches of potential evapotranspiration, with over half having a potential of 27 inches or more.

Annual variability of precipitation is sometimes dramatic, as is seasonal and monthly variability. Data taken at eight sections in the EIS area shows that monthly and yearly differences in precipitation are quite substantial (table 3-15).

Winter temperatures can fall below 0°F and summer temperatures can rise above 100°F. Mean monthly average low temperatures range from approximately 20°F at Bryce Canyon Airport to approximately 40°F at Zion National Park. High mean monthly average temperatures range from approximately 62°F at Bryce Canyon Airport to approximately 84°F at Zion National Park.

AIR QUALITY

The K/E EIS area is classified as Class II under the Prevention of Significant Deterioration Regulations in the Clean Air Act Amendments of 1977. This means well-controlled industrial growth is acceptable. However, Zion National Park and Bryce Canyon National Park are Class I areas and the Paria Primitive Area is proposed for Class I status. Class I means that very little degradation of air quality related values (including visibility) will be acceptable.

Air quality measurements have been taken at three sites in and around the EIS area: Warner Valley (approximately 13 miles southeast of St. George, Utah); Kaiparowits site (approximately 16 miles north of Glen Canyon City, Utah); and Page, Arizona. Pollution levels at these three sites are below the National Ambient Air Quality Standards.

Visual range in the EIS area is generally between 60 and 70 miles (Vermilion URA, 1978).

TABLE 3-15

Average Precipitation from 1972 to 1978 at Kanab/Escalante Stations

Month	Bryce Canyon				Zion National Park		
	Alton	Escalante	Henrie-ville	Kanab	Tropic	National Park	Order-ville
January	1.31	0.67	0.69	1.62	1.03	1.64	1.43
February	1.55	0.60	0.86	1.16	1.06	1.34	1.31
March	1.89	0.79	0.87	1.89	1.02	2.33	1.71
April	1.11	0.49	0.72	0.99	0.59	1.00	0.76
May	0.81	0.76	0.63	0.56	0.70	0.99	0.78
June	0.53	0.46	0.41	0.44	0.50	0.84	0.58
July	1.44	0.75	0.62	0.80	1.00	1.29	0.96
August	0.91	0.79	0.81	0.55	0.85	1.17	0.93
September	1.32	0.74	0.78	0.82	0.86	0.70	1.00
October	1.47	1.63	1.52	1.52	1.52	1.18	1.38
November	1.62	1.38	1.37	0.97	1.32	1.24	1.23
December	1.23	0.46	0.55	0.93	0.29	1.01	0.87
Annual	15.19	9.48	9.76	12.41	11.33	14.73	12.86

Source: National Oceanic and Atmospheric Administration Climatological Data, Annual Summary, Utah, 1972-78

Note: All precipitation measurements are in inches.

TOPOGRAPHY/GEOGRAPHY

The K/E EIS area is characterized by steep canyons, benches, terraced plateaus, cliffs, and valley floors. Much of the terrain in the area is inaccessible. There are numerous south-facing cliffs in the area which have lower vegetation densities due to accelerated water evaporation on the watershed areas.

Elevations in the EIS area range from 3,760 feet above mean sea level at Wahweap Creek to 9,196 feet above mean sea level at Kaiparowits Peak. Major drainages in the area eventually empty into the Colorado River.



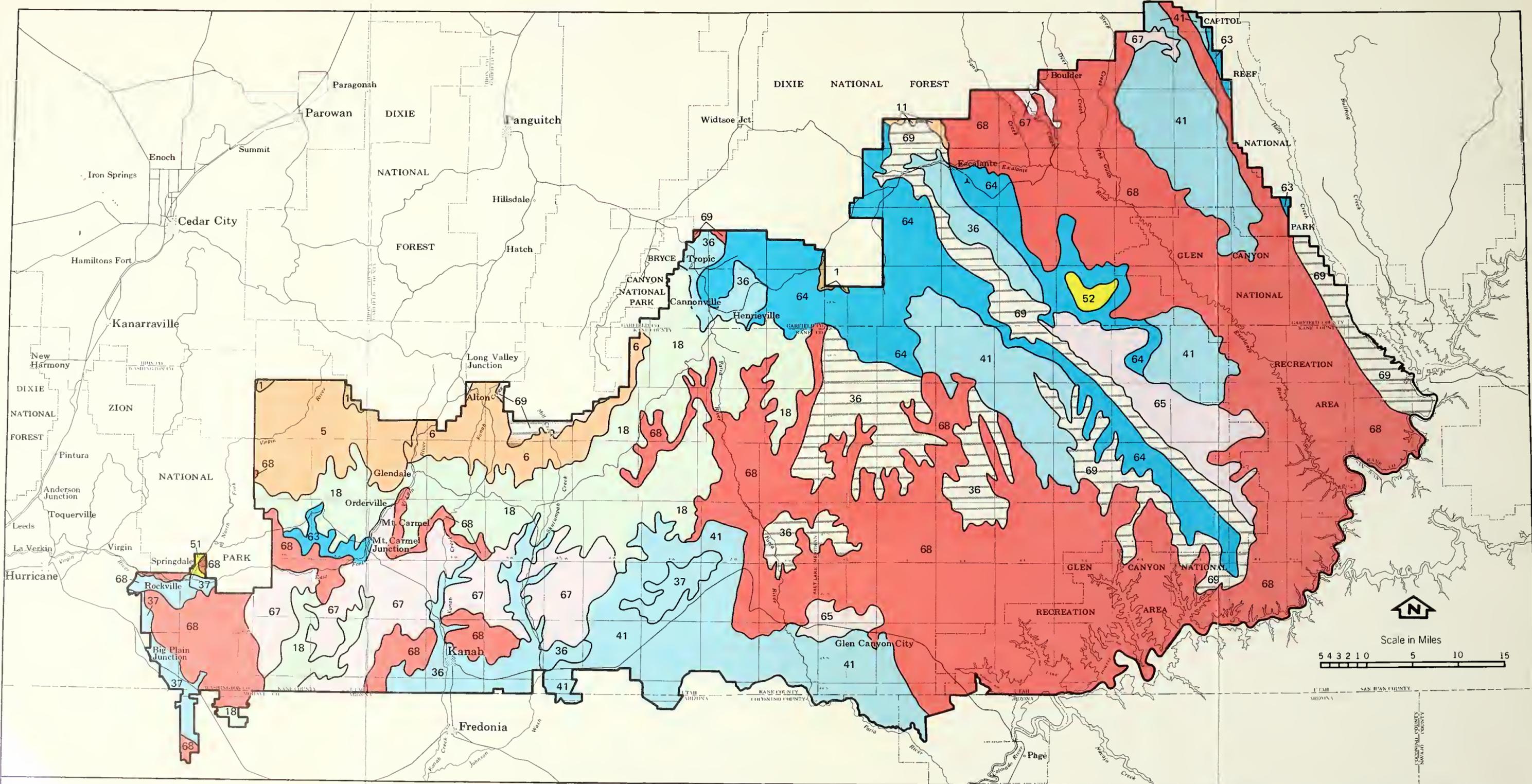


FIGURE 3-2

GENERAL
SOIL
ASSOCIATIONS

- 1, Dark and Light Colored Soils of High Mountains
- 5, 6, Dark Colored Soils of Upland Plains and Terraces
- 11, Dark Colored Soils of Mountains and Plateaus

LEGEND

- 36, 37, Light Colored Soils of Valleys, 40, 41, Terraces and Mesas
- 51, 52 Light Colored Desert Soils of Valleys, Terraces and Fans
- 63, 64 Highly Erodable Soils
- 65, 67 Highly Erodable Soils
- 68, 69 Rock Land, Badland-Rock Land Associations
- Moderate And Slightly Saline Soils

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

KANAB-ESCALANTE GRAZING
ENVIRONMENTAL IMPACT
STATEMENT

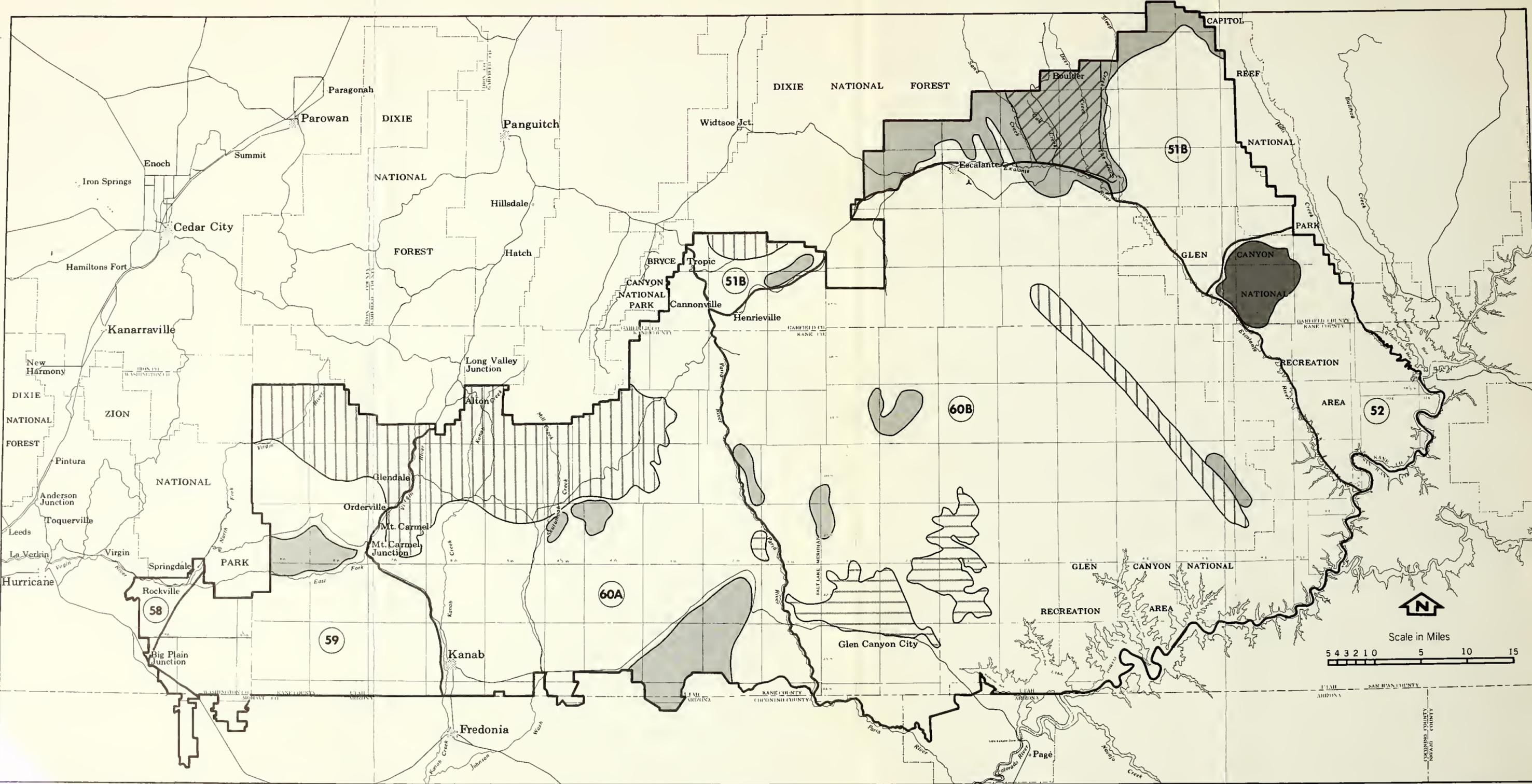


FIGURE 3-3

MAJOR
WILDLIFE
HABITATS

- | | |
|---|---|
|  | Desert Bighorn Sheep |
|  | Antelope Yearlong Range |
|  | Elk Winter Range |
|  | Deer Winter Range (Scattered-Unit Wide) |

LEGEND

- | | | | |
|---|------------------------------|---|----------------------------|
|  | Important Big Game Habitat |  | Critical Big Game Habitat |
|  | Deer Critical Winter Range |  | Deer Summer Range |
|  | UDWR Deer Herd Unit Boundary |  | UDWR Deer Herd Unit Number |

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KANAB-ESCALANTE GRAZING
ENVIRONMENTAL IMPACT
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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter identifies the probable environmental impacts of the six alternatives. Significant impacts are those which (1) affect the quality of the human environment; (2) are controversial; or (3) affect a legally protected species or resource. Short-term or initial impacts are those that would occur as a direct result of implementing the alternatives. Long-term impacts are those that would occur after an alternative has been implemented. Generally, short-term impacts would last up to 9 years; long-term impacts would last from 9 to 24 years or longer.

The analysis of impacts presented is designed to be commensurate with expected magnitude, intensity, duration, and incidence of impacts.

The probable impacts are traced from the proposed action to man and his environment. This requires following impacts from one environmental component to another until the ultimate significance of an impact has been evaluated to the extent possible. Each impact is analyzed in a cause and effect manner, and secondary impacts are identified and pursued as far as practical. A cause identified is tied to a component of an alternative (Chapter 2) and an effect identified is tied to a component of the environment (Chapter 3).

In this chapter, the analysis process is keyed to a series of narratives and summary tables which describe both positive and negative impacts associated with specific environmental resource components. These summaries are based on a detailed analysis and a cause-effect documentation process.

The most dominant direct impact from livestock grazing would occur on the vegetation resource; however, direct impacts would occur to a lesser extent on other resources, such as soils, wildlife, and socioeconomics. Changes in production, condition, and trend of vegetation would cause direct effects to other resources.

The impact discussion presented in this environmental impact statement (EIS) does not cover all of the intricate aspects of the ecological conditions in the Kanab/Escalante (K/E) area. Rather, the statement highlights those portions of the analysis that are considered by the Bureau of Land Management (BLM) to be of primary interest to the public, other agencies, and resource decision makers for the public lands involved.

Impacts are discussed by resource components in this chapter. The resource components are in the same order as in Chapter 3.

Each component discussion includes an evaluation of the possible avoidable adverse impacts (negative impacts that cannot be avoided should an alternative be implemented), the relationship between the short-term use proposed in each alternative and the long-term productivity of the environment, and whether or not they would be irreversible or irretrievable. The conclusions draw together the results of this assessment for each



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resource. Significant impacts are summarized in Chapter 2, Description of the Alternatives.

Each impact discussion includes:

1. Identification of the principal environmental elements except climate, geology, and topography (these three elements would not be significantly affected by any of the proposed alternatives):
2. An analysis of the action items that affect the elements;
3. Quantification of the degree of effect or amount of change;
4. Assessment of the significance of the change;
5. A brief conclusion.

Assumptions

For meaningful impact analysis it is assumed that:

1. Any one or parts of the six alternatives could be included in the eventual implementation plan; therefore, impacts of each alternative are analyzed equally in depth. The basis for the analysis of impacts is the existing environment and how it would be changed by any one or part of the proposed alternatives.

2. Mitigating measures included in the Summary of Project Design Specifications (Appendix 3) have been considered in the impact analysis and would be carried out as construction stipulations. No other mitigating measures have been identified as a result of the impact analysis.

3. Each proposed alternative's assumptions and corresponding objectives would be applicable.

4. Impacts to State and private lands are not treated separately in the analysis; however, it is assumed that impacts would be similar to those identified on adjacent public lands.

5. The alternatives would not involve any direct BLM control over private or State lands (which are intermixed within grazing allotments) where exchange of use agreements do not exist.

6. Due to the difficulty of predicting future livestock market conditions, an assumption that current market conditions would prevail is necessary for socioeconomic analysis. The baseline for analysis of impacts to average net annual rancher income is average active authorized use, 68,895 animal unit months (AUMs). Analysis is based on the BLM charge for livestock AUMs at the 1979 rate of \$1.89 per AUM.

7. Past active authorized use is used as a baseline on allotments for which that information is available. On those allotments where that information is not available it is assumed that recent surveyed capacity is correct, regardless if it exceeds the present grazing preference.

8. Grazing management systems proposed and monitoring and evaluation processes would be carried out as described in each alternative.

Following the district manager's selection of a management plan, additional cooperation and coordination with the livestock operators would be needed to finalize grazing management systems and to determine the location of rangeland developments and/or vegetation treatments. The manager could then develop a decision document which would protect the resources and most nearly fit the livestock operator's needs. Implementation of the management plan for the K/E EIS area would take place at the beginning of the new grazing fee year (March 1981) approximately 6 months after filing the Final K/E EIS statement.

9. Where there was a lack of survey data such as in soils, as well as a lack of specificity relating to exact locations of vegetation treatments and rangeland developments, worst possible case analysis was carried out. Therefore, success of treatments is depicted by the minimum percent of success expected.

10. On those allotments where specific management would be proposed, implementation would require from 1 to 9 years. Short-term impacts are considered to occur within 9 years, long-term impacts are considered to occur within 24 years.

11. The timeframe in which the Short-term Uses Affecting Long-Term Productivity section is analyzed is not the same timeframe used in analyzing other impacts of the proposed alternatives. Under this section the short-term uses would occur within a 24-year period, a time that would include the accomplishment of all objectives of any proposed alternative. Long-term productivity would occur after 24 years, when attainment of the proposed objectives would be accomplished and subsequent effects would still be impacting the environment.

12. None of the rangeland developments proposed for areas now under intensive study would be constructed until final decisions are made on wilderness study areas. When wilderness study areas are defined, management restrictions as defined in Section 603 of Federal Land Policy Management Act (FLPMA) would apply to proposed developments. Restrictions would be removed from remaining areas and developments would be implemented as proposed.

13. Forage allocations would be fully utilized as proposed in each alternative (Chapter 2). The analysis directly considers the affect of specific forage allocations to livestock, wild horses, and big game (deer, elk, antelope, and bighorn sheep). However, the analysis of forage allocated to other resource uses is not quantified, as there are no specific needs or demands identified and this forage has not been specifically apportioned to the other elements by resource (Chapter 2).

The overall effect of the allocation to other resources has been considered along with the various changes in level and intensity of use for each of the six alternatives. The effect of this allocation is considered in the evaluation of existing resource conditions and populations.

Analysis Guidelines

Impact analysis was performed at the allotment level for each resource. However, because of the size of the area affected, number of allotments, and complexity of each alternative, the results of the impact analysis are grouped (where possible) by the total number of allotments and acres affected. Individual allotment analysis is found in Appendix 10.

IMPACTS TO VEGETATION

Each of the allotments in the K/E EIS area (fig. 2-2, Existing Allotments map at the end of this volume) is analyzed to determine how the major components of the six alternatives would impact vegetation in relation to rangeland condition, apparent trend in rangeland condition, and forage production. In each alternative the impact would be caused by grazing livestock; however, the degree of impact would vary by alternative, depending on the management practices prescribed. The major grazing management practices considered in the analysis were: season of use, intensity of grazing, rest, grazing systems, and vegetation treatments. A summary of impacts by alternative is shown in table 4-1. For a more detailed discussion of analyses methods see Appendix 20.

Livestock Forage Condition

Existing forage condition is used as a comparison baseline in the alternative analysis. In an attempt to simplify analysis of expected change in condition class, the dominant condition class of each allotment is applied to all suitable acres in that allotment. An allotment listing of condition is contained in Appendix 10.

Impacts to forage condition are evaluated by analyzing specific components in each alternative that affect plant community composition and comparing the effect to existing forage conditions.

Trend in Rangeland Condition

Apparent trend information is used as a baseline in the alternative analysis. It should be considered as a subjective estimate in that no documented long-term studies have been made correlating "apparent" trend observations with actual trend measurements. Apparent trend observations were determined at one point in time by a field examination made during the range survey. This determination is made using the factors shown in Appendix 11. To simplify the analysis, the dominant trend of each allotment was applied to all suitable acres in that allotment.

Impacts to trend are determined by evaluating specific components in each alternative that affect livestock forage vigor, number of seedlings, surface litter, and the extent of gully and pedestal formation.

TABLE 4-1

Summary of Impacts to Vegetation

Alternative	Livestock Forage ^a				Forage Production (AUMs) ^b				Riparian Condition ^b	
	Condition Class		Apparent Trend		Initial	Long Term	Acres	Allotments	Acres	Allotments
	Acres	Allotments	Acres	Allotments						
Present Situation	Good	124,344	9	Up	137,551	.....	85,262	15	Excellent	20
	Fair	682,880	70	Static					Good	571
	Poor	500,465	115	Down					Fair	2,320	Fair	2,756	Very poor	545
1. Continuation of Present Grazing Management	Good	124,344	9	Up	137,551	129,889	89,959	15	Excellent	20
	Fair	682,325	69	Static					Good	571
	Poor	500,970	116	Down					Fair	2,320	Fair	2,756	Very poor	545
2. Elimination of Livestock Grazing	Good	188,092	12	Up	137,551	151,959	1,049,123	167	Excellent	203
	Fair	632,494	69	Static					Good	3,026
	Poor	487,053	113	Down					Fair	2,388	Fair	2,595	Very poor	0
3. Multiple Resource Enhancement	Good	124,344	9	Up	137,551	137,947	855,633	145	Excellent	203
	Fair	695,654	72	Static					Good	3,026
	Poor	487,641	113	Down					Fair	2,388	Fair	2,595	Very poor	0
4. Adjustment to Grazing Capacity	Good	124,344	9	Up	137,551	150,239	594,398	108	Excellent	20
	Fair	695,654	72	Static					Good	571
	Poor	487,641	113	Down					Fair	2,464	Fair	3,147	Very poor	10
5. Rangeland Management Recommendation	Good	164,384	12	Up	137,551	163,071	667,396	115	Excellent	20
	Fair	678,551	66	Static					Good	571
	Poor	464,704	116	Down					Fair	2,565	Fair	3,046	Very poor	2
6. Livestock Optimization	Good	252,667	18	Up	137,551	183,552	664,087	114	Excellent	20
	Fair	596,932	62	Static					Good	571
	Poor	458,040	114	Down					Fair	2,565	Fair	3,046	Very poor	10

^aCondition and apparent trend data except for Present Situation represents projections expected within 24 years.

^bRiparian condition data except for Present Situation represents projections expected within 24 years. Riparian condition acres do not include 595 acres of unallotted riparian vegetation.

Forage Production

Impacts to existing forage production are evaluated by examining the present grazing preference, average active authorized use, and the present surveyed carrying capacity figures in relation to the existing and proposed season of use and the present and predicted forage condition and trend for each allotment.

Future forage production is predicted based on impacts to vegetation condition and trend, and on the expected success of proposed water developments and vegetation treatments. Proposed rangeland management practices such as changes in season of use and type of management are also considered.

Appendix 20 (Forage Production under Methods Used in Analysis of Impacts section, and table 3, Attainment of Management AUMs) contains a set of criteria developed to evaluate proposed management practices and to determine AUMs that might be attained over a 24-year management period. These criteria were applied to each allotment for the six alternatives.

Appendix 20 (Vegetation Treatments under Additional Information Used to Predict Vegetation Impacts) and 21 (Analysis of Seeding Success) discuss the expected effect and success of vegetation treatments, which include chemical spraying, burning, chaining, plowing, and seeding.

Forage that would be expected to be available in the short and long term in each allotment by alternative is shown in Appendix 10. A summary of forage production by alternative is shown in table 4-1.

Riparian Vegetation

Existing riparian condition and trend information is used as a comparison baseline in the alternative analysis. The dominant condition and trend of the riparian vegetation occurring in each allotment is used in an attempt to simplify analysis. Analysis only considers the 6,212 acres of allotted riparian rather than the total 6,807 acres because the remaining 595 acres would be unaffected by the alternative proposals.

Changes to Proposed Threatened and Endangered Vegetation

According to a telephone conversation with John A. Gill, U.S. Fish and Wildlife Service, on October 17, 1979, only one officially Federally listed endangered species of plant has been found in the K/E EIS area, the siler pincushion cactus (Pediocactus sileri) (Federal Register, Volume 44, October 26, 1979, p. 6178). During the informal consultations with USFWS, no impacts as a result of any of the proposed alternatives were identified. This is a cactus and is not grazed by livestock (personal observation of a BLM employee and public testimony of Dr. Jim Bowns, Range Scientist, SUSC, July 11, 1978, St. George, Utah). There is no indication that livestock grazing presents a significant existing or potential threat to the species (Welsh et al., 1979). Onsite field investigation would be made prior to construction of rangeland developments to assure that the species is protected. If other species are listed in the future, they will be protected as required by the Endangered Species Act, 1972 (PL 93-205 as amended).

Continuation of Present Management: ALTERNATIVE 1

No new improvements, treatments, or management would occur in this alternative. No significant improvement in vegetation would be expected. Specific vegetation components would respond as follows:

Livestock Forage Condition

This alternative would not result in an adjustment in present management practices that would directly affect plant composition and subsequently livestock forage condition. However, continuation of present management would result in a slight decline in forage condition due to continuation of early spring use and utilization of desirable forage species occurring beyond proper physiological limits of 50 to 60 percent (Hormay, 1970). In most cases the decline would not be enough to change forage condition class.

The decline in livestock forage condition would occur in many allotments because of a lack of prescribed periodic rest, continued heavy utilization, and/or spring grazing. This would weaken desirable forage species, and would give the competitive advantage to undesirable invader species (shrubs). From studies on sagebrush rangeland, Laycock (1967) indicates that heavy spring grazing on rangeland already in poor condition maintained the low productivity of palatable forage species and further increased sagebrush.

Stoddart et al., (1975) states ". . . the early growing season is the critical one, both from the standpoint of vegetation and the grazing animal. If at all possible, grazing should not take place at this time so that forage plants could recover from dormancy and provide sufficient forage for the grazing animal." In the K/E area, growth begins as early as March 1 (table 3-2, Vegetation, Chapter 3) and continues through June. Present turn-on for many allotments is as early as March 16 to April 15.

Adverse impacts to the plant would be a result of the interruption of the reproductive functions and normal growth of the plant. Cook (1966) found that when heavy grazing persists for several years, it reduces the amount of roots and rhizomes, and eventually kills the plant.

As a result of early spring use and utilization of forage species beyond proper physiological limits, a slight decline in livestock forage condition would be expected. Good condition rangeland would be maintained at 124,344 acres, fair condition rangeland would decline from 682,830 to 682,325 acres, and poor condition rangeland would increase from 500,465 to 500,970 acres.

Trend in Rangeland Condition

Continuing present management would cause an increase in the number of acres in a downward trend. Overutilization of forage by livestock would continue to limit the amount of litter accumulation. Continuous spring grazing would affect vigor of desirable forage species.

Cook (1966) found (in studies in western Utah) that excessive defoliation of grasses led to reduced vigor and subsequently increased their susceptibility to the competition from other plants. Food storage in heavily

grazed plants is gradually reduced while the less palatable species have optimum food reserves.

Since litter accumulation and vigor of desirable forage species are used to indicate apparent trends and would be affected by continuation of present management, it would be likely that the acreage in a downward trend would increase in the long term (a response similar to that expected of forage condition). Rangeland currently in an apparent static trend would be most likely to change trend class. As a result, areas in an upward trend would increase from 85,262 to 89,959 acres, areas in static trend would decline from 1,178,368 to 1,059,730 acres, and areas in downward trend would increase from 44,009 to 157,950 acres.

Forage Production

Under this alternative, forage allocations to livestock would continue at present levels. The overobligation of forage occurring on approximately 100 allotments would result in excessive utilization rates on desirable forage species (especially grasses). According to Appendix 22, present wildlife use appears to be within the available forage capacity, and therefore does not accentuate the overobligation. Currently the surveyed livestock forage capacity is 68,298 AUMs. This is based on proper utilization levels averaging 50 to 60 percent on desirable forage species. These species, according to Reynolds and Martin (1968), should be properly used if rangeland condition is to be maintained or improved. They also state that proper utilization requires 45 to 65 percent of the herbage produced be left each year.

Hormay (1970) indicates that continuous grazing at any stocking level would result in the more palatable and accessible plants gradually being replaced by less palatable species due to selectivity of grazing livestock. Furthermore, Martin (1975) suggests that continuous grazing tends to suppress perennial grasses and would eventually allow less desirable shrubs to thrive. In the K/E area, continued use at existing levels and seasons (yearly spring grazing) would result in a decline in the present forage capacity in the K/E area for livestock and eventually wildlife. In the short term this decline would be undetectable; however, in the long term an estimated 6-percent decline in forage availability would be expected. Most of the decline would be concentrated in those approximately 100 allotments where current use by livestock exceeds proper utilization levels.

As a result of overutilization and continuous seasonal grazing, present forage production would decline from 137,551 AUMs in the short term, to 129,889 AUMs in the long term.

Riparian Vegetation

Continuation of present management practices, particularly the level of use, would result in a decline in the condition of riparian vegetation (Hormay, 1970). However, condition would not be expected to decline sufficiently to change condition class. Woody riparian species (discussed in Chapter 3 and presently limited in abundance) are very susceptible to continued heavy grazing. Food reserves and areas of growth initiation are often located in

twigs and stems and are exposed to grazing. Heavy grazing on these stems after the food reserves are stored during the dormant period would reduce vigor and cause a decline in condition. Since many of the riparian areas (53 percent) are in poor or very poor condition at present and are subject to natural geologic erosion, subsequent declines in riparian condition would be expected to be small.

Although long-term impacts due to continued heavy use would be anticipated, they would not be expected to be of sufficient magnitude to cause changes in condition class. Short-term impacts would be negligible. Twenty acres would remain in excellent condition, 571 acres would remain in good condition, 2,320 acres would remain in fair condition, 2,756 acres would be in poor condition, and 545 acres would remain in very poor condition.

Conclusion

Short-term impacts would be negligible. In the long term, forage production would decline 6 percent, from 137,551 to 129,889 AUMs. Generally riparian areas would continue to be heavily impacted, but would not change condition class. Livestock forage condition and trend would be impacted as shown:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,344	124,334	Up	85,262	89,959
Fair	682,830	682,325	Static	1,178,368	1,059,730
Poor	500,465	500,970	Down	44,009	157,950

Elimination of Livestock Grazing: ALTERNATIVE 2

Elimination of livestock grazing would cause significant improvements in condition and trend of livestock forage species by allowing them to complete growth and reproductive processes. Species now heavily used would respond the most, although improvement would be slow. Wildlife would continue to utilize forage at an estimated 20 percent.

The 973 miles of fences necessary to protect Federal land from grazing would cause a short-term impact on 1,168 acres due to vegetation disturbance associated with construction. Detailed rangeland development data by allotment is shown in Appendix 23.

The primary component of this alternative would be a reduced level of utilization on available forage.

Specific vegetation categories would respond as follows:

Livestock Forage Condition

With total removal of livestock, forage condition would be expected to improve on those allotments in which there is not a dominant undesirable overstory, and where a significant composition of desirable forage species exists. This would occur because elimination of livestock grazing would

substantially reduce the level of utilization on desirable forage species. Only wildlife use would continue. Livestock grazing during the growing period would be discontinued. These actions would improve plant vigor, especially for grasses. Seedling establishment would be encouraged because an increased opportunity to complete growth and reproductive processes would be provided. Allotments composed primarily of pinyon-juniper or other dominant woody species would not be expected to improve significantly in forage condition because livestock forage species would not successfully compete with well-established, less desirable species. The improvement would be slow, probably negligible in the short term (Sosebee et al., 1977; McLean and Tisdale, 1972). Studies in western Utah have shown that the recovery rate of ranges in poor condition is slow because of low precipitation and a limited growing period (Cook, 1971).

As a result of improved plant vigor and seedling establishment, especially in areas not dominated by pinyon-juniper or sagebrush, livestock forage condition would improve in the long term. Areas now in good condition would improve from 124,344 to 188,092 acres, fair condition areas would be reduced from 682,830 to 632,494 acres, and poor condition areas would be reduced from 500,465 to 487,053 acres.

Trend in Rangeland Condition

Elimination of livestock grazing would result in a significant improvement in trend of livestock forage. This would occur because of the substantially reduced level of utilization on forage species and the absence of livestock grazing during the growing period. This would improve vigor, litter accumulation, and seedling establishment, which are trend indicators. Most of the improvement would occur on areas now in static trend since most desirable forage species would be released from grazing pressures. Visible improvement in accumulation of litter, gully stabilization, and plant vigor would occur rapidly in the short term with a gradual stabilization occurring in the long term. The rate of improvement would depend on the initial state of vigor. Cook (1971) found the rate of recovery over a 7-year period (rest) was proportional to the initial state of vigor. The lower the vigor, the less rapid the recovery.

In the long term, improvement in vigor, litter accumulation, gully stabilization, and seedling establishment would cause areas now in upward trend to improve from 85,262 to 1,049,123 acres, areas in static trend to be reduced from 1,178,368 to 258,516 acres, and downward trend to be halted on 44,009 acres.

Forage Production

Elimination of livestock grazing would result in an improvement in livestock forage production because of the positive response of condition and trend. Although forage production would increase, it would be available only to wildlife species. Desirable species, especially grasses, would be expected to respond the fastest. Natural growth and reproductive processes would be enhanced. According to Hickey (1966), the fastest way to improve deteriorated rangeland and have sufficient cover for natural reseeding is through complete growing season deferment. This would be provided by the complete elimination of livestock grazing.

An improvement in plant vigor would not be expected to result in an increase in forage production in the short term because Cook and Child (1971) found that plants harvested moderately during late spring or in winter and late spring still differed significantly in vigor measurements from untreated plants, even after 7 years of protection. However, due to improved forage condition and trend in the long term, forage production would increase. Present forage production (both wildlife and livestock) would increase from 137,551 AUMs to 151,959 AUMs.

Riparian Vegetation

Cover would increase with reduced utilization rates, although wildlife would continue to use these areas. Improvement would be rapid but would level off in the long term as the areas stabilized (Duff, 1978).

Many areas would not reach good to excellent condition as a result of natural limiting factors, primarily natural geologic erosion that causes frequent scouring of existing riparian vegetation.

As a result of reduced utilization rates and a subsequent improvement in vigor of riparian vegetation, excellent condition riparian vegetation would improve from 20 to 203 acres, good condition would increase from 571 to 3,026 acres, fair condition would increase from 2,320 to 2,388 acres, poor condition would decrease from 2,756 to 595 acres, and the 545 acres now in very poor condition would be reduced to 0 acres.

Conclusion

Forage production would increase from 137,551 to 151,959 AUMs. Most riparian areas would improve, notably 545 acres of very poor and 2,756 acres of poor condition areas. Livestock forage condition and trend would improve as shown:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,334	188,092	Up	85,262	1,049,123
Fair	682,830	632,494	Static	1,178,368	258,516
Poor	500,465	487,053	Down	44,009	0

Multiple Resource Enhancement: ALTERNATIVE 3

Special resource considerations identified in this alternative would reduce existing livestock use. All riparian vegetation would be protected by fencing. Where needed, allotments would be adjusted to the surveyed capacity. In 31 allotments in which grazing would be eliminated entirely in the long term (shown in Allocation to Livestock section of Appendix 5), impacts would be similar to those in Alternative 2. Specific vegetation categories would respond as follows:

Livestock Forage Condition

Elimination of livestock on frail watersheds, saline soils, riparian areas, identified deer habitat, and outstanding natural areas in addition to a reduction to 50 percent utilization on five allotments with rest rotation grazing systems (Chapter 2) would effectively reduce the level of livestock use by 33,074 AUMs (48 percent) for 2 years initially, and 23,126 AUMs (34 percent) in the long term. Vigor and seedling establishment would improve. Proposed suspension of grazing on frail watersheds would enhance normal growth and reproductive processes. These actions would benefit desirable livestock forage species, especially grasses, although improvement (as discussed in Alternative 2) would be slow. Also, because the proposed allocation of AUMs to competing resources would often include a dramatic reduction in livestock use from the present situation, forage condition would improve. These reductions would be over and above the adjustment to surveyed capacity (available forage).

Approximately 119 of the 210 existing allotments would receive these special management considerations and would be expected to respond most favorably to this alternative. Improvement in condition on those allotments that would be adjusted to grazing capacity and would not receive special management considerations would be slower and smaller in magnitude.

Improvement in vigor and seedling establishment of forage species in this alternative would cause 124,344 acres to remain in good condition, fair condition rangeland would improve from 682,830 to 695,654 acres, and poor condition rangeland would be reduced from 500,465 to 487,641 acres.

Trend in Rangeland Condition

Proposed management actions in this alternative, especially those that result in suspension or elimination of livestock grazing in specific areas (Chapter 2, Description of Alternatives), would cause an increase in the number of acres in an upward trend and reduce the acreage in static and downward trends. Proposed reductions in present levels of livestock utilization would result in an improvement in those factors which are indicative of trend. Vigor of desirable species, especially grasses, and litter accumulation on frail watersheds would be the factors most affected (Chapter 2). Improvement would be most rapid initially, then level off over a period of time; a response similar to that expected in Alternative 2.

In the long term, improvement in plant vigor and increased litter due to reduced utilization levels would cause areas now in upward trend to increase from 85,262 to 855,633 acres, static trend areas to be reduced from 1,178,368 to 443,933 acres, and downward trend to be reduced from 44,009 to 8,073 acres.

Forage Production

Although trend in rangeland condition would improve significantly in this alternative due to a reduction in livestock utilization levels (estimated to be an average of 30 percent of the current annual growth in the 119 allotments affected by special management considerations), significant

increase in forage production would not be expected because generally vegetation composition would not be altered by management actions. Riparian vegetation, protected by fencing in this alternative, would be expected to provide 396 AUMs of additional forage in the long term.

Paulsen (1975) recommends (on southwest rangeland) use of most browse species at 30 to 35 percent of the current year's twig growth and 40 percent for perennial grass. At this level (according to Paulsen), forage plants would maintain themselves in a vigorous condition and provide adequate soil protection. Hutchings (1954) states that improvement in poor condition rangeland can be achieved by grazing the better forage plants at a rate lower than what is recommended for good condition rangeland. According to Hutchings, desirable plants in weakened condition require greater protection in order to successfully compete with less desirable plants. The improvement in trend, a result of management, would not significantly affect production in the short term. In the long term, an improvement in riparian vegetation would increase forage production (wildlife and livestock) from 137,551 to 137,947 AUMs.

Riparian Vegetation

Since all identified riparian vegetation would be protected by fencing in this alternative, impacts would be similar to those in Alternative 2. Present use levels would be reduced substantially. Only wildlife use would occur in riparian areas. Cover would increase and condition of vegetation would improve except in those areas subject to continued geologic erosion and frequent scouring.

Conclusion

Forage production would increase from 137,551 AUMs to 137,947 AUMs. Most riparian areas would improve, especially 545 acres in very poor and 2,756 acres in poor condition. Livestock forage condition and trend would improve as shown:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,344	124,344	Up	85,262	855,633
Fair	682,830	695,654	Static	1,178,368	443,933
Poor	500,465	487,641	Down	44,009	8,073

Adjustment to Grazing Capacity: ALTERNATIVE 4

In this alternative, livestock use would be adjusted to the surveyed capacity. In addition, 21 allotments with existing allotment management plans (AMPs) would be fully implemented. Based on soils information (contained in Appendix 21), 22,781 acres of treatment (table 2-1) would affect condition of vegetation and trend in rangeland condition. A short-term disturbance of vegetation would occur on 197 acres as a result of rangeland developments. Specific vegetation categories would respond as follows:

Livestock Forage Condition

Treatments, specific management systems providing periodic rest, and deferment of grazing until after seed ripe on many allotments would improve the condition of livestock forage. A 1-percent reduction from the current level of livestock grazing (68,895 AUMs) to present forage availability (68,298 AUMs) would occur. Additionally, an adjustment in the present grazing season would occur. Spring use would be deferred until after seed ripe (about July 1 to July 15) of desirable forage species on 23,072 acres (Chapter 2). Implementation of 21 AMPs would provide specific management on 659,819 acres. This management would involve implementation of grazing systems (Chapter 2, Grazing Management) and would require construction of rangeland developments and vegetation treatments consisting of 7,140 acres of chaining, 8,078 acres of burning, 5,898 acres of spraying, and 1,665 acres of plowing.

Rest rotation grazing systems would be implemented on 1,096,542 acres. These systems would provide periodic rest during the critical growing season which would allow improved seed production and establishment of seedlings (Hormay, 1970). Average utilization rates on grazed pastures could however, exceed moderate (50 to 60 percent) utilization.

Deferred rotation management would occur on 239,558 acres and would generally be favorable to vegetation. Schmutz (1973) indicates that deferred rotation systems improve plant vigor and seedling establishment, and result in more uniform grazing. He also states, however, that after heavy use it may take many years for arid or semi-arid rangeland to improve. Buwai and Trlica (1977) also indicate that it may be necessary to give important forage plants periodic rest to insure their productivity.

As discussed in Vegetation Treatments in Appendix 20, treatments would change plant composition which would improve forage condition. Chaining would remove dominant deep-rooted mature plants (primarily pinyon-juniper or sagebrush). Treatments occurring in pinyon-juniper sites may, however, suffer reinvasion by undesirable species within 15 years (Tausch and Tueller, 1977) and would require retreatment.

Burning, used primarily in dominant sagebrush stands, would remove undesirable shrub species, thereby releasing native grasses from competition. At least 3 years could elapse before production of many desirable species would be back to pretreatment levels (Vallentine, 1971). Linne (1978) also indicates that undesirable species (rabbitbrush) may increase after burning. Nielsen and Henkley (1975) report up to a 100-percent kill of sagebrush by fire.

Mature deep-rooted sagebrush would also be removed by plowing. Native perennial grasses would respond favorably to this method of treatment, but the treatment would be limited to rolling terrain and deep soils.

Spraying would reduce the competition of shrubs and forbs with grasses. Depending on the soil moisture, stage of growth when treated, and species treated, mortality of target plants normally varies from 60 to 95 percent (Herbicide Control of Sagebrush and Wyethia in Utah, Forest Service, 1973).

However, Nielsen and Henkley (1975) indicate that reinvasion of undesirable species may occur within 5 to 14 years, and may require subsequent retreatment to maintain productivity. Although some nontarget species may be adversely affected, grasses would generally be unaffected.

Seedlings would occur on many of the treatments, and would supplement the establishment of native grasses and browse species on the sites.

These actions would give a competitive advantage to desirable forage plants, resulting in improved vigor and production. Fences and water developments would improve distribution and promote more uniform utilization of forage, thereby improving present forage condition (increase in perennial grasses).

As Reynolds and Martin (1968) indicate, sustained high production of perennial grass requires grazing of desirable plants to the proper degree at appropriate times and the optimum distribution of livestock.

Improvement in forage condition would occur because as Anderson (1969) indicates, the effect of proper grazing use on key forage increases or maintains vigor, enhances seedling establishment, and causes an eventual thickening of the stand.

This improvement would be gradual and not significant in the short term. However, due to improvement in season of use, implementation of treatments, and construction of rangeland developments in the long term, the following impacts would occur: 124,344 acres in good condition would remain static, fair condition acres would improve from 682,830 to 695,654 acres, and poor condition acres would decrease from 500,465 to 487,641 acres.

More substantial improvement in condition classes would not be expected since the extent that vegetation composition would be altered to improve condition classes would be limited because of the generally unresponsive nature of pinyon-juniper and sagebrush to management (Springfield, 1976). Most management actions would provide improvement (within a class), but not enough to improve to the next higher forage condition class.

Trend in Rangeland Condition

The management actions described above would result in a corresponding improvement in trend. The reduction to surveyed capacity and adjustment in present season of use would improve those factors which determine trend in livestock forage, specifically vigor and seedling establishment. Proposed management associated with the 21 AMPs, particularly the grazing systems and vegetation treatments, would also improve trend. However, the improvement would not occur until these facilities would be fully implemented and plant establishment occurred.

As a result of the proposed management and treatments, the following impacts to existing trend would occur: areas now in upward trend would improve from 85,262 to 594,398 acres, static trend areas would decrease from 1,178,368 to 699,287 acres, and areas in downward trend would decrease from 44,009 to 13,954 acres.

Forage Production

Proposed management in this alternative would improve forage production. Most of the improvement would occur from implementation of vegetation treatments. Although these treatments would disturb 22,781 acres, an additional 2,614 AUMs of forage would be expected upon successful establishment. These figures would be the minimum expected AUMs, and would be less than proposed (Chapter 2) because of the limited ability of the soils to support a seeding (Seeding Success in Appendix 21). Other management actions would not directly improve forage production because they would not greatly affect existing plant composition, but they would enhance forage quality. As a result, short-term forage production would remain at 137,551 AUMs, while long-term production would increase to 150,239 AUMs.

Riparian Vegetation

Although a reduction in livestock utilization to the surveyed capacity would occur, use of riparian areas by livestock would remain heavy when grazed. Desirable riparian vegetation such as willows and grasses would still be heavily utilized, resulting in little noticeable improvement in condition class over the present situation. Very poor condition riparian vegetation would decrease from 545 acres to 10 acres, poor condition would increase from 2,756 acres to 3,147 acres, fair condition would increase from 2,320 acres to 2,464 acres, while riparian vegetation in good and excellent condition would remain at 571 and 20 acres respectively.

Conclusion

Initially, 137,551 AUMs would be produced, but forage production would increase in the long term to 150,239 AUMs. Condition of riparian vegetation would decline slightly. Livestock forage condition and trend would be impacted as shown:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,344	124,344	Up	85,262	594,398
Fair	682,830	695,654	Static	1,178,368	699,287
Poor	500,465	487,641	Down	44,009	13,954

Rangeland Management Recommendation: ALTERNATIVE 5

In addition to a 1-percent reduction from the existing level of livestock use (68,895 AUMs) to the amount of available livestock forage (68,298 AUMs), seasonal adjustments, vegetation treatments affecting 52,557 acres (table 2-1), rangeland developments, and improved management practices (such as specific grazing systems, fences, water) would result in impacts to vegetation. The 536 acres of vegetation that would be impacted by construction of rangeland developments would be insignificant when compared to the total suitable acres in this alternative and the improvements that would result from more uniform distribution and utilization of forage achieved by these developments.

Specific vegetation categories would respond as follows:

Livestock Forage Condition

Livestock forage condition would be improved overall by the adjustment to grazing capacity, vegetation treatments, specific grazing systems, and rangeland developments proposed in this alternative. Specific management such as the implementation of grazing systems on 129 allotments would in most cases provide desirable forage species with an opportunity to complete growth and reproductive cycles more often than is now afforded by present continuous seasonal management. However, in a given year some grazing systems, such as rest rotation systems, may have greater than 50 to 60-percent average utilization in individual pastures. Buwai and Trlica (1977) suggest that multiple pasture grazing systems may be required to ensure that desirable forage plants receive rest following defoliation during critical growing periods. Furthermore, they conclude that it may be necessary to give important forage species periodic rest to ensure that they are not replaced by less desirable forage species that often can withstand heavier utilization.

Jenkins (1972) further cites a benefit of grazing systems, suggesting that periodic rest may be required to offset the selective grazing pressure placed on desirable forage species. According to Jenkins, adjustment in stocking level is not sufficient by itself to overcome these effects.

This proposed management would be beneficial to all forage species, especially vigor and seedling establishment for perennial grasses. The proposed grazing systems would result in an improvement in condition, and more importantly, would ensure that present conditions would at least be maintained. However, most improvement would occur from proposed vegetation treatments. Many authors such as Pechanec, et al., (1965), Dwyer (1975), and Potter et al., (1967) indicate that natural improvement in mature pinyon-juniper and sagebrush areas is limited. As a result, present vegetation composition must be altered for substantial improvements in forage condition to occur.

As a result of 14,161 acres of burning, 12,144 acres of chaining, 20,645 acres of spraying, and 5,607 acres of plowing, shifts in present composition would cause changes in forage condition classes. Successful treatments would replace less desirable forage species with perennial grass and browse species and result in an improvement in present forage conditions (Vegetation Treatment in Appendix 20 and Rangeland Condition in Alternative 4).

In the short term there would be some improvement, but most improvement would occur after implementation of grazing systems and successful establishment of vegetation treatments. This would be estimated to occur within 24 years if this alternative would be initiated.

Reduction to surveyed capacity, specific management on 129 allotments providing better season of use and periodic rest, and vegetation treatments on 52,557 acres would be expected to produce the following results: good condition areas would increase from 124,344 to 164,384 acres, fair condition areas would decrease from 682,830 to 678,551 acres, and poor condition areas would decrease from 500,465 to 464,704 acres.

Trend in Rangeland Condition

Vegetation treatments, specific grazing systems, adjustment to grazing capacity, and rangeland developments would cause the number of acres in an upward trend to increase and the number of acres in a downward trend to decrease. Perhaps the most important action that would affect trend would be the implementation of proposed grazing systems. These systems would improve vigor (an important trend factor) by allowing periodic rest and would provide the opportunity to/complete growth cycles. Rest would also enhance litter accumulation (another trend factor). As Jenkins (1972) indicates, under rotation grazing systems (similar to those proposed in Chapter 2) plants have an opportunity to make and store food, recover vigor, seeds can ripen, and seedlings have an opportunity to become established. Anderson (1969) also cites improvement in vigor resulting from proper grazing use.

Improvement would be most pronounced on 129 allotments that would have specific management systems and would be proposed for vegetation treatments. Most improvement would occur in the long term, when developments would be fully implemented and systems would be fully operational.

Some initial improvement would occur as a result of the reduction in level of livestock use (68,895 to 68,298 AUMs) and adjustment in present seasons of use.

As a result of management providing periodic rest, reduction to capacity, and better livestock distribution due to rangeland developments, the following improvement in trend would be expected: areas now in upward trend would increase from 85,262 to 667,396 acres, areas in static trend would decrease from 1,178,368 to 634,617 acres, and areas in downward trend would decrease from 44,009 to 5,626 acres.

Forage Production

Forage production would increase under this alternative. Implementation of improved rangeland management practices, particularly specific grazing systems and vegetation treatments, would increase production of livestock and wildlife forage.

Grazing systems would improve production, especially of desirable forage species which would respond favorably to periodic rest, and which are now heavily used. It is estimated that an additional 20,349 AUMs of forage would be produced as grazing systems would be implemented and supportive rangeland developments would be constructed. Recent literature indicates that management systems generally increase annual herbage production. One study (VanPoolen and Lacey, 1979) indicates that production increases an average of 13 percent. Martin and Whitfield (1973) also indicate that grazing systems are an added technique for improving and maintaining forage production and in the long term usually permit increased levels of stocking and increased production per acre.

Proposed vegetation treatments affecting 14,161 acres by burning, 12,144 acres by chaining, 20,645 acres by spraying, and 5,607 acres by plowing would also increase forage production by replacing less desirable forage species

(which do not contribute significantly to production) with desirable forage species (grass and browse). These treatments on 52,557 acres would result in increased long-term sustained production of 5,171 AUMs. Success of proposed treatments was evaluated using available soils information (Appendix 21). Appendix 20 describes how this evaluation was used in the vegetation analysis. Basically, this data indicates the most realistic degree of success that would be expected and the AUM figures noted above would be minimum amounts. It would be possible to increase forage production from vegetation treatments (toward proposed levels in Chapter 2) by on-the-ground examination, site selection, and selection of treatment methods. This would occur prior to the writing of the final AMP.

Projected increases would be available in the long term upon successful implementation of proposed management. Short-term increases would not be expected, although proposed management would likely improve forage quality.

Forage production would be 137,551 AUMs in the short term. In the long term, management (primarily grazing systems), water developments, access, and vegetation treatments would increase forage production to 163,071 AUMs.

Riparian Vegetation

Although specific management systems would be implemented on 129 allotments, proposed management would not adequately protect existing riparian vegetation. Reduction in livestock numbers, rest from spring grazing, and improved livestock distribution would relieve some grazing pressure in the riparian zones. The management changes would be sufficient to improve herbaceous vegetation during the rest periods, but periodic heavy utilization by livestock and continuous heavy utilization by wildlife would prevent long-term improvement. As a result, riparian areas in very poor condition would decrease from 545 acres to 10 acres, areas in poor condition would increase from 2,756 acres to 3,046 acres, 2,320 acres in fair condition would increase to 2,565 acres, and 571 acres in good condition and 20 acres in excellent condition would be maintained in their current condition.

Conclusion

Forage production would increase from 137,551 AUMs in the short term to 163,071 AUMs in the long term. Condition of riparian vegetation would decline slightly over existing conditions. Impacts to livestock forage condition and trend would be:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,344	164,384	Up	85,262	667,396
Fair	682,830	678,551	Static	1,178,368	634,617
Poor	500,465	464,704	Down	44,009	5,620

Livestock Optimization: ALTERNATIVE 6

Impacts of this alternative would be closely related to those in Alternative 5 due to similar implementation procedures developed for this

alternative (Chapter 2). The primary difference in this alternative would be the additional vegetation treatments proposed on 184,005 acres (table 2-1). As a result, initial adjustments in the season and level of use, implementation of specific management (grazing systems), rangeland developments, and vegetation treatments would impact vegetation.

Livestock Forage Condition

Since the same management actions and vegetation treatments would be implemented in this alternative as were described in Alternative 5, impacts to forage condition would be similar. There would be an improvement in forage condition, and as explained in Alternative 5, vegetation treatments would be primarily responsible for this improvement. However, under this alternative there would be 57,240 acres of chaining, 47,242 acres of burning, 51,688 acres of spraying, and 27,835 acres of plowing (vegetation treatments approximately 2.5 times that proposed in Alternative 5), in addition to the 52,557 acres of treatment proposed in Alternative 5 (a total of 236,652 acres). Therefore the magnitude of improvement in forage condition would be much greater. Plant composition would be changed by replacing less desirable forage plants with desirable forage species (grass and browse). This would result in the following impacts to forage condition: areas now in good condition would improve from 124,344 to 252,667 acres, fair condition areas would decrease from 682,830 to 596,932 acres, and poor condition areas would decrease from 500,465 to 458,040 acres.

Trend in Rangeland Condition

Impacts to trend under this alternative would be similar to those in Alternative 5. The two actions that would affect trend the most would be implementation of grazing systems that provide periodic rest, and the 236,562 acres of vegetation treatments. An increase in litter accumulation and improvement in desirable forage species vigor and seedling establishment (Alternative 5) would increase areas in upward trend from 85,262 to 664,087 acres. Areas in static trend would decrease from 1,178,368 to 637,926 acres, and downward trend areas would be reduced from 44,009 to 5,626 acres.

Forage Production

As in Alternative 5, 137,551 AUMs of forage would be produced initially. In the long term, management, water developments and treatments would result in an additional 46,001 AUMs of forage being produced. Management and attendant impacts would be the same as for Alternative 5. Vegetation treatment projects occurring on 236,562 acres would contribute most toward the increased forage production. The limitation on success resulting from inherent soil characteristics would restrict the amount of forage production increases expected. This is discussed in more detail in Alternative 5 and Appendix 21.

Riparian Vegetation

The impacts and array of acres in very poor, poor, fair, good, and excellent condition would be the same as Alternative 5.

Conclusion

There would be 137,551 AUMs produced initially, and 183,552 AUMs produced in the long term. Riparian vegetation condition would decline slightly. Livestock forage condition and trend would be impacted as shown:

<u>Condition</u>	<u>Acres</u>		<u>Trend</u>	<u>Acres</u>	
	<u>From</u>	<u>To</u>		<u>From</u>	<u>To</u>
Good	124,344	252,667	Up	85,262	664,087
Fair	682,830	596,932	Static	1,178,368	637,926
Poor	500,465	458,040	Down	44,009	5,262

Unavoidable Adverse Impacts

Under Alternative 1, utilization occurring above proper physiological limits on approximately 100 allotments would have an adverse impact on condition, vigor, and trend of vegetation.

Nearly 1,168 acres of vegetation under Alternative 2 and 150 acres under Alternative 3 would be disturbed for up to 9 years due to fencing.

Rangeland developments including fences, tanks, and pipelines would disturb 292 acres of vegetation for up to 9 years and 33 acres in the long term in Alternative 4. Treatments affecting 22,781 acres would also be implemented in this alternative.

In both Alternatives 5 and 6, rangeland developments would disturb 535 acres of vegetation for up to 9 years and 33 acres in the long term. In Alternative 5, 52,557 acres of treatments would occur, while 236,652 acres of vegetation would be affected by treatments in Alternative 6.

Short-Term Uses and Long-Term Productivity

A decline in the condition, vigor, and trend of vegetation as a result of overutilization of forage by livestock under Alternative 1 would cause a loss of production from 137,551 AUMs to 129,884 AUMs within the 24-year management period. This production loss would continue into the long term. As a result of elimination of livestock, forage production would be expected to increase from 137,551 AUMs to 151,959 AUMs in the management period and then stabilize in the long term in Alternative 2. Elimination of livestock from riparian areas and reduced utilization by livestock in other areas under Alternative 4 would result in an increase in production of forage in the 24-year management period to 137,947 AUMs, with gradual stabilization in the long term.

Forage production would increase in the 24-year management period to 149,474 AUMs in Alternative 4, 163,071 AUMs in Alternative 5, and 183,552 AUMs in Alternative 6 as a result of rangeland developments, management, and treatments. A gradual stabilization of forage production in the long-term would be expected to occur at a level slightly above that anticipated in the 24-year management period.

Irreversible/Irretrievable Commitment of Resources

The reduction in forage production expected under Alternative 1 would result in an irretrievable loss in annual production of forage.

A potential 9-year disturbance of vegetation as a result of fencing would occur on 1,168 acres in Alternative 2 and 150 acres in Alternative 3. This would result in an irretrievable loss of annual production of forage for the period required to revegetate the sites.

Rangeland developments disturbing 292 acres for up to 9 years and 33 acres in the long term would result in an irretrievable loss of production in Alternative 4. In Alternatives 5 and 6 there would be an irretrievable loss of production for up to 9 years on 535 acres, and a long-term irretrievable loss on 33 acres due to rangeland developments. Treatments would affect 22,781 acres in Alternative 4, 52,557 acres in Alternative 5, 236,652 acres in Alternative 6, and would result in an irretrievable loss in annual production until sites would be revegetated.

IMPACTS TO SOILS

Impacts to the soil resources in the K/E EIS area were determined by analyzing the following three areas:

1. Areas in critical and severe erosion condition;
2. Areas with high or very high sediment yields;
3. Areas of special concern (see Chapter 3, Soils).

These areas are considered to be the most important in terms of soil loss or are required to be addressed by Executive Orders 11988 and 11990. Due to these considerations, major emphasis in the inventory and planning stages was placed on these areas. For additional rationale, see BLM Manual 7250, 7000.3; SSF methodology 7310-12; and Stoddart et al. (1975).

Anticipated changes in vegetation ground cover, composition, and intensity of use are factors that would influence impacts to soils. Other factors considered in the analysis include changes in season of use, distribution of use, developments (placement and disturbance), treatments, and seeding success.

The following discussion examines each alternative based on the three areas delineated above. However, since the alternatives do not prescribe intense erosion control practices, many areas would continue to have major erosion and sedimentation problems. Especially critical in this regard are the steep, highly incised gullies prevalent throughout the region that are subject to natural geologic erosion (Heede, 1976).

While present erosion condition and sediment yield classes are available by allotment, specific values for the anticipated changes in soil erosion cannot be determined due to a lack of suitable predictive models and the

large number of variables such as climatic factors encountered under field conditions. In addition, correlations of soil and vegetation types in this analysis are lacking (except on treatments) due to a lack of detailed soils information over much of the EIS area (Soils, Chapter 3). Furthermore, generalizations of the erosive characteristics of general soil-vegetation complexes would not take into account the highly variable soils, topographic, climatic, and management factors present throughout the EIS area. For these reasons, anticipated changes in soil erosion are given in terms of "more" or "less" erosion. It is recognized that these are subjective terms and the predicted impacts are less precise than desired.

Continuation of Present Management: ALTERNATIVE 1

This alternative would result in the continuation of existing conditions and trends. Of the 309,519 acres in critical condition (table 4-2), approximately 82 percent or 255,752 acres would remain in a static situation due to present trend data which indicates no erosion condition change (i.e., utilization, soil surface factors, livestock forage condition, etc.). Vegetation analysis (Chapter 4) indicates that under this alternative there would be a net downward apparent trend on 157,950 acres. Of this, 45,142 acres in critical erosion condition (15 percent) would continue to decline over the long term, due to present declining trends which are primarily the result of overstocking, greater than moderate utilization, and continued heavy grazing in floodplains, riparian areas, and 59 miles of drainages with existing erosion problems (table 4-2). Research by Dunford (1949), Smeins (1975), Lusby (1970), and Thomas et al. (1979) indicates that grazing at greater than moderate utilization (40 to 60 percent), grazing in gullies (versus nongrazing) and "improper grazing practices" in riparian areas would cause accelerated erosion and soil loss. ("Improper grazing practices" was not defined in the latter study.)

In contrast, under this alternative 8,625 acres in critical erosion condition (3 percent) would improve. This conclusion is based on present upward trend information which indicates that moderate or less forage utilization and grazing management on 9 miles of eroded drainages were improving forage conditions (Vegetation, Chapter 4).

Furthermore, based on the factors described above, existing grazing management of areas with high sedimentation (which includes moderately and slightly saline soils) would reduce soil loss on 2,496 acres (2 percent), increase soil loss on 15,125 acres (12 percent), and not change the situation on 105,725 acres (86 percent) (table 4-2).

Conclusion

This alternative would continue present trends. This would result in an increase in soil loss on 45,142 acres in critical erosion condition and 15,125 acres with high sediment yields. In addition, soil loss would be reduced on 8,625 acres in critical erosion condition and 2,496 acres with high sediment yields. Soil loss on the remaining area in each category, 255,752 acres and 105,725 acres respectively, would not be expected to change.

TABLE 4-2

Summary of Impacts to Soil Resources by Alternative
Planning Multiple Use

Area of Concern	Condition	Existing Situation	ALTERNATIVES					
			1	2	3	4	5	6
Areas in critical erosion condition (acres)	Improve	8,625	211,366	165,890	143,972	104,725	101,731	
	No change	309,519	98,153	142,204	^a 157,209	^b 202,281	^c 150,744	
	Decline	45,142	0	1,425	11,986	13,525	86,432	
Areas with very high sediment yields (acres)	Improve	2,496	77,136	61,692	54,659	50,553	48,311	
	No change	123,346	46,210	61,654	^a 61,587	^b 72,599	^c 59,079	
	Decline	15,125	0	0	10,748	12,708	45,344	
Drainage channels with erosion problems (miles)	Improve	9.3	227.9	227.9	^d 74.7	^d 59.3	^d 59.3	
	No change	^e 287.7	219.6	59.8	162.7	184.1	170.4	
	Decline	58.8	0.0	0.0	50.3	44.3	58.0	

Source: URA, Watershed, all planning units, 1975-79; Soils Technical Report; Individual Allotment Analysis.

- ^aIncludes 3,648 acres presently in moderate erosion and sediment yield categories that would be in critical erosion and high sediment yield categories within 24 years.
- ^bIncludes 11,012 acres presently in moderate erosion and sediment yield categories that would be in critical erosion and high sediment yield categories within 24 years.
- ^cIncludes 29,388 acres presently in moderate erosion and sediment yield categories that would be in critical erosion and high sediment yield categories within 24 years.
- ^dThe decline of channel miles in Alternatives 4, 5, and 6 is primarily due to the 38.0 miles in the Escalante River Allotment which would remain in a no change condition under Alternative 1 (1,067 AUMs average licensed use) and would decline under Alternative 4 (2,737 proposed AUMs) and Alternatives 5 and 6 (3,061 proposed AUMs).
- ^eDoes not include 26.1 miles of channel in unallotted areas.

Elimination of Livestock Grazing: ALTERNATIVE 2

Based on the elimination of all livestock grazing and subsequent trampling, soil compaction, and cover reductions, up to 211,366 acres or 68 percent of the acres in critical erosion could improve in the long term. Branson et al. (1975) state that "grazing animals remove protective plant cover and compact the soil surface" and that "both of these actions affect the infiltration rate". With livestock removal, these effects would be eliminated. In addition, reduced utilization rates (especially of heavily grazed and riparian areas) would contribute to improvement in vegetation cover and subsequent soil erosion conditions (Dunford, 1949; Smeins, 1975; Rhoades, 1964; Thomas, 1979). See table 4-1 for additional information.

Based on vegetation analysis (Chapter 4), and the above sources, this alternative would improve conditions on all heavily grazed floodplains, on all areas with critical erosion conditions and heavy use, and on 228 miles (80 percent) of the eroded drainages. The remaining 20 percent of the eroded drainages (60 miles) would not respond solely to livestock removal since no intensive erosion control practices would be prescribed (Soils, Chapter 4). In addition, 77,136 acres or 63 percent of the acres in the high sediment yield category with slightly saline soils would improve. However, based on field observations during the range inventory, it would be expected that an additional 98,153 acres in critical erosion condition and 46,210 acres with high sediment yields and moderately saline soils would continue in their existing condition since their inherent erodibility, slope, or accelerated degree of erosion would not respond to livestock removal alone. These factors are not management controlled (Soils, Chapter 3).

Conclusion

Alternative 2 would reduce soil loss on 211,366 acres in critical erosion condition and 77,136 acres with high sediment yields.

Multiple Resource Enhancement: ALTERNATIVE 3

Management offered by this alternative includes reduction in livestock numbers, changes in season of use to less erosive periods (winter), reduction in utilization to moderate or less, and fencing to protect riparian and floodplain acres (Appendix 5). As discussed in Alternatives 1 and 2, research indicates that greater than moderate utilization is detrimental to erosion and soil surface conditions. Van Poolen and Lacey (1979) indicate that herbage production responses to livestock number reductions were more significant than those attributable to grazing systems. In addition, these reductions appeared to "become increasingly important as a management tool" in the arid southwest as a means of improving forage production and vegetation cover (Vegetation, Chapter 4; Climate, Chapter 3).

Approximately 54 percent of the total acres in critical erosion condition (165,890 acres) would be improved by the management offered in this alternative over the long term. This includes improvement due to livestock number reductions on areas in critical erosion with heavy use and on all floodplain acres (31,061 acres) and eroded drainages (228 miles) capable of improvement under this management. Proposed increased utilization on 1,425

acres in critical erosion (less than 1 percent) would result in further decline to these areas. There would be 142,204 acres in critical erosion condition (46 percent) that would not be significantly affected by management since livestock numbers, season of use changes, or livestock distribution would not change significantly enough to alter existing conditions. Although these changes would begin immediately upon implementation, the full effects of the proposal would not be evident until the end of the 24-year management period. Based on Vegetation analysis (Chapter 4), range survey data, and the literature sources cited above, similarly corresponding figures for areas with slightly and moderately saline soils and high sediment yields would be 61,692 acres (50 percent) with possible improvement and 61,654 acres (50 percent) with no change in status. No areas in the high sediment yield category would decline under this proposal.

Conclusion

Alternative 3 would reduce soil loss on 165,890 acres in critical erosion condition and on 61,692 acres with high sediment yields. In contrast, 1,425 acres in critical erosion condition would worsen under this proposal. The remaining acreage in each category, 142,204 acres and 61,654 acres respectively, would have no change in present rates of soil loss.

Adjustment to Grazing Capacity: ALTERNATIVE 4

This alternative would adjust livestock numbers to the surveyed grazing capacity. The only other management changes proposed would be on the 21 existing AMPs. Under these AMPs, 7,140 acres proposed for chaining would have minor short-term (2 to 3 years) soil losses until seeding establishment or native vegetation reestablishment occurred (Alternative 5). In addition, 563,546 suitable Federal acres in 15 allotments would have proposed rest rotation systems with average allotment utilizations of 50 percent. Individual pasture utilizations, however, may exceed moderate use when grazed and may have accelerated soil loss (see discussion of rest rotation systems in Alternative 5). Based on a review of the literature (Alternative 5), the 5,898 acres proposed for spraying and the 1,665 acres of plowing treatment would have minimal effects on sediment production since present design restrictions (Appendix 3) would be followed. The 8,078 acres of burning proposed in this alternative would have increased soil erosion for at least 1 or 2 years, until vegetation cover reached preburn levels and percent bare soil was reduced (Ffolliott and Thorud, 1975). Based on this analysis and on reductions of livestock numbers, approximately 143,972 acres (46 percent) of the acres in critical erosion could improve. This would include improvement on 3,917 acres (13 percent) of floodplain with heavy use, 3,908 acres (27 percent) of critical erosion with heavy use, and 75 miles (26 percent) of the eroded drainages (Alternative 3 this section, and Vegetation, Chapter 4.) However, 11,986 acres in critical erosion (4 percent) and 50 miles of eroded drainages (17 percent) with proposed increases in livestock numbers would decline under this proposal. Also 157,209 acres (50 percent) and 163 miles (57 percent) of eroded drainages would not significantly change in condition over the long term. Again, results in this latter category would be due to little proposed change from present management on areas in stable critical erosion conditions and on the remaining floodplain acres. However, site specific soils analysis would mitigate soil losses (Appendix 3) in areas

proposed for treatment, and the declining figures mentioned represent the maximum acreage with increased soil loss (see Alternative 5 for further discussion). Although these changes would begin with the initial implementation of this proposal, the effects listed would not be evident until after 24 years of management. Again, based upon the above analysis, Vegetation analysis (Chapter 4), range survey information, and literature sources cited previously, areas with high sediment production and moderate and slightly saline soils would show similar trends as above, with 54,659 acres (43 percent) with improved conditions, 10,748 acres (8 percent) with further declines, and 61,587 acres (49 percent) without foreseeable change in status.

Conclusion

Alternative 4 would result in a reduction of soil loss on 143,972 acres in critical erosion condition and 54,659 acres with high sediment yields. In addition, 11,986 acres in critical erosion condition and 10,748 acres with high sediment yields would have increased soil loss. No change in present rates of soil loss would be expected on the remaining acreage in each category (157,209 acres and 61,654 acres respectively).

Rangeland Management Recommendation: ALTERNATIVE 5

This proposal would utilize a combination of livestock number adjustments, season of use changes, vegetation treatments, developments (water, fences, etc.), and rangeland management systems.

Increased soil erosion would be anticipated to occur on 14,161 acres proposed for burning for at least 1 and perhaps 2 years after treatment. This would occur as a result of reducing surface litter, destroying soil organic matter, and subsequently exposing large amounts of bare soil to the erosive effects of summer rain storms while the newly seeded plants were becoming established (Wells et al., 1979). Such storms cause most of the floodwater damage, surface erosion, and arroyo formation on western rangelands (Branson et al., 1975). Burning restrictions as proposed in Appendix 3 would reduce impacts.

Spraying, on the other hand, would produce minimal disturbance to the soil surface since debris would be left in place. In addition, the direct impacts to soils from the application of 2,4-D would be of short duration since the herbicide would be quickly degraded in 2 to 6 weeks and would not accumulate in the soil (Vegetation Management with Herbicides in the Eastern Region, Final ES, USDI, BLM, 1978; East Roswell Grazing Environmental Statement, Final ES, USDI, BLM, 1979). Therefore, only insignificant soil losses would be expected on the proposed 20,645 acres of spraying.

Lusby (1979) looked at the effects of converting sagebrush cover to grass on four small watersheds in Colorado and determined that sediment yield from the two converted watersheds was reduced nearly 80 percent from those of the two untreated watersheds. However, this study did not look at the effects of subsequent grazing on the four watersheds. Studies by Blackburn and Skau (1974) and Gifford and Busby (1974) have shown that only minor reductions of sediment production resulted from plowing. Thus, if there would be impacts to sediment production in the EIS area from the 5,607 acres of plowing treatments, they would be minimal and short term.

In the EIS area, 12,144 acres of proposed pinyon-juniper chainings would have initial (2 to 3-year) increases in soil loss. However, over longer periods of time, studies in southern Utah have demonstrated no consistent decrease or increase in sediment yields following chaining of pinyon-juniper and seeding to grass. Only when the slash debris is windrowed following chaining would there be potential for increased runoff and sediment yields (Gifford et al., 1970). No windrowing would be proposed under this alternative. Therefore, soil losses on the 12,144 acres of chaining should be only short term and insignificant.

It appears quite likely that the short-term increases in erosion noted above would increase both in duration and intensity if the newly seeded plants failed to mature properly. In order to determine the probability of this happening, the Soil Conservation Service Interim Guide was used for rating soils for their seeding suitability (Appendix 21). The severity of the impact would depend on the degree of seeding failure experienced on a particular area. However, due to site specific soils analysis required prior to treatment (Appendix 3), failure would be less likely than predicted based on the general soils information utilized for Appendix 21. The site specific soil analysis would look at pertinent edaphic factors (rooting depth, soil texture, etc.) and would eliminate areas determined to be unsuitable for seeding. In addition, if seeding failure did occur due to unpredictable factors such as weather conditions, mitigation in Appendix 3 would provide for subsequent retreatment or reseedling.

Sturges (1975) indicates that few methods of sagebrush treatment permanently eradicate the brush. Since not all plants are killed by treatment, the remnants provide a seed source. Heady and Bartolome (1977) also found that the apparent reinvasion on treated sites was from surviving plants. In nearly all treatment projects, ample big sagebrush remains after treatment to allow for reinvasion. From this evidence it would seem certain that some natural reestablishment would occur. It is estimated that pretreatment cover levels would occur within 5 years, although there are no studies available that substantiate this timeframe. Such a situation would not reduce present erosion rates, but merely return them to pretreatment levels.

Reestablishment of the pinyon-juniper overstory would not appear likely in the short-term (1 to 7 years). However, the removal of the soil moisture competition of this vegetation type may increase the amount of soil moisture available to understory vegetation (Skau, 1964; Tausch and Tueller, 1977). Therefore, soil losses due to reduction of overstory cover may be mitigated by increased understory cover.

Rest rotation systems with average allotment utilizations of 50 percent (moderate) may have grazed pastures with greater than moderate utilization when grazed. Under this alternative, 798,114 suitable Federal acres in 36 allotments would have proposed rest rotation systems (Chapter 2). Research by Dunford (1949), Smeins (1975) and Johnston (1962) indicates that grazing at greater than moderate utilization would cause accelerated erosion and soil loss. However, a review of the literature on the impacts of rest rotation systems on watershed values (infiltration, sedimentation, etc.) has shown a definite lack of research in this area (Gifford and Hawkins, 1976). Recent research on the effects of rest rotation systems in riparian areas indicates

that the increased trampling and trailing potential of this system may accelerate streambank erosion and instability (Meehan and Platts, 1978). In addition, Busby (1979) states that rest rotation systems "seem to work well when precipitation exceeds 15 to 20 inches per year and is predictably distributed. Both of these requirements are necessary to insure that the rest period will result in soil and vegetation recovery." Climate (Chapter 3) indicates that precipitation in the K/E EIS area is highly variable and varies from 9 to 15 inches annually.

Based on the review above, Vegetation (Chapter 4), and literature discussed in Alternatives 1 through 4, approximately 104,726 acres (33 percent) in critical erosion condition could improve. Livestock number reductions, season of use adjustments, treatment success, and distribution changes (due to water developments and fence construction), would all contribute to this improvement. In addition, this would include improvement on approximately 17 percent of the heavily grazed floodplains and critical erosion acres (5,254 acres and 2,498 acres respectively) and on 59 miles of eroded drainages (table 4-2). However, nearly 202,281 acres (63 percent) in the critical erosion category and 184 miles of the eroded drainages would not change significantly due to only minor management changes on stable areas. An additional 13,525 acres in critical erosion in 13 allotments would decline, based on increased utilization of areas in critical erosion, livestock number additions, treatments on frail watersheds, etc. However, site specific soil analysis may mitigate soil losses (Appendix 3) in areas proposed for treatment and figures given represent the maximum acreage with increased soil loss. Again, acres with moderate and slightly saline soils and high sediment yields would show similar trends, with 50,553 acres with reduced soil loss, 12,708 acres with increased losses, and 61,587 acres remaining in the no change category. (See Alternative 3 for a discussion of the effects of livestock number reductions.)

Conclusion

Alternative 5 would result in a reduction in soil loss on 104,725 acres in critical erosion condition and 50,553 acres with high sediment yields. Soil loss would increase on 13,525 acres in critical erosion and on 12,708 acres with high sediment yields. No change in the existing rate of soil loss would be expected on 202,281 acres and 71,097 acres of the respective categories.

Livestock Optimization: ALTERNATIVE 6

This alternative would be based on maximizing livestock forage by completing an additional 57,240 acres of chaining, 47,242 acres of burning, 51,688 acres of spraying, and 27,835 acres of plowing. As discussed in Alternative 5, only minor short-term soil loss (2 to 3 years) would be anticipated on these treatments until seedings (162,695 acres) or natural reestablishment of the native vegetation occurred. Minimum seeding success for this alternative would only be 49 percent (Appendix 21) since many treatments would be proposed in areas with limiting edaphic factors. In addition, 798,114 total Federal acres in 36 allotments (Chapter 2) would have proposed rest rotation systems with average allotment utilizations of 50 percent. Individual pasture utilizations, however, may exceed moderate utilization

when grazed, and may accelerate soil loss, especially in susceptible soils (riparian and areas of critical erosion, Alternative 5). As a result, nearly 26 percent of the areas in critical erosion (86,432 acres) and 58 miles of eroded drainages would decline with livestock number increases, treatment failures, and increased use on frail soils over the long term. (See the discussion of the effects of livestock number adjustments in Alternative 3 and the effects of treatments in Alternative 5.) However, site specific soils analysis (Appendix 3) would mitigate soil losses in areas proposed for treatment. Therefore the figures given represent the maximum acreage with increased soil loss (Alternative 5).

Approximately 30 percent of the acreage in critical erosion condition (30 percent) could improve due to better livestock distribution, increased vegetation cover, reduced livestock numbers, and season of use improvements (table 4-1 and Vegetation, Chapter 4). Much of this improvement would result from better management and reduced livestock numbers on 4,993 acres (16 percent) of the heavily grazed floodplains and 2,498 acres (17 percent) of heavily grazed critical erosion areas. In addition, 59 miles (21 percent) of the eroded drainages would also improve over the management period due to reduced livestock numbers.

No predictable change would occur on 170 miles (59 percent) of eroded drainages or on 150,744 acres (44 percent) in critical erosion condition since present trends (utilization, apparent trend, soil surface factors, etc.) are static in these areas and no significant management change would be proposed.

Based on the analysis above, salinity and sediment production would be increased on 45,344 acres with high sediment yields (26 percent), reduced on 48,311 acres (30 percent), and not changed on 59,079 acres (44 percent).

Conclusion

Alternative 6 would result in a reduction of soil loss on 101,731 acres in critical erosion condition and on 48,311 acres with high sediment yields. However, soil loss would increase on 86,432 acres in critical erosion condition and on 45,344 acres with high sediment yields. No change would be expected on the remaining acreage of each category (150,744 acres and 59,079 acres respectively).

Unavoidable Adverse Impacts

The following unavoidable adverse impacts would occur to the soils resource as a result of implementing the alternatives. Alternative 1 would result in increased erosion on 45,142 acres and increased sediment yield on 15,125 acres. Implementation of Alternative 2 would not cause any unavoidable adverse impacts to soils. Alternative 3 would cause increased sediment yield on 1,425 acres. Alternative 4 would increase erosion on 11,986 acres and increase sediment yield on 10,748 acres. Implementation of Alternative 5 would cause increased erosion on 13,525 acres and increased sediment yield on 12,708 acres. Alternative 6 would result in 86,432 acres of increased soil erosion and 45,344 acres of increased sediment yield.

Short-Term Uses and Long-Term Productivity

The proposed allocation of forage, vegetation treatments, and rangeland developments in each alternative would result in the following changes in the long-term soil productivity. Implementation of Alternative 1 would result in the following to areas in critical erosion condition: improvement on 8,625 acres, decline on 45,142 acres, and no change on 255,752 acres. In areas of high sediment yield there would be more soil loss on 15,125 acres, less soil loss on 2,496 acres, and no change on 105,725 acres.

Implementation of Alternative 2 would result in improvement on 211,366 acres in critical erosion condition and no change on 98,153 acres in critical erosion condition. There would be less soil loss on 77,136 acres with high sediment yield, and no change in soil loss on 46,210 acres with high sediment yield.

Areas in critical erosion condition would be affected as follows under Alternative 3: improvement on 165,890 acres, decline on 1,425 acres, and no change on 142,204 acres. On areas with high sediment yield there would be less soil loss on 61,692 acres and no change on 61,654 acres.

Under Alternative 4, areas in critical erosion condition would be affected as follows: improvement on 143,972 acres, decline on 11,986 acres, and no change on 157,209 acres. In areas of high sediment yield there would be less soil loss on 54,659 acres, more soil loss on 10,748 acres, and no change on 61,587 acres.

Implementation of Alternative 5 would affect areas in critical erosion condition as follows: improvement on 104,725 acres, decline on 13,525 acres, and no change on 202,281 acres. Areas of high sediment yield would be affected as follows: 50,553 acres would have less soil loss, 12,708 acres would have more soil loss, and 72,599 acres would not change.

Under Alternative 6, areas in critical erosion condition would be affected as follows: improvement on 101,731 acres, decline on 86,432 acres, and no change on 150,744 acres. On areas of critical erosion there would be less soil loss on 48,311 acres, more soil loss on 45,344 acres, and no change on 59,079 acres.

Where improvement in critical erosion areas and a reduction in soil loss would occur, an improvement in long-term soil productivity would be anticipated. Where a further decline in critical erosion areas and an increase in soil loss would occur, the long-term soil productivity would be expected to decline.

Irreversible/Irretrievable Commitment of Resources

The soil losses as shown in table 4-2 in Alternatives 1, 4, 5, and 6 would result in an irreversible and irretrievable loss.

IMPACTS TO WATER RESOURCES

Implementation of the proposed management plans would produce little change in existing water resources. The water consumptively used for livestock grazing would not change significantly, although new water developments in Alternatives 3, 4, 5, and 6 would distribute the water use more evenly than at present.

Impact on Water Quality

The following discussion evaluates relative water quality impacts that would be expected in each alternative. Water quality data is insufficient to allow for quantification of these impacts. However, changes in riparian vegetation due to grazing as analyzed in Chapter 4, Vegetation, can be used as an indicator of adjacent stream water quality (Thomas et al., 1979; Meehan and Platts, 1978; Johnson et al., 1978). Only public water supplies are monitored at regular intervals. The only periodically monitored BLM water quality stations within the EIS region are at Calf Creek Campground (spring) and Paria Primitive Area (well), neither being directly affected by livestock grazing.

Continuation of Present Management: ALTERNATIVE 1

Under this alternative, existing water quality trends would not be altered since no management change would be effected during the 24-year management period. Large sediment loads and high total dissolved solids would continue to remain water quality problems in the EIS area. For example, in riparian areas with declining apparent trends (vigor, condition, soil surface factors, etc. due primarily to heavy grazing), approximately 75 stream miles (21 percent) would have a reduction in water quality due to suspended sediment and total dissolved solids increases. (See table 4-3 for a summary of the existing situation in riparian zones.) On the other hand, water quality should continue to improve in 24 stream miles (7 percent) with upward apparent trends. No change in water quality would occur in the remaining 250 stream miles where utilization of riparian vegetation and natural water quality condition would remain constant.

The direct impact to water quality from livestock grazing, primarily due to increases in coliform bacteria counts, would be slight except in areas of livestock concentrations (riparian or wet zones). Most coliform bacteria contamination from livestock comes from use in or directly adjacent to the stream. Thus, downstream coliform bacteria levels would increase during periods of grazing and would decline when livestock are removed (Johnson et al., 1978). However, no data on increased coliform counts due to livestock grazing is available in the EIS area.

Most of the grazing impacts related to water quality would be secondary impacts caused by a reduction in vegetation, compaction of soils, and destruction of streambanks and riparian vegetation. These actions would increase runoff and streambank sloughing, causing increases in suspended sediment, total dissolved solids, and salt concentrations (Thomas et al., 1979). However, quantification of these impacts requires continual monitoring to capture peak flow effects. No continuous sediment or total dissolved solids data is available in the EIS region.

TABLE 4-3

Summary of Impacts to Water Quality

Planning Unit	Existing ^a Situation	Condition	MILES OF STREAM				
			Alternatives				
			1	2 and 3	4	5	6
Canaan Mountain	19.0	Improve	0	18.9	10.0	10.5	10.5
		Static	6.3	0.1	8.0	8.5	8.5
		Decline	12.7	0	1.0	0	0
Escalante	156.9	Improve	0	126.9	25.6	19.4	19.4
		Static	137.3	30.0	81.8	102.5	102.5
		Decline	19.6	0	49.5	35.0	35.0
Paria	117.6	Improve	13.3	115.5	20.3	23.0	23.0
		Static	91.6	2.1	95.2	92.5	92.5
		Decline	12.7	0	2.1	2.1	2.1
Vermilion	37.9	Improve	4.2	31.2	21.2	21.2	21.2
		Static	12.3	6.7	12.5	12.5	5.3
		Decline	21.4	0	4.2	4.2	11.4
Zion	18.0	Improve	6.5	14.2	9.1	9.1	9.1
		Static	3.3	3.8	6.9	6.9	6.9
		Decline	8.2	0	2.0	2.0	2.0
TOTALS	349.4	Improve	24.0	306.7	86.2	83.2	83.2
		Static	250.8	42.7	204.4	222.9	215.7
		Decline	74.6	0	58.8	43.3	50.5

Source: URA, Wildlife, all planning units, 1975-79.

^aTotal mileage listed in the existing situation includes stream miles in unallotted areas which would not be affected by the proposed alternatives.

Conclusion

Under Alternative 1, water quality would improve in 24 stream miles, decline in 75 stream miles, and not change in 250 stream miles.

Elimination of Livestock Grazing: ALTERNATIVE 2

Water quality improvement would be expected in 307 stream miles (88 percent of the total) in 54 allotments (table 4-3). Due to the elimination of livestock grazing and the subsequent vegetation response over the 24-year management period, the problems associated with grazing (TDS, sediment, coliform bacteria) (Thomas et al., 1979) would be eliminated (Vegetation, Chapter 4). No water quality improvement would be expected in the remaining 42 stream miles which presently have good water quality or are subject to natural salt and sediment-related water quality problems (e.g., Paria River and Henderson Creek).

Conclusion

Under this alternative, water quality would improve in 307 stream miles and remain unchanged in 42 miles. No stream miles would have reduced water quality.

Multiple Resource Enhancement: ALTERNATIVE 3

With protection of all riparian zones and identified floodplains (Appendixes 13 and 17) water quality would be expected to improve in 54 allotments and 307 stream miles (88 percent of the total stream miles). Proposed reduction of existing use would improve cover, especially litter. Livestock concentration in riparian areas would be reduced. Improvement in water quality would occur with reduced sedimentation rates, although the amount of the improvement cannot be quantified (see previous discussion in Alternatives 1 and 2). Areas of improvement would include the five rest rotation systems with reduced utilization, 134,682 acres of Glen Canyon National Recreation Area (GCNRA), and 44,250 acres of Outstanding Natural Areas recommended for exclusion of grazing (Appendix 5).

No change would be expected in water quality in 42 stream miles (12 percent) where water quality would not be related to grazing or where livestock management would not change substantially (see Alternative 2 for additional rationale).

Conclusion

With the implementation of this alternative, water quality would improve in 307 stream miles. No stream miles would decline under this alternative, however, water quality in 42 stream miles would not change.

Adjustment to Grazing Capacity: ALTERNATIVE 4

This alternative would be primarily based on the adjustment of livestock numbers to surveyed capacity, although 22,781 acres of treatments under 21 AMPs would be completed (7,140 acres of chaining, 8,078 acres of burning,

5,898 acres of spraying, and 1,665 acres of plowing). As discussed in Alternative 5, the water quality effects of these treatments would primarily be short term, but would depend on general factors including seeding success, site characteristics, and subsequent storm and grazing conditions. Thus, the amount of water quality change due to these treatments would be unknown. Based on livestock number reductions in riparian zones (where utilization would be reduced sufficiently to allow riparian vegetation to recover [Vegetation, Chapter 4]), approximately 86 stream miles (25 percent) would improve. However, 59 stream miles (17 percent) with increased livestock numbers and concentrations would decline under this proposal. Water quality in the remaining 204 stream miles (58 percent) would not change significantly because present management practices would continue and present riparian apparent trends are stable (see riparian analysis in Chapter 4, Vegetation).

Conclusion

Alternative 4 would improve water quality in 86 stream miles, reduce water quality in 59 stream miles, and not affect present water quality in 204 stream miles.

Rangeland Management Recommendation: ALTERNATIVE 5

The implementation of the proposed grazing/resting treatments and range management facilities (fences, water troughs, etc.) would have a positive effect on water quality. Water projects should reduce concentrations of livestock near streams. However, reduced streambank sloughing would not be measurable and, therefore, neither would the specific water quality impact. Streambanks not fenced for riparian management and under rest rotation systems (Chapter 2, General Features for Implementation) would have some improvement in water quality during rest periods. However, increased utilization during grazing periods could offset this improvement. Documentation of the nature of these effects is lacking (Meehan and Platts, 1978).

Initiation of vegetation conversion actions would have definite impacts to water quality. Following fire treatment of vegetation and before seedling establishments the area would be susceptible to increased runoff from rains with subsequent increases in soil loss. However, the extent of these changes in water quality due to burning and seeding treatment would depend on initial site characteristics, total area burned, post-burn storm characteristics, and seeding success (Gifford et al., 1975). Water repellent soils (DeBano, 1969) may also be an important factor controlling runoff and erosion following fire. Burning would be prescribed for 14,161 acres under this proposal.

Chemical treatment would add a threat of pollution of the water, although this has not occurred in many areas before. This threat would be minimized by the use of 2,4-Dichlorophenoxyacetic acid (2,4-D). The half life of 2,4-D is only a few days and there would be a 0.25-mile buffer around water bodies. The risk to the private lands would also be minimal since 2,4-D is relatively harmless to grasses. Studies of water samples taken from unprotected streams which were directly sprayed with 2,4-D showed concentrations of the chemicals below the levels recommended for public water supplies by the Environmental Protection Agency, and much below the 50-percent lethal dose values for fish (Vegetation Management with Herbicides in the Eastern

Region, USDI, 1978). Compliance with design specifications (Appendix 3) would minimize or eliminate adverse impacts. Spraying with 2,4-D would be proposed on 20,645 acres in the EIS area.

Plowing and chaining are mechanical conversion treatments which would primarily affect water quality by increasing suspended sediments and turbidity in the water. This would be a short-term augmentation until seedings became established or native vegetation reestablished itself. (See Soils, Chapter 4, for additional discussion.) Plowing and chaining would be proposed on 17,751 acres in the EIS area.

If establishment of the newly seeded plants would not occur, and if reseedling would be necessary, the treated area would be exposed to rain and unprotected from increased sediment flow. This would cause degradation of the water quality of nearby streams. Appendix 21 evaluates seeding success for each proposed treatment under this alternative.

Based on reduced livestock numbers, fencing to exclude livestock grazing, improved season of use, and calculated treatment success, (Appendix 21) 83 stream miles (24 percent) in 24 allotments would have possible water quality enhancement over the 24-year management period (table 4-3). An additional 43 stream miles (12 percent) in six allotments would probably have deteriorating water quality, primarily due to increased livestock numbers in these areas. The remaining 64 percent of stream miles (223 miles) would not have significant water quality change due to either inappreciable management change or dominance of natural water quality (Alternative 4). Soils and Vegetation, Chapter 4, discuss additional factors influencing water quality under this alternative.

Conclusion

Under this alternative, water quality would improve in 83 stream miles, decline in 43 stream miles, and remain unchanged in 223 stream miles.

Livestock Optimization: ALTERNATIVE 6

Under this proposal, 184,005 acres would be proposed for treatment in order to maximize livestock forage. Specifically, this includes 57,240 acres of chaining, 27,835 acres of plowing, 47,242 acres of burning, and 51,688 acres of spraying. Water quality impacts of these treatments (as discussed in Alternative 5) would primarily be short term, but would depend upon many factors including actual seeding success, site characteristics, grazing intensities, and subsequent weather conditions. In essence, given the number of unknown factors involved, long-term impacts to water quality due to treatments cannot be predicted.

Relative water quality impacts, however, can be estimated based on changes in riparian vegetation (see Impact on Water Quality). Thus, with increased livestock numbers in some riparian zones (which would increase trampling and soil compaction, and reduce protective cover), approximately 51 stream miles (15 percent) would decline over the long term. Eighty-three miles (which would have reductions in livestock numbers or would be fenced to exclude livestock) would improve under this proposal. Water quality in the

remaining 215 miles of stream would not change significantly due to insubstantial livestock number adjustments in stable riparian zones. Naturally occurring water quality problem areas (Water Quality, Chapter 3) would also remain in this category.

Conclusion

Alternative 6 would result in an improvement of water quality in 83.2 stream miles, a reduction of water quality in 51 stream miles, and no change in water quality in 215 stream miles.

Unavoidable Adverse Impacts

Under Alternative 1 there would be unavoidable adverse impacts to water quality in 75 miles of stream. There would be no adverse impacts to water quality in Alternatives 2 or 3. Unavoidable adverse impacts would occur in 59 miles of stream under Alternative 4, 43 miles of stream under alternative 5, and 50 miles of stream under Alternative 6.

Short-Term Uses and Long-Term Productivity

Under Alternative 1, overallocation of livestock forage would result in a long-term reduction of preferred forage and a subsequent reduction in water quality in the long-term. Elimination of livestock grazing in Alternatives 2 and 3 would result in an improvement of water quality in 307 miles of stream in the long-term. Short-term losses in water quality in the short term due to vegetation treatments and rangeland developments would result in a long-term improvement to 86 miles of stream in Alternative 4, 83 miles of stream in Alternative 5, and 83 miles of stream in Alternative 6.

Irreversible/Irretrievable Commitment of Resources

There would be no irreversible or irretrievable losses in water quality in any of the alternatives.

IMPACTS TO LAND USE

Livestock Grazing

Continuation of Present Management: ALTERNATIVE 1

Under this alternative there would be no changes in livestock forage allocations. Therefore, no changes in present land-use trends would be anticipated. Rangeland forage production would remain essentially unchanged and the relationship between active preference and average active authorized use for the three scales of ranch operations would continue at:

	<u>Active Preference</u>	<u>Average Active Authorized Use</u>	<u>Percent Capacity Not Used</u>
Small	10,178 AUMs	6,454 AUMs	37
Medium	27,378 AUMs	19,466 AUMs	29
Large	66,620 AUMs	44,851 AUMs	33

With the above figures, the long-term 6-percent decline in livestock forage predicted in Vegetation (Chapter 4) would not be likely to precipitate any land use changes.

Elimination of Livestock Grazing: ALTERNATIVE 2

Implementation of this alternative would probably generate major changes in certain land uses in the EIS area. The total elimination of livestock grazing on public lands would undermine the financial viability of many ranching operations and could result in some agricultural properties being sold to other interests. Those ranches remaining in the livestock business would be forced to compensate for lost forage by either intensifying feed production on private lands or transporting stock to other sources. In either event, major changes in existing land uses would be required.

Multiple Resource Enhancement: ALTERNATIVE 3

Impacts to land use under this alternative would be somewhat less than those described in Alternative 2, although major changes in some land uses would occur. Overall grazing capacities would be reduced, all livestock grazing on 32 allotments would be eliminated, and access to existing water sources would be altered.

Livestock forage allocation to the three scales of ranch operations would be as follows:

<u>Initial Stocking Rates</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Active preference (AUMs)	10,178	27,378	66,620
Initial allocation (AUMs)	2,982	9,884	22,008
Percent change from present	-71	-64	-67

Long Term Stocking Rates

Long term allocation (AUMs)	4,025	13,364	27,325
Percent change from present	-60	-51	-59

Since stockmen are not currently using all of their active preference, the net percent change would be calculated by modifying the amount of change (above) by the amount of livestock forage not being used from Alternative 1. Net percent changes from present for the three scales of ranch operations would then be:

	<u>Initial Net Percent Reductions</u>	<u>Long-Term Net Percent Reductions</u>
Small	71 - 37 = 34	60 - 37 = 23
Medium	64 - 29 = 35	51 - 29 = 22
Large	67 - 33 = 34	59 - 33 = 26

Probable land-use changes resulting from these reductions would be the intensification of feed production on private lands and the alteration of existing modes of operation to seek other feed sources either by importing feed or shipping livestock elsewhere.

Adjustment to Grazing Capacity: ALTERNATIVE 4

This alternative could generate changes in land uses by several means. There would be some reductions in rangeland grazing capacity in the following amounts for the three scales of ranch operations:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Active preference (AUMs)	10,178	27,378	66,620
Adjusted allocations (AUMs)	4,729	18,282	47,062
Percent change from present	-54	-33	-29
Percent nonuse	37	29	33
Net percent change	-17	-4	+4

Some intensification of feed production might result from these reductions, but they would not be expected to generate any noticeable land use changes. However, proposed season of use changes and exclusion for 2 years from treatment areas would generate conflicts in land use. Under this alternative, 22 small, 39 medium, and 23 large scale operations would receive season of use changes of 2 weeks or more. Nearly 80 percent of these delays would occur in the late spring or early summer months when keeping herds on private land would interfere with feed production and could jeopardize the financial viability of many ranch operations. Also, some 22,420 acres of vegetation treatments would be performed under this alternative and would require a 2-year post-treatment rest period. During this period the herds normally using these areas would have to be kept elsewhere. This would interrupt normal modes of operation and could interfere with land uses on private lands.

Rangeland Management Recommendation: ALTERNATIVE 5

This alternative contains several elements which could generate changes in land use, such as changes in rangeland production, season of use changes, allotment consolidations, and the implementation of rangeland treatments.

Changes in rangeland production for the three scales of ranch operations would be as follows:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Active preference (AUMs)	10,178	27,378	66,620
Initial adjustments (AUMs)	5,368	17,236	51,753
Percent change from present	-47	-37	-22
Percent nonuse	37	29	33
Net percent change	-10	-8	+11
Long-term adjustments (AUMs)	6,274	23,554	63,099
Percent change from present	-38	-14	-5
Percent nonuse	37	29	33
Net percent change	-1	+15	+28

Adjustments in existing land-use patterns to these levels of change in rangeland production would probably be only minor. More crucial would be adjustments in seasons of use. Some 22 small scale, 31 medium scale, and 17

large scale operations would receive changes in their normal season of use by 2 weeks or more. Of these, less than half would occur during the spring/summer months (which would be most disruptive to existing feed production activities and other crucial land uses).

Proposed allotment consolidations under this alternative would also affect existing land use patterns if the consolidations would interfere with such activities as livestock breeding programs, calving and branding activities. Special arrangements may be necessary on private lands to provide for these needs, thereby changing some land-use patterns.

Impacts to land use from rangeland treatments would be the same as discussed in Alternative 4.

Livestock Optimization: ALTERNATIVE 6

Impacts to land uses under this alternative would essentially be the same as those discussed for Alternative 5. Elements under this alternative which could affect land-use changes would be changes in rangeland forage production, season of use changes, allotment consolidations, and implementation of rangeland treatments.

Predicted changes in livestock forage allocation for the three scales of ranch operations would be as follows:

	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Active preference (AUMs)	10,178	27,378	66,620
Initial adjustments (AUMs)	6,239	24,886	61,797
Percent change from present	-39	-9	-7
Percent nonuse	37	29	33
Net percent change	-2	+20	+26
Long-term adjustments (AUMs)	7,661	30,076	67,490
Percent change from present	-25	+10	+1
Percent nonuse	37	29	33
Net percent change	+12	+39	+34

Unavoidable Adverse Impacts

There would be unavoidable adverse impacts to livestock operations in all alternatives. These impacts would be directly dependent upon adjustments in stocking rates, season of use, and consolidation of allotments. In Alternative 1, the overallocation of forage to livestock would result in an eventual reduction in stocking rates. Alternatives 2 and 3, which would have the greatest stocking rate reductions, would have the greatest impact on the livestock operations and subsequent use of private lands. Under Alternatives 4, 5, and 6, reductions and season of use changes would cause unavoidable adverse impacts to livestock operations.

Short-Term Uses and Long-Term Productivity

Increased use of private land occurring as a result of the implementation of any alternative would adversely affect the long-term productivity of

private land. Implementation of Alternatives 2 and 3 would especially have this effect. Should changes in season of use cause livestock to remain on private farmland longer in the spring or return earlier in the fall, hay production would be reduced. Vegetation treatments and rangeland developments in Alternatives 4, 5, and 6 would continue to have beneficial effects into the long term.

Irreversible/Irretrievable Commitment of Resources

Commitments of human resources to implement any of these alternatives would be irreversible and irretrievable. Money, fuel, and materials used to fully develop any of the alternatives would be irreversible. These commitments would be most pronounced in Alternatives 4, 5, and 6.

IMPACTS TO SOCIOECONOMICS

Impacts to Rancher Finances

This section is comprised of four subsections: gross incomes, expenses, net incomes, and potential for failure. All analyses are based on the figures in table 4-4 at the end of this section, Impacts to Incomes and Costs. To avoid repetition of what is shown in the table, the figures in the narrative show the amount of change that would occur in incomes and costs from the baseline to the levels resulting from the implementation of each respective alternative. All data in the analysis represents an average of the entire size class. Any individual's finances could differ significantly from that average. Therefore, the numbers should be interpreted as general indicators, not as hard and fast facts.

All analyses present a "worst case" result. This is in line with determining the maximum amount of hardship which might be incurred by the area through any given set of managerial decisions.

In those instances where there is a difference between short-term and long-term impacts, each is addressed separately; otherwise, the figure presented represents both short-term and long-term impacts.

Gross Incomes

Impacts to gross incomes are computed by subtracting the gross income figure in the column labeled "Baseline" from the corresponding figures in the "Short Term" and/or "Long Term" columns in table 4-4.

Expenses

Impacts to expenses are computed in the same fashion as gross incomes. For analytical purposes, those expenses labeled Fixed Costs are held constant since they would not be changed immediately by changes in the number of AUMs that an operation runs. Variable costs are tied directly to the number of AUMs that are run and would therefore fluctuate in roughly direct proportion with changes in the number of AUMs allotted. Impacts to expenses show the

TABLE 4-4

Impacts to Incomes and Costs

	SMALL SCALE (80 operations)			MEDIUM SCALE (113 operations)			LARGE SCALE (89 operations)		
	Baseline ^a	Short Term ^b	Long ^b Term	Baseline ^a	Short Term ^b	Long ^b Term	Baseline ^a	Short Term ^b	Long ^b Term
ALTERNATIVE 1									
Gross Income	\$ 3,661	.....	3,549	13,375	.....	12,693	45,718	.....	44,045
Fixed Costs	2,469	.....	2,469	13,275	.....	13,275	26,837	.....	26,837
Variable Costs	2,466	.....	2,391	6,267	.....	5,947	21,365	.....	20,583
Total Costs	4,935	.....	4,860	19,542	.....	19,222	48,202	.....	47,420
Net Income	-1,274	.....	-1,311	-6,167	.....	-6,530	-2,484	.....	-3,375
ALTERNATIVE 2									
Gross Income	\$ 3,661	1,794	.....	13,375	2,006	.....	45,718	17,830	.....
Fixed Costs	2,469	2,469	.....	13,275	13,275	.....	26,837	26,837	.....
Variable Costs	2,466	1,208	.....	6,267	940	.....	21,365	8,332	.....
Total Costs	4,935	3,677	.....	19,542	14,215	.....	48,202	35,169	.....
Net Income	-1,274	-1,883	.....	-6,167	-12,209	.....	-2,484	-17,339	.....
ALTERNATIVE 3									
Gross Income	\$ 3,661	3,026	3,232	13,375	9,396	10,874	45,718	36,236	38,467
Fixed Costs	2,469	2,469	2,469	13,275	13,275	13,275	26,837	26,837	26,837
Variable Costs	2,466	2,038	2,177	6,267	4,403	5,095	21,365	16,934	17,977
Total Costs	4,935	4,507	4,646	19,542	17,678	18,370	48,202	43,771	44,814
Net Income	-1,274	-1,481	-1,414	-6,167	-8,282	-7,496	-2,484	-7,535	-6,346
ALTERNATIVE 4									
Gross Income	\$ 3,661	3,344	.....	13,375	12,920	.....	45,718	46,834	.....
Fixed Costs	2,469	2,469	.....	13,275	13,275	.....	26,834	26,837	.....
Variable Costs	2,466	2,252	.....	6,267	6,054	.....	21,365	21,886	.....
Total Costs	4,935	4,721	.....	19,542	19,329	.....	48,202	48,723	.....
Net Income	-1,274	-1,378	.....	-6,167	-6,409	.....	-2,484	+1,890	.....
ALTERNATIVE 5									
Gross Income	\$ 3,661	3,474	3,642	13,375	12,466	15,080	45,718	47,786	53,527
Fixed Costs	2,469	2,469	2,469	13,275	13,275	13,275	26,387	26,387	26,387
Variable Costs	2,466	2,340	2,453	6,267	5,841	7,066	21,365	22,799	25,014
Total Costs	4,935	4,809	4,922	19,542	19,116	20,341	48,202	49,636	51,851
Net Income	-1,274	-1,335	-1,280	-6,167	-6,650	-5,261	-2,484	-850	1,675
ALTERNATIVE 6									
Gross Income	\$ 3,661	3,624	3,885	13,375	15,649	17,809	45,718	52,969	55,200
Fixed Costs	2,469	2,469	2,469	13,275	13,275	13,275	26,837	26,837	26,837
Variable Costs	2,466	2,441	2,617	6,267	7,332	8,345	21,365	24,753	25,796
Total Costs	4,935	4,901	5,086	19,542	20,607	21,620	48,202	51,590	52,633
Net Income	-1,274	-1,286	-1,201	-6,167	-4,959	-3,811	-2,484	1,378	2,567

Source: Rancher Socioeconomic Study, Carlson, 1979.

^aFrom survey.^bSee Appendix 24 for calculation methodology.

combined effects of changes in variable costs plus the constant level of fixed costs.

Net Income

Impacts to net incomes are computed by subtracting baseline net incomes from the short-term and/or long-term net incomes. It should be remembered that since all baseline net incomes are shown to be negative, that is "in the red", a larger negative net income figure in, say, the short-term column represents a larger deficit, or a worsening in the ranch's financial position.

Capital Value of the Permit

This subsection estimates the potential percentage change in the collateral worths of grazing permits as the result of the implementation of each alternative. Calculations for these estimates are quite complex and require several assumptions Appendix 24 contains a technical description of how capital values have been determined.

Impacts to the Region and Its Communities

This section is composed of three subsections: Impacts to Industry Revenues, Impacts to Support Industries, and Impacts to Various Taxes and Miscellaneous Payments. The impacts discussed in the Impacts to Rancher Finances section, which address impacts at the individual ranch scale level, are aggregated in this section to estimate the impacts on a broader plane.

Impacts to Industry Revenues

Impacts to gross incomes of each size class in the preceding section are multiplied by the number of operations in each scale in this subsection. This represents the aggregate effect of an alternative on the livestock industry's gross income. As with the section on Impacts to Rancher Incomes, the data in this subsection represents the amount of change in income levels, not the final income (this can be obtained from table 4-4).

Impacts to Support Industries

The assumption of this subsection is that those items of expense for the ranchers are, in turn, items of revenue for support industries. Therefore, if spending by ranchers is affected by an alternative, "selling" by support industries would be affected by roughly a proportionate amount. The data in this subsection must not be confused with changes in the personal incomes of various support industry proprietors. The data more closely approximates the value of the unsold inventories of the various industries. A rough rule-of-thumb would be to take 5 to 10 percent of these figures to approximate the effects of an alternative on proprietor incomes.

Impacts to Various Taxes and Miscellaneous Payments

There are numerous taxes and miscellaneous payments which are tied to rangeland and agricultural production and BLM activities. Predominant among these are local agricultural taxes, Federal impact area funding to schools,

Federal payments to counties in lieu of taxes, the proportion of grazing fees which are returned to the district for rangeland betterment projects, and inflows of monies generated by recreationists. With the exception of hunter usage, however, no measurable impacts have been projected in recreation as a result of any alternative. Some attempts have been made to project changes in big game numbers and, consequently, to estimate changes in hunter days in the region due to management actions. In order to project the socioeconomic implications of these estimates, they have been further extrapolated to indicate the hunter's place of residence (42 percent from Kane and Garfield Counties, 34 percent from other Utah counties, and 24 percent nonresident [Recreation Technical Report]). Assuming that these same relationships would hold in the future, 58 percent of any increases in hunter-days and hunter expenditures would represent new money flows into the region. The figure of \$29.40 per hunter day (calculated from: Hansen, 1977) was then utilized to estimate the amount of expenditures attributable to deer hunters as a result of such changes.

Impacts to Attitudes and Expectations

Impacts to attitudes and expectations were interpreted from the concerns expressed by the predominant interest groups - livestock interests, wildlife advocates, wild horse advocates, and recreationists - as they have been expressed in public meetings, in correspondence, and in past EISs. These interpretations are intended to indicate only whether the results of various management actions would essentially meet with, conflict with, or have no effect on the perceived attitudes and expectations of these groups.

Continuation of Present Management: ALTERNATIVE 1

This alternative would continue current grazing levels. Vegetation analysis indicates that over the long term (within 24 years) there would be an approximate 6-percent overall decline in grazing capacity due to current downward trends in some areas.

Impacts to Rancher Finances

In the short term this alternative would have little noticeable effect on gross revenues. In the long term, small scale operations could lose approximately \$112 per year, a 3-percent reduction; medium scale operations could lose \$682 per year, a 5-percent reduction; and large scale operations could lose \$1,673 per year or a 4-percent reduction. There would be no change in expenses in the short term. However, in the long term the variable costs would be expected to decline by the same percentage as gross incomes: small \$75 per year; medium \$320 per year, and large \$782 per year. Therefore, annual net incomes would be expected to decline further over the long term by: small scale \$37 (-3 percent); medium scale \$363 (-6 percent); and large scale \$891 (-36 percent). As a result of these financial declines the value of the grazing permit in terms of pledged collateral could be expected to decline as grazing capacities decline. With an overall 6-percent drop in grazing, collateral worth of ranch operations would have a maximum decline of: small scale 2 percent, medium scale 5 percent, and large scale 3 percent.

Impacts to the Region and Its Communities

Under this alternative the aggregate livestock industry gross revenues would be reduced by approximately \$236,000. These declines would reduce expenditures to support industries by around \$112,000 (-2 percent) annually. This represents less than 1 percent of the estimated \$40 million of gross taxable sales in the region and would therefore not be anticipated to generate significant impacts (calculated from: UTAH: County Economic Facts, 1978). Also, agriculturally based tax receipts in the region could be reduced by as much as \$16,300. Federal payments into the region under Payments in Lieu of Taxes would not be affected, however, rangeland betterment expenditures from those portions of grazing fees returned to the area could be reduced by around \$46,300. There would be no significant change in hunter expenditures in the region under this alternative (Alternative 1 of Recreation, Chapter 4).

Impacts to Attitudes and Expectations

This alternative would maintain existing grazing levels and would therefore not be expected to effect any changes in the attitudes or expectations of the livestock industry. However, since existing conflicts between wildlife and livestock would not be relieved, negative impacts would be incurred by wildlife advocates. Similarly, conflicts between recreationists and livestock in high use areas would continue and existing negative impacts would be continued indefinitely.

Conclusion

In the short term this alternative would have little socioeconomic effect. In the long term, some detrimental effects would occur but these would not be expected to be significant to the region. Conflicts between the attitudes and expectations of livestock interests and both wildlife advocates and recreationists would be continued.

Elimination of Livestock Grazing: ALTERNATIVE 2

This alternative would eliminate livestock grazing on Federal lands. Assuming that no economically feasible alternative source of feed would be available, this alternative could reduce small scale herds by 51 percent; medium scale herds by 85 percent, and large scale herds by 61 percent.

Impacts to Rancher Finances

Because of major grazing reductions, rancher incomes under this alternative would be severely reduced. Small scale operations would lose an average \$1,867 per year; medium scale operations would lose an average \$11,369 per year; and large scale operations would lose an average \$27,888 per year. These reductions would be equivalent to 51, 85, and 65-percent reductions in gross incomes respectively. Fixed costs would remain unchanged, although variable costs would be reduced by a proportion equal to gross incomes. As such, total costs would be reduced by the following average amounts: small scale \$1,258; medium scale \$5,327, and large scale \$13,033. The foregoing would result in reductions in net incomes by the following average amounts:

small scale \$609 (-48 percent); medium scale \$6,042 (-98 percent); and large scale \$14,855 (-598 percent). Since all average net incomes were negative initially, these figures would represent additional indebtedness. With such decreases in net worth, the collateral worths of ranching operations could be reduced by the following amounts with the implementation of this alternative: small ranches 20 percent, medium ranches 66 percent; and large ranches 30 percent (Appendix 24).

Impacts to the Region and Its Communities

Impacts to the livestock industry's aggregate revenues would be quite substantial. Under this alternative as much as \$3.9 million in annual revenues could be lost to the industry. These reductions would ultimately affect expenditures to support industries of the region, reducing them by around \$1.9 million annually (-27 percent). This would represent a 5-percent decline in the estimated \$40 million in regional gross taxable sales (calculated from: UTAH: County Economic Facts, 1978). In addition, there would be a reduction of \$15,000 in agriculturally based tax receipts and a reduction of \$49,000 in expenditures from grazing fees. However, Federal payments in lieu of taxes would be unaffected and an anticipated increase of 100 hunter-days from increased wildlife numbers would be expected to generate about \$1,700 of additional expenditures into the region.

Impacts to Attitudes and Expectations

This alternative would generate extreme negative impacts on the livestock industry's attitudes and expectations. Basic economic livelihood would be affected, lifestyles would be altered, and many individuals would probably be forced out of business. However, wildlife, wild horse, and recreational advocates would be positively affected. More forage would be available to wildlife, conflicts between some of the wild horses and livestock would be resolved, and conflicts in high use areas between stock and recreationists would be removed.

Conclusion

Under this alternative in both the short and long term there would be very significant detrimental socioeconomic impacts at both the individual and regional levels. The attitudes and expectations of livestock interests would be negatively affected. However, wildlife and wild horse advocates and recreationists would be favorably affected.

Multiple Resource Enhancement: ALTERNATIVE 3

Although other resources would receive benefits under this alternative, short-term grazing levels could be reduced by 34 percent for small scale operations; 35 percent for medium scale operations, and 34 percent for large scale operations. Compared with existing use levels, the long-term management proposals would result in reductions of 23, 22, and 26 percent respectively.

Impacts to Rancher Finances

Under this alternative, short-term reductions in rancher incomes would be: small 17 percent; medium 30 percent; and large 21 percent. Over the long term these reductions would be relieved somewhat to 12, 19, and 16 percent respectively. Annual average income losses would be: small \$635; medium \$3,979; and large \$9,482. Average annual losses in gross income would be: small \$429; medium \$2,501; and large \$7,251. Total costs would be reduced moderately in both the short and long term. However, since fixed costs would remain unchanged, expenses would not be reduced by as much as income. In the short term, total costs would be reduced by the following amounts: small \$428; medium \$1,854; and large \$4,431. In the long term, expenses would be reduced by the following amounts: small \$289; medium \$1,172; and large \$3,388. Since revenues would be reduced by larger amounts than expenses, this alternative would generate larger deficits in net revenues than exist in the baseline. In the short term, average annual net incomes would decline further by: small \$207 (-16 percent); medium \$2,115 (-34 percent); and large \$5,051 (-203 percent). The long term would yield a somewhat reduced deficit, but would still be larger than the baseline by the following amounts: small \$140 (-11 percent); medium \$1,329 (-22 percent); and large \$3,862 (-155 percent). With such reductions in net worth, the collateral worths of ranching operations could be reduced in the short term by the following amounts: small 13 percent; medium 27 percent; and large 16 percent. Long-term reductions would be 9, 17, and 13 percent respectively (Appendix 24).

Impacts to the Region and Its Communities

Impacts to the livestock industry aggregate revenues would be quite substantial in both the short and long term. In the short term the industry would lose over \$1.3 million in annual revenues. In the long term the average annual losses would be around \$1 million. This could, in turn, reduce expenditures by the industry to support industries by as much as \$640,000 (-9 percent) in the short term, and approximately \$457,000 (-7 percent) in annual expenditures in the long term. These reductions would represent less than 2 percent of the estimated \$40 million in regional gross taxable sales and would probably not generate any significant impacts. Other financial reductions under this alternative would include agriculturally based tax receipts, \$37,000 in the short term and \$28,000 in the long term; and Federal grazing fee expenditures, about \$33,000. Payments in lieu of taxes would not be affected by this alternative. However, an anticipated increase of 110 hunter-days due to expected increases in wildlife numbers would generate about \$1,900 in new expenditures in the region.

Under this alternative, significant numbers of families in the following communities could experience abrupt reductions in their standards of living, subsequently affecting the ability of the community to provide social services: Boulder, 7 families; Escalante, 10 families; and Kanab, 14 families.

Impacts to Attitudes and Expectations

This alternative would negatively affect the attitudes of both ranching interests and wild horse advocates, but would generate positive impacts for

wildlife advocates and recreationists. Ranchers would be negatively affected by grazing capacity cuts and by some increased controls resulting from the fencing of riparian areas. The proposed removal of wild horses could generate major protests from wild horse advocates. However, reduction of conflicts between livestock and both wildlife advocates and recreationists in high use areas should allay the concerns of these two groups.

Conclusion

Negative socioeconomic impacts in both the short and long term would result from losses in rancher incomes due to the implementation of this alternative. The attitudes and expectations of livestock interests and wild horse advocates would be negatively affected, but wildlife advocates and recreationists would be positively affected.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Average levels of grazing use under this alternative would be reduced moderately for small and medium scale ranches. Large scale ranches would receive a small increase in allocated AUMs. The percent changes in authorized AUMs would be: small scale -17 percent; medium scale -4 percent; and large ranches +4 percent.

Impacts to Rancher Finances

Due to the above changes in grazing capacities, rancher incomes under this alternative would be variously affected, depending on the scale of operation involved. Both small and medium scales would receive reductions in annual gross incomes: \$135 or -9 percent for the small scale, and \$455 or -3 percent for the medium scale. Large scale operators, however, would receive increases of about 2 percent, or \$1,116 in annual gross incomes. Fixed costs would remain essentially unchanged, but annual variable and total costs would be altered by the following amounts: small -\$18, medium -\$450, and large \$2,023.

These effects would generate the following changes in average annual net income: small -\$104 (-8 percent); medium -\$242 (-4 percent); and large +\$4,374 (+176 percent). As such, the collateral worths of ranching operations could be affected by the following amounts: small -7 percent; medium -3 percent; and large +2 percent (Appendix 24).

Impacts to the Region and Its Communities

Impacts to the aggregate livestock industry revenues would be quite substantial under this alternative. Losses in total average annual gross income would occur with the small and medium scale operations. These would be offset by increases in the large scale, with a resulting net increase in aggregate gross income of around \$22,500. These increases in gross revenues would result in added annual expenditures to support industries by stockmen for goods and services by as much as \$5,200. This would have an insignificant impact on the estimated regional gross taxable sales of \$40 million (calculated from: UTAH! County Economic Facts, 1978). Also, agriculturally based tax receipts in the region could be increased by around \$700. Federal

payments into the region under Payments in Lieu of Taxes would not be materially affected, nor would rangeland betterment expenditures from grazing fees. However, this alternative could potentially result in an annual increase of 110 hunter-days in the region, which could yield an increase of \$1,900 in expenditures.

Impacts to Attitudes and Expectations

The impacts to attitudes and expectations of ranchers under this alternative would be negative because of controls imposed under grazing systems, season of use changes, and grazing reductions. Wildlife advocates would, however, have many of their concerns addressed with specific forage allocations and some wildlife/livestock conflicts alleviated by changes in livestock season of use. No change from the present would be anticipated for either wild horse enthusiasts or recreationists.

Conclusion

This alternative would generate mixed socioeconomic impacts. Small and medium scale operators would be detrimentally affected, while large scale operators would be beneficially affected. The net regional impacts would be beneficial. The attitudes and expectations of livestock interests would be negatively affected but wildlife advocates would be benefitted. Neither wild horses nor recreationists would be affected.

Rangeland Management Recommendation: ALTERNATIVE 5

Under this alternative, average allocations of livestock AUMs would generally be increased, especially in the long term. Short-term changes would be of the following amounts: small scale -10 percent; medium scale -8 percent; and large scale +11 percent. In the long term, changes in available AUMs would be: small scale -1 percent; medium scale +15 percent; and large scale +28 percent.

Impacts to Rancher Finances

Rancher incomes under this alternative would be reduced in the short term for small and medium scale operations by about \$187, -5 percent and \$910, -7 percent per year respectively. Large scale operations would obtain a 5-percent increase in gross incomes of about \$3,068 per year. In the long term, small scale ranches would still receive a 1-percent reduction in gross incomes at about \$19 per year. Medium and large scale operations would receive increased gross revenues of around \$1,705 and \$7,809 or 13 and 17 percent respectively. Costs would be reduced in the short term for small and medium scale operations by \$126 and \$426 respectively. Large scale operators would incur short-term increases in costs of \$1,434. In the long term, only small scale operations would have reduced costs, \$13; medium and large scale operations would have increased costs of \$799 and \$3,649 respectively. Since revenues would be changed in greater amounts than costs, this alternative would generate increased deficits in net revenues. The average changes in annual net incomes in the short term under this alternative would be: small -\$61 (-5 percent); medium -\$483 (-8 percent); and large +\$1,634 (+66 percent). In the long term these changes in net incomes would be: small -\$6 (-1 percent); medium +\$906 (+15 percent); and large +\$4,159 (+167 percent).

As with net incomes, the collateral worths of ranching operations could have varied changes: small -7 percent; medium -3 percent; and large +2 percent (Appendix 24).

Impacts to the Region and Its Communities

Aggregate revenues for the livestock industry would be increased substantially in the short term, and would become comparatively greater over the long term. Short-term annual revenue increases would be in the neighborhood of \$155,000. Annual long-term increases would be considerably more, approximately \$890,000. These increases could then generate additional annual expenditures by stockmen for goods and services from support industries by as much as \$70,000 (+1 percent). In the long term the increase in purchasing by stockmen could be in the neighborhood of \$414,000 (+6 percent) per year. This increased purchasing would, however, represent less than a 1-percent change to the estimated regional gross taxable sales of \$40 million and would not be anticipated to generate significant impacts (calculated from: UTAH! County Economic Facts, 1978). Also, in the short term this alternative could increase agriculturally based tax receipts in the region by \$4,188. Long-term increases in such taxes would be around \$25,000. Federal payments into the region under Payments in Lieu of Taxes would not be affected materially by this alternative, but rangeland betterment expenditures from grazing fee receipts could be reduced by \$19,566. However, with projected increases in big game species there would be an increase of 294 hunter-days. If this would actually occur, an additional \$5,000 in hunter expenditures could be brought into the region.

Impacts to Attitudes and Expectations

This alternative would generate mixed impacts to rancher attitudes and expectations. Over the long term, most operations would receive increases in grazing capacities. However, most would also receive initial cuts which would only be recovered over a period of time. They would also incur additional controls, resulting from grazing systems, season of use changes, and some allotment consolidations. On the whole, rancher reactions would be expected to be negative.

Forage allocations plus quality forage from treatments would be beneficial to wildlife. Therefore, it would be anticipated that wildlife advocates would be favorably affected. However, wild horse advocates would be unfavorably affected because existing conflicts with livestock would continue and no forage allocations would be made. No change in present attitudes or expectations would be anticipated for recreationists.

Conclusion

Although some negative impacts would be incurred, the overall socioeconomic effects of this alternative would be beneficial in both the short and long term. The attitudes and expectations of livestock interests and wild horse advocates would be negatively affected; wildlife advocates would be benefitted; and recreationists would be unaffected.

Livestock Optimization: ALTERNATIVE 6

Under this alternative there would be an overall increase in livestock grazing in both the short and long term. Small scale operations would incur a temporary 2-percent reduction in the short term, but a 12-percent increase in the long term. Medium scale operations would receive a short term 20-percent increase and a long term 39-percent increase. Large scale operations would receive a 26-percent increase in forage allocations and a 34-percent increase over the long term.

Impacts to Rancher Finances

With increases in grazing levels, rancher incomes under this alternative would generally increase in both the short and long term. Short-term gains in average annual gross income would be: medium +17 percent or \$2,274; and large +16 percent or \$7,251. Small scale operators would incur a 1-percent or \$37 decrease. Long-term annual gains of about 6 percent for the small scale would yield \$224; for medium size operations it would be +33 percent or \$4,434; and for large scale operations it would be +21 percent or \$9,482. Short-term total costs under this alternative would also generally increase. Short-term cost changes would be: small -\$25; medium +\$1,064; and large +\$3,388. Long-term increases for the small scale would be \$151 annually, while the medium and large scales would experience increases in average annual operating expenses of \$2,078 and \$4,431 respectively. This would result in the net incomes for small and medium scales of operation remaining negative in both short and long term. However, net losses would generally be reduced, especially in the long term. Short-term changes in net income would be: small -\$12 (-1 percent); medium +\$1,208 (+20 percent); and large +\$3,862 (+155 percent). In the long term all three scales would receive increases in net income, although the large scale would be the only one which would actually attain a positive net income. Long-term changes in small, medium, and large scale net incomes would be \$73 (+6 percent), \$2,356 (+38 percent), and \$5,051 (+203 percent) respectively.

Impacts to the Region and Its Communities

Impacts to annual aggregate livestock industry revenues in the region would be substantial. Short-term gains would be approximately \$900,000. Long-term increases would be about \$1.4 million per year.

These increases could then increase annual expenditures by stockmen for various support industry goods and services by about \$420,000 (+6 percent) in the short term. Long-term gains in annual spending could be around \$640,000 (+9 percent). These changes represent less than a 2-percent difference each in the estimated \$40 million regional gross taxable sales and would not be expected to generate any significant impacts (calculated from: UTAH! County Economic Facts, 1978). Also, the short-term effects of this alternative could increase agriculturally based tax receipts in the region by \$25,000. Long-term net effects of the alternative could yield an increase in such tax receipts by about \$38,000. Payments in lieu of taxes would be unaffected by this alternative. However, rangeland betterment expenditures from grazing fees would be annually increased by around \$60,000 in the short term and by about \$66,000 in the long term. Also, if projected expansions of wildlife

numbers in the region would be realized, there could be an annual increase of 294 hunter-days. This increase could bring an additional \$5,000 of hunter expenditures into the region.

Impacts to Attitudes and Expectations

Except for wild horse advocates, the impacts to attitudes and expectations under this alternative would be essentially the same as with Alternative 5: negative for ranchers, positive for wildlife enthusiasts, and no change for recreationists. Wild horse advocates would be negatively affected by the proposed removal of wild horses from the area.

Conclusion

The net socioeconomic impacts resulting from this alternative would be beneficial. Attitudes and expectations of ranchers and wild horse advocates would be negatively affected, wildlife advocates would be benefitted; and recreationists would be unaffected.

Unavoidable Adverse Impacts

There would be unavoidable adverse impacts under all alternatives except Alternative 6, Livestock Optimization. The unavoidable adverse impacts would primarily affect medium size ranch operations and would reflect the moderate to high potential for financial failure. Unavoidable adverse impacts would occur because in most instances ranchers would be unable to service existing debt loads or secure short term production-oriented credit. This could affect as many as 113 ranch operations, and could result in impacts to the communities of Boulder, Escalante, and Kanab. Significant impacts to community social service capabilities would result if such failures to so many ranch operations occurred in a short period of time.

Implementation of Alternative 2 would negatively affect all three size operations. Financial failures would be expected to occur and would result in unavoidable adverse socioeconomic impacts. This could jeopardize the present economic structure of most of the 282 ranch operations and would severely alter existing lifestyles and community social structures.

No unavoidable adverse impacts would be expected under Alternative 6 because rancher incomes would generally increase in both short and long terms.

Short-Term Uses Affecting Long-Term Productivity

Under Alternatives 1 through 5 the short-term losses of net income to the medium scale operations could severely alter the fundamental composition of the existing operations in the long term. This would have social impacts on the communities in which they occur. Small and large scale operations would not incur substantial adverse impacts under these alternatives except under Alternative 2, Elimination of Livestock Grazing, in which all scales of operations would be affected similarly. Under present economic structures most of the 282 ranch operations would have moderate to high potential for financial failure in the long term, which could severely alter existing lifestyles and community social service structures.

Under Alternative 6 the increased grazing levels in the short term would be sustained in the long term, continuing a beneficial effect on ranch operations of all scales and the communities in which they occur.

Irreversible/Irretrievable Commitment of Resources

Although unavoidable impacts to rancher incomes would be anticipated in all but Alternative 6, it is not possible with existing data to translate impacts into an irreversible or irretrievable "failure" of the ranch units in economic terms. As stated at the beginning of this analysis (Unavoidable Adverse Impact section), impacts to incomes would simply mean that extreme financial stress would occur. This would precipitate a change in some sort to the ranch operations and subsequently to the community based sociological institutions. Additionally, because of the inherent and historical resilience of existing ranch operations and community based social structures, a prediction of irreversible or irretrievable impacts is not possible in a strict economic sense.

IMPACTS TO WILDLIFE

Deer populations are presently low in the EIS area (5,539 head). According to the 1975-79 Range Survey (BLM Cedar City District Office) more than adequate forage is available to deer. Therefore, it is assumed that other undefined factors which are not associated with forage availability are limiting deer numbers.

Antelope numbers have steadily declined since their introduction and currently number approximately 30 head. Forage allocated specifically to antelope (35 AUMs) would be only of sufficient quantity to support existing numbers.

Elk were transplanted into the Boulder elk herd unit in 1977-78. Since that time the elk numbers have increased. Heavy snowfall during 1978-79 forced several elk bands (approximately 100 head) to move into the EIS area. It has not been determined if elk use will continue during mild winters, however, impact analysis is based on the assumption that the elk use will continue. Currently there are 798 AUMs available to elk.

Bighorn sheep introduced into the area have steadily increased from 23 head to 40 head, and would be expected to increase to approximately 150 head during the 24-year timeframe. This estimated population would require approximately 321 AUMs annually. According to the 1975-79 Range Survey (BLM Cedar City District Office), only 261 AUMs are currently available. Bighorn sheep would disperse into other areas (Escalante River and Death Hollow Allotments) before forage shortages would occur.

Wildlife AUMs and species numbers by allotment can be found in Appendix 22. Big game forage allocations proposed in each alternative in Chapter 2 have been considered in the analysis are shown in table 4-5. Forage allocated to other resource uses is not useable by big game (Chapter 2, Introduction). A summary of impacts to important and critical big game habitat

TABLE 4-5

Summary of Forage Allocation to Big Game

Alternative	Big Game (Initial Allocation)	Big Game Long-Term Allocation)
1. Continuation of Present Management	0	0
2. Elimination of Livestock Grazing	16,515	16,515
3. Multiple Resource Enhancement	16,784	16,784
4. Adjustment to Grazing Capacity	16,515	16,515
5. Rangeland Management Recommendation	16,784	16,784
6. Livestock Optimization	16,784	16,784

condition by alternative can be found in table 4-6. The acres shown in this summary are derived from projection of the Distribution of Wildlife Species map (fig. 3-3 at the end of Chapter 3) on the Existing Allotment map (fig. 2-2 inserted at the back of this volume).

The predicted impacts to wildlife are based on information contained in the vegetation impact analysis (Vegetation, Chapter 4). A big game and upland game bird impact summary by allotment and alternative can be found in Appendix 25. Included in Appendix 25 is a discussion of methodology used in projecting deer numbers.

Continuation of Present Grazing Management: ALTERNATIVE 1

Under this alternative there would be a continuation of the present season and level of livestock use. This would result in an overallocation of livestock forage, which would cause a long-term decrease of forage production by 6 percent and a decline in forage condition (Vegetation, Chapter 4). Consequently, critical wildlife areas would continue to be utilized heavily and conflicts with livestock would result in a decline in wildlife habitat condition.

Mule Deer

Due to the present overallocation of livestock forage, low plant vigor, and poor quality forage, deer habitat would continue to decline on 139 allotments containing 1,001,361 acres of important deer habitat, and 68 allotments containing 178,746 acres of critical deer habitat (tables 3-8 and 3-9). Desirable browse species would continue to decrease in areas of heavy livestock grazing, lowering the quality of habitat (Dusek, 1975). An overall 6-percent decline in forage production would result (Vegetation, Chapter 4). This decline would cause a change in condition class on 2,019 acres (table 4-6), and would result in further deterioration of deer habitat. A decline

TABLE 4-6

Summary of Impacts to Big Game Habitat

Alternative	MULE DEER						ANTELOPE						ELK		
	Important			Critical ^a			Important			Critical			Important		
	Condition	Acres	Allot-ments	Condition	Acres	Allot-ments	Condition	Acres	Allot-ments	Condition	Acres	Allot-ments	Condition	Acres	Allot-ments
Existing Situation	Good	39,555	5	Good	700	2	Good	37,065	4	Good	1,689	3	Good	19,404	...
	Fair	411,541	47	Fair	66,897	20	Fair	19,547	2	Fair	290	2	Fair	19,404	6
	Poor	537,921	78	Poor	103,710	44	Poor	.....	...	Poor	.....	...	Poor	.....	...
	Unknown	12,344	9	Unknown	5,570	2									
Continuation of Present Management	Good	39,555	5	Good	700	2	Good	37,065	4	Good	1,689	3	Good	19,404	...
	Poor	409,522	46	Fair	66,897	20	Fair	19,547	2	Fair	290	2	Fair	19,404	6
Elimination of Livestock Grazing	Good	48,284	9	Good	b	b	Good	37,065	4	Good	.....	...	Good	.....	...
	Fair	298,646	44	Fair	b	b	Fair	19,547	2	Fair	.....	...	Fair	19,404	6
	Poor	522,669	77	Poor	b	b	Poor	.....	...	Poor	.....	...	Poor	.....	...
Multiple Resource Enhancement	Good	145,082	6	Good	5,674	5	Good	37,065	4	Good	1,689	3	Good	19,404	...
	Fair	306,014	46	Fair	68,143	21	Fair	19,547	2	Fair	290	2	Fair	19,404	6
	Poor	537,921	78	Poor	97,490	40	Poor	.....	...	Poor	.....	...	Poor	.....	...
Adjustment to Grazing Capacity	Good	39,555	7	Good	700	2	Good	37,065	4	Good	1,689	3	Good	19,404	...
	Fair	415,097	48	Fair	72,417	22	Fair	19,547	2	Fair	290	2	Fair	19,404	6
	Poor	534,365	77	Poor	98,190	42	Poor	.....	...	Poor	.....	...	Poor	.....	...
Rangeland Management Recommendation	Good	56,885	7	Good	2,405	3	Good	52,292	5	Good	1,764	4	Good	1,891	1
	Fair	415,811	47	Fair	71,632	22	Fair	4,320	1	Fair	215	1	Fair	17,513	5
	Poor	516,321	76	Poor	97,270	41	Poor	0	...	Poor	.....	...	Poor	.....	...
Livestock Optimization	Good	176,642	9	Good	13,154	6	Good	52,292	5	Good	1,764	4	Good	1,891	1
	Fair	292,498	44	Fair	60,883	19	Fair	4,320	1	Fair	215	1	Fair	17,513	5
	Poor	519,877	77	Poor	97,270	41	Poor	0	...	Poor	.....	...	Poor	.....	...

^aCritical habitat is comprised primarily of areas in which deer or antelope compete or conflict with livestock grazing.
^bConflicts and competition with livestock would be eliminated.

NOTE: Bighorn sheep occupy 1,680 acres of fair condition habitat. This habitat is not expected to change condition.

in forage production would be most pronounced in areas of critical deer habitat receiving heavy livestock use.

No forage allocation would be made to deer in this alternative. As a result, an overall decline in the quantity (4,155 AUMs; Vegetation, Chapter 4) and quality of forage available to deer would occur in the long term due to heavy livestock grazing. The continuation of livestock grazing at present levels and seasons of use would cause a long-term projected loss of 13 deer. The current shortage of 486 AUMs in five allotments would continue (Appendix 4). This shortage would not significantly affect total deer populations, but would limit deer increases in the allotments with shortages.

Antelope

Continued heavy utilization of riparian areas by livestock during the antelope fawning period would result in a long-term reduction in cover and would further intensify present conflicts. This would occur on seven allotments containing 56,612 acres of important antelope habitat and five allotments containing 1,979 acres of critical antelope habitat (tables 3-8, 3-9, and 4-6). The important areas are utilized yearlong by antelope, but a shift toward riparian areas occurs during spring and summer. These areas appear to be critical to antelope, especially during years of drought (Kanab BLM Antelope Transplant File, 1970 to present). Conflicts occurring on these areas are critical because heavy utilization of riparian areas reduces cover and succulent forage, which are important during the fawning periods (Beale and Holmgren, 1974). The use of riparian areas is the only factor which has been studied, although other undefined limiting factors are suspected of contributing to the inability of the herd to increase. The long-term decline in forage production (Vegetation, Chapter 4) and lack of forage allocation would not be expected to affect antelope since little dietary overlap occurs between antelope and livestock. However, the decline in forage would intensify competition in the riparian areas and could limit antelope reproductive processes. No increase in the present antelope numbers (30 head) would be expected under current management practices.

Elk

As discussed earlier, the continued overallocation of forage to livestock would cause a decrease in forage condition in the long term. This loss, although not sufficient to cause a change in habitat condition class, would result in a decrease in quality browse species. These species are most important to elk during severe winters of deep snow and without this quality forage the physical condition of elk would deteriorate, possibly increasing losses due to winter kill (Gaffney, 1941).

Most of the 19,404 acres of important elk habitat in the EIS area (table 3-8), is in fair condition. Although critical elk habitat has not been determined, some competition between elk and livestock exists, especially in years of heavy snowfall. No forage allocation to elk would be proposed under this alternative. This would allow livestock to heavily use key browse species prior to winter use by elk, thereby intensifying overutilization. Adequate forage would be available for current elk numbers. Under this alternative elk numbers would be expected to increase to 154 head (from 100

head using 316 AUMs to 154 head using 486 AUMs). No critical elk habitat has been determined, however, adjustments in stocking rates may be necessary once important areas are located.

Bighorn Sheep

Bighorn sheep presently inhabit approximately 1,680 acres of public land (table 3-8). Most of this area is in fair to poor condition. Adequate forage is available and most of this area receives only light grazing by livestock due to its rough terrain. Conflicts between wild horses and bighorn sheep for water do occur in the Moody Canyon area, although the extent of these conflicts is not known. Studies in Nevada have shown that wild horses can have a limiting effect on bighorn sheep populations (McQuivey, 1978).

A bighorn sheep transplant has been proposed for Spencer Bench and Harvey's Fear Allotments (table 3-9). These allotments are inhabited by a small band of wild horses, a potential limiting factor in the success of this transplant. This alternative would not provide for removal of wild horses from this area.

Sufficient forage is currently available for present bighorn sheep (40 head). Under this alternative, the bighorn sheep population would be expected to reach 150 head and expand into the Escalante River Allotment. Wild horse numbers would not be expected to increase, but conflicts would be expected to intensify. No forage is presently allocated to bighorn sheep and no allocation would be made under this alternative. The lack of a forage allocation made specifically to bighorn sheep would not significantly impact bighorn sheep due to the rough nature of their habitat and the lack of competition with livestock.

Upland Game Birds

The implementation of Alternative 1 would have the most impact upon upland game bird species by affecting their food and cover. Continued livestock grazing would reduce the availability of succulent plants, decrease plant vigor, and reduce cover. Upland game birds presently occupy approximately 139,417 acres of rangeland, most of which is in fair to good condition (Wildlife, Chapter 3). Quail and chukar partridge are dependent on riparian areas for cover, water, and succulent plants, especially during dry periods (BLM Manual Tech. Supplement 6601). Limited amounts of these habitat factors would result under present grazing management practices and would limit increases of upland game bird populations.

Although little information is available concerning turkey and blue grouse habitat, similar impacts would be anticipated.

There are 3,160 acres of sage grouse habitat (table 3-10) that would not be expected to change significantly, although forbs, which are used by sage grouse during the spring, would continue to be heavily utilized by cattle. Most of the critical habitat (wet meadows) required by sage grouse occurs on private lands.

Other Wildlife

Implementation of this alternative would cause only a slight negative impact to most small birds and mammals. Habitat for these species would remain in poor to fair condition throughout the EIS area. The greatest impact to these species would occur in the riparian areas. Riparian zones and the plant diversity created in these areas supply important habitat factors (food, cover, and water) for approximately 275 species. Allotted riparian habitat is presently overutilized by livestock (Vegetation, Chapter 3) and would remain in poor to fair condition because of the level of livestock grazing proposed. As a result, no change in other wildlife species composition would occur.

Conclusion

Important and critical deer habitat would remain in poor to fair condition. Habitat quality would decrease and present deer numbers would decline from 5,539 to 5,526 head. No change in important or critical antelope habitat would occur, and present antelope numbers (30 head) would be expected to remain stable. Elk numbers would be expected to increase in the long term to 154 head, with no change in condition of elk habitat expected. Although bighorn sheep habitat would not change, sheep numbers would be expected to increase to approximately 150 head, eventually spreading into other areas. Upland game bird habitat would not significantly change.

Riparian habitat condition would remain in the same condition, with most being in fair to poor condition in the allotments where livestock grazing would be allowed (Vegetation, Chapter 4). The condition of riparian habitat would affect approximately 275 nongame species which are dependent upon the riparian community (URA, Wildlife, all planning units, 1975-79).

Elimination of Livestock Grazing: ALTERNATIVE 2

The elimination of livestock grazing on public lands would eliminate existing competition between livestock and wildlife. A reduction in the present utilization levels on desirable forage species would provide for improvement in plant vigor and production (Vegetation, Chapter 4). The improvement in forage condition would result in a corresponding improvement in present wildlife habitat conditions. This would be especially true in critical habitat areas. Although proposed fencing (needed to accomplish complete elimination) would restrict wildlife movement, standard design restrictions (Appendix 3) would reduce hazards to wildlife.

Mule Deer

Excluding livestock grazing from public lands would eliminate all competition between deer and livestock on approximately 1,001,361 acres of important and 176,817 acres of critical deer habitat (table 4-6). Livestock tend to overutilize some desirable species, causing wildlife to compete for forage (Peek et al., 1978). The elimination of livestock grazing would allow key wildlife forage species (especially browse species) to improve, and an overall improvement in plant vigor, quality, and abundance would result (Vegetation, Chapter 4). This improvement of desirable deer forage species would

cause important deer habitat condition to improve on 128,147 acres. All acres of critical deer habitat would improve, since most of the present conflicts in these areas occur with livestock grazing (Wildlife, Chapter 3). The improvement in the quality and quantity of forage available to deer and the elimination of conflicts between deer and livestock would allow deer numbers to increase from 5,539 to 5,672 head, assuming that all limiting factors would remain constant. Mule deer would be allocated 15,527 AUMs initially and in the long term.

Under this alternative there would be approximately 973 miles of new fence (table 2-1). All fences impede the natural movements of big game to a degree, and injury or death could occur from entanglement. This often occurs when animals are weak due to stresses (such as malnutrition) and are unable to jump high enough to clear fences. To minimize these hazards, fences would be built to BLM specifications (Appendix 3).

Antelope

The elimination of livestock grazing would result in a significant improvement in riparian vegetation and would improve conditions on 1,979 acres of critical habitat now utilized primarily during the spring and summer (Vegetation, Chapter 4). Important antelope habitat (56,612 acres) would not change condition class and would remain in the present fair to good condition. Antelope numbers have declined from introduced levels (125 head) to approximately 30 head and appear to have stabilized. Habitat in this area may not be conducive to antelope numbers above the present level, although sufficient forage is available. Therefore, antelope would be allocated 35 AUMs, and no increases would be expected above the present numbers.

This alternative would require fencing of State and private lands. Portions of these fences would be built in areas of important antelope habitat. Improperly built fences could be a hazard to antelope and could restrict antelope movements. Since all fences would be built to BLM specifications (Appendix 3), this impact would be minimized.

Elk

Generally the elimination of livestock grazing would result in an improvement in forage condition (Vegetation, Chapter 4) and would cause an overall increase in forage quality and its availability. However, the 19,404 acres of elk habitat would remain in fair condition. The improvement in forage quality resulting from the implementation of this alternative would benefit elk. Also, livestock conflicts with elk for forage would be eliminated, allowing elk numbers to increase from 100 head (316 AUMs) to at least 200 head (632 AUMs). All livestock forage would be available to wildlife and no forage shortages for elk would exist (elk allocated 632 AUMs). This alternative would require the construction of fences around State and private lands. Fences could be a hazard to elk by restricting movements and causing entanglement. All fences would be built according to BLM specifications (Appendix 3) to minimize these hazards.

Bighorn Sheep

Elimination of livestock grazing would not be expected to change bighorn sheep habitat condition because only light grazing by livestock currently occurs in these areas due to rough terrain. Wild horse numbers in the Escalante area would be expected to increase, intensifying conflicts with bighorn sheep for water. A proposed bighorn sheep transplant into the Spencer Bench-Harvey's Fear area could have only limited success due to the presence of wild horses. Studies in Nevada have shown that wild horses can limit bighorn sheep numbers (McQuivey, 1978). The effects of wild horses would be most pronounced in cases of newly introduced animals. Bighorn sheep would be allocated 321 AUMs, sufficient forage to allow them to increase to 150 head. No fences would be constructed in this area under this alternative.

Upland Game Birds

The elimination of livestock grazing would be beneficial to all upland game birds. Increased forage production and plant vigor would occur, providing upland game birds with more succulent plants and seeds (Vegetation, Chapter 4). Improvements in the riparian habitat would result from the elimination of livestock trampling and heavy utilization of these areas. Increased production in these areas would allow quail and chukar partridge to increase in number and distribution (Nish, 1964). Although little information is available concerning turkey and blue grouse, their habitat would be expected to improve with the corresponding improvement in forage condition (Vegetation, Chapter 4). Sage grouse habitat (3,160 acres) would not be expected to change significantly.

Other Wildlife

The elimination of livestock grazing would improve riparian areas by increasing vegetation diversity and cover on approximately 2,688 acres presently grazed by livestock. This would be a substantial benefit to all forms of wildlife (Black and Frischknect, 1971).

Conclusion

The exclusion of livestock grazing from public land would improve the condition of important and critical deer habitat. The predicted increase in forage quality and condition would increase deer numbers from 5,539 head to a projected 5,672 head. Important antelope, elk, and bighorn sheep habitat would not improve sufficiently to change condition class, but there would be an improvement in plant quality. Antelope numbers would remain the same, but elk and bighorn sheep numbers would increase from 100 head to at least 200 head and 40 head to 150 head respectively. All upland game bird habitat would improve, giving upland game birds the opportunity to increase in numbers and distribution. Riparian habitat would improve on a net 2,688 acres, benefiting many species.

Multiple Resource Enhancement: ALTERNATIVE 3

Reduced utilization of forage by livestock and the elimination of livestock grazing in riparian areas would improve wildlife habitat conditions.

Critical habitats would improve as a result of the corresponding improvement in forage condition (Vegetation, Chapter 4). As a result of increased forage production, existing forage competition would be reduced. The 125 miles of fence required to protect riparian areas and fragile watersheds would be constructed to standard BLM specifications (Appendix 3) to minimize wildlife impacts.

Mule Deer

As a result of the wildlife enhancement aspects in this alternative (Chapter 2), mule deer habitat condition would improve on a net 105,527 acres of important and 4,974 acres of critical habitat. These improvements would be the result of the elimination or reduction of livestock numbers in some allotments and the protection of riparian areas (Dahlem, 1978). In addition, livestock grazing would be eliminated for a 2-year period on 34 allotments containing important and critical habitat. The elimination of livestock grazing for 2 years would allow plant vigor to improve but would not provide additional forage to deer in the long term. The improvement in quality of forage as a result of improved plant vigor and reduced livestock use of key browse species would allow deer numbers to increase from 5,539 to a projected 5,672 head. However, a shortage of 459 AUMs would occur in four allotments (Appendix 4). This shortage would not be expected to significantly affect overall deer numbers. Mule deer would be allocated 15,527 AUMs (based on prior stable deer numbers) both initially and in the long term.

The implementation of this alternative would require the construction of approximately 125 miles of fence. Impacts resulting from fencing are discussed in this section under Alternative 2. Since fences would meet BLM construction standards (Appendix 3), the impacts to deer would be minimized.

Antelope

Implementation of this alternative would not result in a significant change in the condition of important antelope habitat (table 4-6). However, benefits would occur in the 1,979 acres of critical habitat (table 4-6). These benefits would result from the removal of livestock from critical riparian fawning areas. Riparian areas provide succulent forage, cover, and water, which can be critical to antelope during fawning periods (Beale and Holmgren, 1974). Adequate forage would exist for antelope, but until undefined limiting factors would be overcome there would be little increase in their numbers. Antelope presently numbering 30 head would be allocated 35 AUMs both initially and in the long term.

The implementation of this alternative would require the fencing of riparian areas. As mentioned in Alternative 2, fences could be a hazard for antelope by restricting movements. Fence construction would meet BLM standards (Appendix 3) and as a result these impacts would be reduced.

Elk

Although the reduction of livestock numbers would improve forage quality, elk habitat (19,409 acres) would not significantly change under this alternative. The elimination of livestock grazing on 34 allotments would not occur

in elk habitat. Desirable browse species would be slightly enhanced by the reduced use by livestock, resulting in a small improvement in quality of forage available to elk. Sufficient elk forage exists for present herd numbers. However, elk numbers would be expected to increase from 100 to at least 200 head, creating a shortage of 75 AUMs in one allotment (Appendix 4). Elk using this allotment would have to shift to areas with more forage or utilization exceeding 50 percent would occur. The significance of this allotment as elk habitat is not currently known.

Elk would be allocated 632 AUMs initially and in the long term. Some fencing of riparian areas would occur in elk habitat under this alternative. As discussed in Alternative 2, fencing could be a hazard to wildlife. To minimize hazards to elk, all fences would meet BLM construction specifications (Appendix 3).

Bighorn Sheep

No change in condition of bighorn sheep habitat would be anticipated. However, the removal of wild horses (Chapter 2) would eliminate any existing or potential conflicts between these species for habitat. Since bighorn sheep seldom utilize areas used by wild horses, success of the proposed transplants of bighorn sheep into the Spencer Bench - Harvey's Fear area would be enhanced. Bighorn sheep would be allocated 590 AUMs both initially and in the long term.

Limited fencing would occur in bighorn sheep habitat. In order to minimize the hazards of fences, their location would not cross bighorn sheep routes of movement and/or migration. Also, fences would be constructed according to BLM specifications (Appendix 3), minimizing impacts.

Upland Game Birds

The elimination of livestock grazing from riparian areas would allow rapid recovery of riparian vegetation (Vegetation, Chapter 4). Quail and chukar partridge would have the opportunity to increase in numbers and expand their territory (Nish, 1964). Reduced livestock numbers would increase succulent plants and improve seed production. This would also benefit turkey, sage grouse, and blue grouse. However, the reductions in use by livestock in these areas would not be sufficient to change condition class; habitat would remain in fair to good condition classes.

Other Wildlife

Improvements in the riparian areas (similar to those in Alternative 2) would benefit approximately 275 nongame species (URA, Wildlife, all planning units, 1975-79). In the past, grazing by livestock has caused deterioration of riparian areas, which are now in poor to fair condition (Vegetation, Chapter 3). This alternative would allow 2,688 acres of riparian areas to improve. Riparian areas create a diversity of plant species which provide important habitat factors (food, cover, and water) to many nongame species. Other rangeland areas would also improve due to a decrease in livestock utilization. This improvement would primarily occur in plant vigor and seed production, allowing increased species diversity (Vegetation, Chapter 4).

All residual forage not available to livestock or utilized by big game would be available to other wildlife.

Conclusion

Improvement to mule deer habitat would occur on a net 105,527 acres of important habitat and 4,974 acres of critical habitat. No change in condition would occur to important antelope, elk, or bighorn sheep habitat. Although no improvement in habitat condition would occur to critical antelope areas, the removal of livestock from these areas would eliminate conflicts in fawning areas. Potential conflicts of habitat between bighorn sheep and wild horses would be eliminated. The improvement in deer habitat would be expected to increase deer numbers from 5,539 head to a projected 5,672 head, and elk would be anticipated to increase from 100 head to at least 200 head. Bighorn sheep would also be enhanced by the removal of wild horses and their numbers would increase from 40 to 150 head. No change in antelope population would be expected. Upland game bird habitat and other wildlife species habitat would improve in vigor due to livestock reductions; the greatest improvement and benefit occurring in riparian areas.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Initial adjustments in season and level of livestock use would improve forage condition (Vegetation, Chapter 4) and cause subsequent improvement in wildlife habitat conditions. Construction of rangeland developments and implementation of grazing systems and vegetation treatments on 21 allotments would improve forage production and enhance livestock distribution. These actions would reduce forage competition, especially on critical habitat areas. Vegetation treatments (chaining, spraying, burning, plowing, and seeding) would replace less desirable forage species with desirable forage, improving quality of wildlife forage.

Mule Deer

Implementation of this alternative would result in a net improvement on 3,556 acres of important and 700 acres of critical deer habitat (table 4-6). Vegetation treatments would contribute most of this increase since livestock numbers would be reduced only 1 percent from the past active authorized use. Livestock grazing would be limited on 104 allotments to a period "after seed ripe." This would improve the vigor and quality of all forage species utilized by deer. However, this would result in deer and cattle utilizing these areas at the same time (10/1-3/30) and competing for forage. Implementation of 21 AMPs would also occur. Only treatments or rangeland developments necessary to implement these AMPs would be completed. Upon completion of these treatments, grazing systems (such as rest rotation or deferred rotation systems) would be implemented. The effects of such systems upon ungulates has not been conclusive. In Oregon (Skovlin et al., 1968) it has been found that mule deer and elk benefit more from deferred rotation systems than from season-long use. Knowles (1975), however, has reported little difference between the use of pastures in a rest rotation system and those pastures grazed continuously. Average utilization of forage species in specific pastures may exceed 50 to 60 percent in years they are grazed, limiting the amount of quality forage available to deer.

As shown in the Specific Management tables in Appendix 1, various types of vegetation treatments would be utilized to implement the 21 AMPs. Chaining would be used to remove deep-rooted plants such as pinyon-juniper or sagebrush and would reduce canopy cover, allow more desirable browse species to become established, and increase diversity and "edge effect" (Vegetation Treatments in Appendix 20).

Sagebrush areas would be treated using several methods. Burning would remove many desirable species, and according to Linne (1978), at least 3 years may be required to restore normal production. Linne also indicates that rabbitbrush may increase as much as nine times over preburn levels following a fire. This would be beneficial to deer, especially in mature stands of big sagebrush.

Spraying treatments would be less severe than burning treatments, as some forage would remain. However, the use of 2,4-D could adversely affect some nontarget plants. The application of 2,4-D would be expected to greatly reduce forbs and shrubs, but would have little impact on grasses. This reduction in forbs and shrubs would occur initially, but they would begin to recover toward pretreatment levels during the first year after treatment. This initial loss of forbs would be most detrimental to deer in the early spring because young forbs and grasses contain the very essential nutrients needed to restore deer to a healthy state following the stresses of winter malnutrition (BLM Manual Tech. Supplement 6601-6).

Plowing sagebrush would also remove browse species while favoring perennial grasses. Use of this treatment would be limited and would be restricted to areas of deep soils. This would remove big sagebrush for 8 to 10 years and would increase diversity. After 8 to 10 years, reinvasion of sagebrush would begin to occur. Therefore, only a short-term loss of sagebrush in deer habitat would result.

A more complete discussion of treatments and their effects on various vegetation types can be found in the Vegetation Treatments section of Appendix 20.

Mule deer would be allocated 15,527 AUMs initially and in the long term. This would be more than enough forage for present deer numbers. However, projection of deer numbers indicates that deer would increase to 5,898 head, resulting in a shortage of 486 AUMs in five allotments (Appendix 4). This would not significantly impact total deer numbers.

There would be 35 miles of new fence proposed under this alternative. Fences would be constructed to BLM design specifications to minimize impacts (entanglement) to deer (Appendix 3).

Antelope

Implementation of this alternative would not change antelope habitat condition. Due to limited dietary overlap between livestock and antelope, little competition for forage would occur and reduced livestock numbers would have little effect on antelope forage availability.

Conflicts between antelope and livestock for use of critical areas (riparian) would continue because no protection would be provided for these areas. As a result, no significant change from the present condition would be expected. As stated in Alternative 1, these areas are critical to antelope fawning and are presently utilized heavily by livestock. Antelope would be allocated 35 AUMs in both the short and long terms and no change in present antelope numbers (30 head) would be anticipated.

Approximately 2.5 miles of fence would be built on areas utilized by antelope. Fencing could be a barrier to antelope, especially if improperly constructed. Therefore, all fences would be built according to BLM specifications (Appendix 3), and there would be minimal restriction of antelope movement.

Elk

No vegetation treatments or developments would occur in elk habitat. As a result, the 19,404 acres of elk habitat would not significantly change.

Under this alternative, 632 AUMs would be allocated to elk in both short and long terms. This would be sufficient forage for present elk numbers. However, elk numbers would double in the long term, creating a shortage of 146 AUMs in three allotments (Appendix 4). This shortage of forage would cause elk to exceed 50 percent grazing of key browse species or to shift to areas with more abundant forage.

No fencing would be constructed in areas utilized by elk.

Bighorn Sheep

Bighorn sheep habitat would not change from fair condition under this alternative. Most of this area receives only light use by livestock and the reduction in livestock numbers would have only minimal effects. Currently no conflicts with wild horses exist, and none would be expected under this alternative. Wild horses would be allocated only sufficient forage to maintain present numbers.

The presence of wild horses in an area currently proposed for a bighorn sheep transplant (Spencer Bench - Harvey's Fear) would be a potential limiting factor in the success of this transplant (McQuivey, 1978).

Adequate forage is currently available to bighorn sheep. Sheep numbers would be expected to increase from 40 to 150 head and sufficient forage would be available to support these increased numbers. Bighorn sheep would be allocated 321 AUMs both initially and in the long term. No fences or treatments would be proposed for areas utilized by bighorn sheep.

Upland Game Birds

The 139,417 acres presently inhabited by upland game birds (Wildlife, Chapter 3) would not significantly change with the adjustment of livestock numbers to the surveyed capacity. Riparian habitat condition would improve on 679 acres (Vegetation, Chapter 4). This improvement would be most evident

in areas where livestock grazing is presently heavy. Succulent plants utilized by upland game birds (especially the young birds) would be more abundant in areas of improvement (Patterson, 1952; Martin et al., 1961). Upland areas utilized by turkey and blue grouse would remain in fair to good condition, as would sage grouse habitat (Vegetation, Chapter 4).

Other Wildlife

With a reduction in livestock numbers by only 1 percent, little change in nongame habitat would be expected. Vegetation treatments on 13,547 acres would increase diversity of plant and animal species. The improvement of very poor condition riparian habitat to poor condition on 530 acres, and the improvement of poor condition habitat to fair condition on 144 acres, would improve the habitat of 275 wildlife species which are dependent upon the riparian habitat.

Conclusion

Approximately 3,556 acres of important and 700 acres of critical deer habitat would improve due to treatments. Little change in antelope habitat would occur and conflicts with livestock in critical areas would continue. Elk habitat (19,404 acres) and bighorn sheep habitat would not change condition. Deer numbers would increase from 5,539 to 5,898 head. No change would occur to present antelope numbers (30 head). Elk numbers would be expected to double, creating some forage shortages. Present bighorn sheep numbers would be expected to increase from 40 to 150 head, although the potential for wild horses to restrict bighorn sheep expansion in some areas would exist. Upland game birds and other wildlife species would benefit from an improvement on 679 acres of riparian habitat.

Rangeland Management Recommendation: ALTERNATIVE 5

There would be a favorable impact to wildlife from improved rangeland management practices (grazing systems, water and fence developments), vegetation treatments, adjustment in season of livestock use, and an overall 1-percent reduction in the existing level of livestock use. Better distribution of livestock and increased production and diversity of desirable forage species would occur. This would result in an improvement in wildlife habitat conditions, especially forage quality.

Mule Deer

The reduction of livestock grazing to the surveyed capacity and the improved distribution as a result of construction of rangeland developments and management practices would relieve some of the pressure now placed on browse species in important and critical deer winter range.

As projected in the Impacts to Vegetation (Chapter 4), forage condition would improve and would result in a corresponding improvement on 21,600 acres of important mule deer habitat. Critical deer areas would improve on a net 2,625 acres. Implementation of vegetation treatments would be the primary cause of this improvement in condition. The reduction of livestock grazing to the surveyed capacity would improve plant vigor and relieve some of the

pressure now placed on browse species (Vegetation, Chapter 4). Specific management systems (rest-rotation or deferred systems) would be implemented on 66 allotments containing mule deer habitat. As stated in Alternative 4, the effects of these systems on species such as deer are not conclusive. Deer, however, do tend to prefer areas which are deferred or not grazed by livestock (Knowles, 1975).

Livestock grazing after seed ripe would be proposed on an additional 63 allotments. Grazing of this nature would improve vigor and quality of all forage species. However, this would result in deer and cattle utilizing these areas at the same time (10/1-3/30) and would cause additional competition for forage.

Approximately 40,049 acres of vegetation treatments would be necessary to implement the proposed grazing systems. As discussed in Alternative 4, chaining would remove deep rooted plants such as pinyon-juniper and would reduce canopy cover. Sagebrush removal by burning could result in an increase in rabbitbrush; however, 3 years could be required to restore some desirable species to normal production. Spraying with 2,4-D would remove sagebrush without disturbing the soil (Soils, Chapter 4). Spraying would also reduce forbs and desirable shrub species while favoring perennial grasses. Plowing would remove deep-rooted mature stands of big sagebrush and would increase forbs and annuals due to the accompanying disturbance. In all areas of deer habitat these treatments would remove less desirable species and replace them with higher quality species, resulting in additional forage available to deer.

In addition to vegetation treatments, approximately 117 miles of fence would be constructed. As has been discussed in Alternatives 2, 3, and 4, improperly constructed fences could have direct impacts on deer by interfering with migrational movements or restricting their access to additional habitat. However, since fences would be designed and constructed to BLM specifications, impacts would be minimized.

Under this alternative, deer would be allocated 15,527 AUMs in both short and long terms. Projected deer numbers (5,898) indicate that a shortage of 229 AUMs in four allotments would exist (Appendix 4). This shortage, however, would not significantly impact projected deer populations.

Antelope

Implementation of this alternative would improve important antelope habitat on 10,220 acres. As a result of improved livestock distribution, critical antelope habitat would improve on 75 acres, primarily in riparian areas used for fawning. Sufficient forage would be available in all allotments containing antelope. Antelope would be allocated 35 AUMs both initially and in the long term.

Approximately 9 miles of fence would be built in antelope habitat. Antelope usually crawl under fences in their natural habitat (Spillet et al., 1967). Proposed fences would be built to BLM design specifications to minimize possible negative impacts (Appendix 3).

Elk

As discussed in the impacts to deer, livestock grazing would be reduced to the surveyed capacity, resulting in improved plant vigor. The proposed grazing system for the Circle Cliffs Allotment would cause shortages of forage in pastures that would be grazed. Wildlife such as deer and elk may prefer areas that are not grazed by livestock (Knowles, 1975). This could cause elk to concentrate in pastures not grazed.

Vegetation treatments in the Circle Cliffs Allotment would eventually benefit elk by improving the quality and quantity of forage available, although elk use in this allotment does not appear to be heavy at this time. As a result of this alternative, elk habitat would improve on 1,891 acres (table 4-6). Impacts from treatments that would benefit elk include the removal of undesirable canopy cover and the increased growth of native grasses and forbs. A more detailed discussion of these impacts can be found in Alternative 4. Elk would be allocated 632 AUMs both initially and in the long term. Isolated shortages of 31 AUMs in one allotment (Appendix 4) would occur as elk numbers increase to 200 head. As stated earlier, this increase would cause overutilization of key species and would require elk to shift to other areas.

Approximately 4 miles of fence would be constructed. Fencing would be constructed to BLM specifications (Appendix 3) to minimize hazards to elk.

Bighorn Sheep

Bighorn sheep habitat would not change from fair condition under this alternative. The removal of wild horses from the Escalante area would eliminate existing conflicts for water. The removal of wild horses from the Spencer Bench - Harvey's Fear area would improve possibilities for success of the proposed transplants into this area (McQuivey, 1978). Approximately 3 miles of fence would be constructed in the Moody Canyons Area. Improperly designed fencing could be a hazard because of restriction of movements to areas with higher quality forage and because direct mortality could result if animals tried to cross these fences. In order to minimize these hazards, fences would be constructed according to BLM specifications (Appendix 3).

Bighorn sheep would be allocated 590 AUMs in both the short and long terms. This would be sufficient forage to allow bighorn sheep to increase from 40 to 150 head.

Upland Game Birds

Because reductions in livestock use would be small, the majority of upland game bird habitat would not change with implementation of this alternative. Most vegetation treatments would not occur in areas that are currently upland game bird habitat, although approximately 35 percent of the sage grouse habitat would be lost in the Black Rock Allotment due to proposed seedings. The importance of this area as sage grouse habitat is not known and no strutting grounds have been located. Treatments that would occur in sage grouse habitat would conform to guidelines which were developed for sage grouse habitat (Western States Sage Grouse Committee, 1968). In addition,

on-the-ground examinations by BLM and Utah Division of Wildlife Resources (UDWR) personnel would be made. Riparian areas utilized by quail yearlong for food and protection and by chukar partridge for succulent forage during dry periods (Martin et al., 1961) would improve on 780 acres due to improved distribution of livestock as a result of management systems and treatments (Vegetation, Chapter 4).

Other Wildlife

Small mammals and birds would benefit from the increased cover and food from perennial grasses and shrubs (Vegetation, Chapter 4). There would be improvement on 780 riparian acres because treatments would provide higher quality forage and there would be better distribution of livestock.

Conclusion

The improvement in condition of deer habitat would result in deer numbers increasing from 5,539 to 5,898 head. Antelope numbers would not change from the present 30 head. Elk numbers would at least double from the present 100 head to 200 head. Bighorn sheep and potential wild horse conflicts would be eliminated with the removal of wild horses. Bighorn sheep numbers would be expected to increase from 40 to 150 head. The majority of upland game bird habitat would not change and the importance of sage grouse habitat that would be lost due to treatments is not known, but would probably be small. Other wildlife species would benefit due to diversity of plant species resulting from vegetation treatments and the improvement of 780 acres of riparian habitat.

Livestock Optimization: ALTERNATIVE 6

The same actions proposed in Alternative 5 would occur in this alternative. Additionally, increased vegetation treatments would be implemented. These actions would improve wildlife habitat condition and increase forage productivity. Quality of wildlife forage would improve and existing competition and conflicts would be reduced.

Mule Deer

Proposals of this alternative would provide for treatments in addition to those proposed in Alternative 5. There would be 176,971 acres of seedings which would be designed to replace low quality forage with plant species that would be more desirable. Management objectives discussed in Alternative 5 would be carried into this alternative, with similar impacts expected. Reduced livestock grazing, grazing systems, and grazing that would begin after seed ripe (Chapter 2) would improve plant vigor. Vegetation treatments such as spraying, burning, chaining, and plowing would reduce cover and remove less desirable forage species. These actions would result in the improvement of 165,013 acres of important and 12,454 acres of critical deer habitat. Impacts of these treatments are discussed in more detail in Alternatives 4 and 5. Fencing projects would be similar to those described in Alternative 5 and impacts would be similar.

Mule deer would be allocated 15,527 AUMs initially and in the long term. A forage shortage of 18 AUMs on three allotments would occur (Appendix 4). According to projected deer numbers, deer would increase from their present numbers of 5,539 to 5,898 head.

Antelope

As a result of improved livestock distribution, important and critical antelope habitat would improve on 10,220 acres and 75 acres respectively. Antelope would be allocated 35 AUMs both initially and in the long term. No treatments or fences other than those discussed in Alternative 5 would be developed in antelope areas.

Elk

Elk habitat would improve on 1,891 acres (table 4-6). As discussed in Alternatives 4 and 5, most of these improvements would occur due to vegetation treatments, reduced livestock numbers, and development of grazing systems.

Sufficient forage currently exists for present elk numbers (100 animals). The elk herd would be expected to double within 24 years, requiring 632 AUMs of forage. Elk would be allocated 632 AUMs, however, a shortage of 51 AUMs would occur in one allotments (Appendix 4) causing overutilization or a shift in elk use to areas of more available forage.

Bighorn Sheep

Bighorn sheep habitat would not change under this alternative. As discussed in Alternative 5, removal of wild horses would allow present bighorn sheep numbers to increase and would enhance proposed transplant possibilities. No additional fencing other than that proposed in Alternative 5 would be constructed, and it would meet BLM specifications (Appendix 3). Bighorn sheep would be allocated 590 AUMs initially and in the long term. Bighorn sheep populations would be expected to increase from 40 to 150 head in the long term.

Upland Game Birds

Impacts to upland game birds would be similar to those discussed in the Rangeland Management Recommendation, Alternative 5. Most vegetation treatments would not be proposed for areas which would impact upland game bird habitat. The significance of treatments proposed for sage grouse areas is not known due to a lack of information, but the same guidelines as discussed in Alternative 5 would be followed. Riparian areas currently grazed would not be protected but would improve on 780 acres due to improved livestock distribution and treatments (Vegetation, Chapter 4).

Other Wildlife

Other wildlife species would benefit from the increased cover and food which would result from the proposed 176,971 acres of treatments. Riparian areas would show a net improvement on 780 acres.

Conclusion

The improvement in deer habitat would result in the increase of deer numbers from 5,539 to 5,898 head. Antelope numbers (50 head) would not increase, and elk numbers would be expected to increase from 100 to at least 200 head. Bighorn sheep numbers would be expected to increase from 40 to 150 head in the long term. Upland game bird habitat would not be expected to change, however, some sage grouse habitat would be lost due to treatments. Habitat of other wildlife species would increase due to vegetation treatments and improvement on 780 acres of riparian areas.

Threatened and Endangered Species

The peregrine falcon and the bald eagle are the only known threatened and endangered species in the area. No adverse impacts to these species as a result of implementing any of the six alternatives were identified during informal consultations with the U.S. Fish and Wildlife Service (John Gill, U.S. Fish and Wildlife Service, personal communication, 1979). The peregrine falcon nests in cliffs and ledges and feeds on small birds and mammals. The implementation of any of the six alternatives would not affect nesting areas and no significant change in the prey base would occur. Therefore, no impacts to the peregrine falcon would be expected. The impacts to bald eagles would depend upon the impacts to their prey and roosting areas, which would not be impacted in any of the alternatives under consideration.

Unavoidable Adverse Impacts

The overallocation of forage to livestock in Alternative 1 would result in unavoidable adverse impacts to big game habitat. This impact would be in the form of reducing overall habitat quality and in reducing wildlife forage in the long term. As a result there would be an expected decline of 13 head of deer. All other big game would be unaffected. Implementation of Alternative 4 would create competition for forage between livestock and big game due to a change to winter grazing by livestock. However, there would be no change in wildlife populations as a result of this. Bighorn sheep/wild horse conflicts would continue in Alternatives 1, 2, and 4, with the greatest impacts occurring in Alternative 2 due to an allocation of 650 AUMs to wild horses. There would be an increase in wild horse numbers in Alternative 2. There would not be a decline in bighorn sheep numbers in Alternatives 1, 2, or 4.

Vegetation treatments occurring in Alternatives 4, 5, and 6 would have adverse impacts to some small wildlife species (especially small mammals), but would be beneficial to others. Some changes in sage grouse habitat condition would occur in Alternatives 5 and 6, but the significance of these losses has not been determined.

Short-Term Uses and Long-Term Productivity

In the short term, overallocation of forage to livestock in Alternative 1 would result in a reduction of preferred wildlife forage in the long term, and a decline of 13 head of deer. All other alternatives would have an increase in forage production in the long term until numbers of grazing animals would be stabilized.

Irreversible/Irretrievable Commitment of Resources

There would be no irreversible or irretrievable losses in wildlife populations. Only the consumed forage would be considered irretrievable.

IMPACTS TO FISHERIES

The analysis of fisheries habitat is based on the quality of riparian and aquatic habitat. Riparian habitat provides stream cover and decreases water temperature by shading. Streamside vegetation also reduces sedimentation, which can reduce aquatic organisms and inhibit trout reproduction by killing incubating trout embryos. The overutilization of riparian areas by livestock has been documented as the cause of limited fisheries resources in many areas (Meehan and Platts, 1978).

Generally riparian vegetation begins growth earlier in the spring and continues growth later into the fall than most upland range plants. During this time the plants are more palatable than dried range plants and are actively sought by cattle (Platts and Rountree, 1972). Because of this, vegetation in meadows and along streams is invariably highly utilized under any stocking rate or system of grazing. By affecting the riparian vegetation, livestock also affect the fisheries resource. Due to the variability of information concerning nongame fish, only impacts to sport fisheries (rainbow and brown trout) will be discussed. However, it is assumed that nongame species would be similarly impacted.

Of the 54.2 miles of stream containing sport fish species, 20.5 miles of stream are not presently grazed nor would they be grazed in any of the six alternatives. Because grazing activities would not affect the quality of 20.5 miles of riparian/aquatic habitat, these areas will not be considered in the analysis. Only the 33.7 miles of trout stream which could be affected by the six grazing management alternatives will be subject to analysis.

Vegetation treatments have not been proposed in any of the six alternatives for the eight allotments which have trout fisheries resources. Thus, the 54.2 miles of trout stream would not be affected by vegetation treatments and this aspect of the proposed alternatives will not be considered in the analysis. Table 4-7 contains a summary by alternative of the impacts to fisheries that would result from implementation.

Continuation of Present Management: ALTERNATIVE 1

Present grazing practices would continue on allotments containing trout habitat. Because current livestock numbers are within the limits of the forage surveyed capacity, the aquatic/riparian habitat condition of 33.3 of the 33.7 miles of trout habitat would remain as follows: 9.1 miles in good condition, 22.1 miles in fair condition, and 2.1 miles in poor condition.

The current forage allocation (313 AUMs) is well above the surveyed capacity (220 AUMs) in the Steep Creek Allotment. Because current livestock numbers are significantly above the riparian area's capacity to sustain its

TABLE 4-7

Summary of Impacts to Fisheries

Alternative	Impact
1. Continuation of Present Management	Fisheries habitat would remain unchanged on 33.3 miles of stream. Aquatic/riparian habitat along 0.4 mile of Deer Creek would decline.
2. Elimination of Livestock Grazing	Sport fisheries habitat would improve on 33.7 miles due to improvement in riparian condition.
3. Multiple Resource Enhancement	Fisheries habitat would improve on 33.7 miles due to fencing of riparian areas to eliminate livestock grazing.
4. Adjustment to Grazing Capacity	There would be no change on 26.8 miles of fisheries habitat. Cattle would tend to concentrate in riparian areas. Approximately 6.9 miles of stream would decline due to increased livestock use.
5. Rangeland Management Recommendation	Generally the same impacts as Alternative 4.
6. Livestock Optimization	Fisheries habitat would decline slightly on 26.8 miles of stream in the long term due to increased livestock numbers. Fish habitat along 6.9 miles of stream would decline from fair to poor condition.

present condition, aquatic/riparian habitat condition would be expected to decline. The reduction of habitat condition would occur primarily due to increased streambottom sedimentation and reduced water quality (Water Resources, Chapter 4). These factors would cause further deterioration of 0.4 mile of Deer Creek, which is presently in poor condition.

Conclusion

The continuation of present grazing practices would not change the aquatic/riparian habitat condition of 33.3 miles of stream. The aquatic/riparian habitat along 0.4 mile of Deer Creek, presently in poor condition, would decrease.

Elimination of Livestock Grazing: ALTERNATIVE 2

The exclusion of livestock from public lands would improve the condition classes of all aquatic/riparian areas by eliminating livestock utilization of streambank vegetation and by stopping the physical effects of livestock trampling (streambank sloughing and the reduction of woody riparian vegetation). Improved streambank vegetation would reduce streambottom sedimentation and improve the riparian overhead shade canopy. These factors would improve fish habitat on 33.7 miles of stream. Exceptions would occur where livestock use would continue on private lands upstream from public lands, thereby impacting those aquatic habitats through siltation/sedimentation of streambottom gravels, and causing deterioration of pool and water quality conditions.

The exclusion of livestock grazing would change the condition classes of riparian habitats as follows: 0 miles in excellent condition increased to 14.8 miles, 9.1 miles in good condition increased to 18.5 miles, 22.1 miles in fair condition decreased to 0.4 mile, and 2.5 miles in poor condition decreased to 0 miles (Vegetation, Chapter 4). Habitats presently in poor or fair condition would generally improve to good condition, while those in good condition would improve to excellent condition.

Conclusion

The elimination of livestock grazing on public lands would improve the fisheries resources on 33.7 miles of stream.

Multiple Resource Enhancement: ALTERNATIVE 3

This alternative would provide complete exclusion of livestock grazing from riparian areas, including 33.7 miles of trout habitat on public lands. Because grazing would be eliminated from riparian areas, the impacts to fisheries resources would be the same as outlined in Alternative 2.

Conclusion

The elimination of livestock grazing on riparian areas would improve the fisheries resources on 33.7 miles of stream.

Adjustment to Grazing Capacity: ALTERNATIVE 4

Adjustment of the grazing levels to the surveyed capacity would not alter the present condition of 26.8 miles of stream. Although grazing levels would be reduced from existing levels to the surveyed capacity, reductions would not be significant enough to alter condition classes (Vegetation, Chapter 4). Of the 26.8 miles of stream in which condition would not be altered, 20.1 miles of stream would be in allotments that would be under continuous seasonal management, and 6.7 stream miles would be in allotments that would have rest-rotation systems (AMPs). The condition of 26.8 miles of stream would remain as follows: 9.1 miles in good condition, 15.2 miles in fair condition, and 2.5 miles in poor condition.

Adjustment of livestock levels to the grazing capacity in the Escalante River Allotment (AMP) would result in increased livestock use. The increased utilization and physical injury to riparian vegetation caused by livestock in this allotment (Vegetation, Chapter 4) would degrade aquatic/riparian habitat in Boulder Creek (2.6 miles) and Deer Creek (4.3 miles). The continued overutilization of these areas would result in a decline in condition from fair to poor on 6.9 stream miles. The decline would result from increased streambank sloughing, reduced streambank cover, and increased sedimentation (Vegetation and Water Resources, Chapter 4).

Conclusion

Fisheries resources on 26.8 stream miles would remain unchanged. Fisheries resources would decline on 6.9 stream miles where the habitat condition would decline from fair to poor.

Rangeland Management Recommendation: ALTERNATIVE 5

In woody plants, food reserves and growing points are located in stems and twigs, which are exposed to grazing. Grazing during the winter dormant period can limit the regrowth potential of woody plants in the spring (Hormay, 1976). Riparian and aquatic damage caused by heavy livestock utilization in a rest rotation system may not recover in a 1-year rest period (Platts and Rountree, 1972). Behnke et al. (1977) indicated that a rest rotation system may maintain a streamside community, but it is unlikely to restore a degraded one. These factors account for the stable condition of 26.8 miles of aquatic/riparian habitat in the K/E EIS area.

Although specific management systems would be implemented, measures for protection would not be provided. Of the 26.8 miles of stream in which condition would not be altered, riparian areas along 24.7 miles would be grazed in the winter and 1.8 miles would be grazed in accordance with a rest-rotation system. The 26.8 miles of stream would be in allotments which have AMPs.

This alternative would not change the aquatic/riparian habitat condition of 26.8 of the 33.7 stream miles. The condition of 26.8 miles of stream would remain as follows: 9.1 miles in good condition, 15.2 miles in fair condition, and 2.5 miles in poor condition.

Overutilization in the Escalante River Allotment (AMP), due to increased livestock use and adoption of a rest rotation grazing system, would cause a decline in the aquatic/riparian habitat condition along 2.6 miles of Boulder Creek and 4.3 miles of Deer Creek. These 6.9 miles presently in fair condition would decline to a poor condition.

Conclusion

Fisheries resources would remain unchanged on 26.8 stream miles and would decrease on 6.9 miles of stream where aquatic/riparian habitat conditions would decline from fair to poor.

Optimization of Livestock: ALTERNATIVE 6

The impacts to fisheries would be similar to those in Alternative 5. The only exception would be in the long term as livestock numbers increased. Without protection from livestock grazing, 26.8 stream miles would begin to deteriorate in the long term, but condition classes would not change. This would result because riparian vegetation is more palatable at most times of the year than drier range plants. Cattle would tend to use these areas until all available forage was utilized before moving to seedings and other areas.

The overutilization of riparian vegetation in the Escalante River Allotment would cause 6.9 miles of habitat presently in fair condition to decline to poor condition.

Conclusion

The fisheries resources on 26.8 miles of stream would not be altered in the short term. As livestock numbers increase in the long term, fisheries habitat quality would decrease due to continued overuse.

Fish habitat along 6.9 miles of stream in the Escalante River Allotment would decline from fair to poor condition.

Unavoidable Adverse Impacts

Alternatives 1, 4, 5, and 6 would cause unavoidable adverse impacts to fisheries resources. The continuation of present grazing practices (Alternative 1) would result in the deterioration of 0.4 mile of aquatic/riparian habitat. Under Alternatives 4, 5, and 6 there would be 6.9 miles of aquatic/riparian habitat degraded due to increased livestock numbers in the Escalante River Allotment. The elimination of livestock grazing from riparian areas in Alternatives 2 and 3 would improve fisheries resources on 33.7 miles of trout habitat.

Continued grazing at current forage allocation levels (313 AUMs) in the Steep Creek Allotment would cause the habitat condition of 0.4 mile of Deer Creek (which is presently in poor condition) to deteriorate. Continued grazing of 33.3 miles of riparian habitat at the surveyed capacity would not change stream productivity in the long-term (Alternative 1). The exclusion of livestock grazing from 33.7 miles of riparian habitat in Alternatives 2 and 3 would improve stream productivity in the long term by improving stream-side vegetation and reducing streambottom sedimentation.

Short-Term Uses and Long-Term Productivity

Adjusting livestock grazing to the surveyed capacity (Alternatives 4 and 5) would not alter the long-term productivity of 26.8 miles of stream, but the productivity of 6.8 stream miles would decrease as a result of overutilization. Adjusting livestock grazing to the surveyed capacity (Alternative 4) in the Escalante River Allotment would increase livestock numbers and increase the amount of injury to riparian vegetation and streambanks. Alternative 6 would have the same short-term uses and long-term productivity as Alternative 5, but the productivity of 26.8 stream miles would decline in the long term as livestock numbers increased.

Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitments to fisheries resources would not be created by any of the alternatives.

IMPACTS TO WILD HORSES

This section discusses impacts to wild horses that would occur as a result of implementing any one of the six alternatives. The two herds of wild horses in the K/E EIS area will be referred to as the Escalante herd (located in the Wagon Box, Moody, and Death Hollow Allotments) and the Spencer Bench-Harvey's Fear herd (located in the Spencer Bench, Harvey's Fear, and Navajo Bench Allotments).

Continuation of Present Management: ALTERNATIVE 1

Continuation of present livestock grazing management as proposed in this alternative would have the greatest effect on the 17 wild horses in the Escalante herd because this herd is located in an area having forage conflicts with livestock grazing activities. According to the 1975-79 Range Survey (BLM Cedar City District Office), the area currently used by the Escalante wild horse herd is in poor to fair condition. This is attributed to the moderate to heavy utilization by livestock and yearlong use by wild horses (Vegetation, Chapter 4). Since natural barriers and fences confine the Escalante herd to the Wagon Box, Moody, and Death Hollow Allotments, continuation of present management on these allotments would perpetuate this situation. In 1978-79, severe weather in conjunction with the inability to move to more favorable areas (Wild Horses, Chapter 3) caused winter loss of 18 head to the herd.

The projected 6-percent decrease of forage available in the long term as a result of implementing this alternative (Vegetation, Chapter 4) would intensify the effects of existing livestock grazing and make winter losses in the future more likely, especially during severe weather. In addition, one permanent source of water for wild horses in the Escalante herd area occurs in an area occupied by bighorn sheep, and conflicts for water presently exists. These conflicts would be accentuated during periods of drought because water distribution is thought to be a factor limiting wild horse use of their habitat. As a result of continuing competition for forage and

limited availability of water, the Escalante wild horses would be expected to remain at their present level.

Because no livestock grazing presently occurs in the Spencer Bench-Harvey's Fear area, continuation of present livestock management would not directly affect wild horses. According to the 1975-79 Range Survey (BLM Cedar City District Office), this area is presently in poor to fair condition and no change would be expected. Wild horse numbers in this area have shown an increase of three head since 1969. This situation is expected to continue under this alternative and as a result, wild horses would increase from seven to twelve head in the long term.

No forage allocation would be made to wild horses under this alternative.

Conclusion

Habitat presently used by both wild horse herds would remain in poor to fair condition. Wild horse numbers would increase from 24 to 29 head.

Elimination of Livestock Grazing: ALTERNATIVE 2

This alternative would require the elimination of all livestock grazing on public land in the EIS area. As a result, implementation would only affect the Escalante wild horse herd because livestock grazing does not occur in the Spencer Bench-Harvey's Fear area. The elimination of livestock grazing would make all forage currently used by livestock available to wildlife and the Escalante wild horse herd. This would benefit horses because this area is in poor to fair condition and receives moderate to heavy use by livestock. Competition presently between livestock and wild horses would be eliminated and elimination of livestock grazing would allow forage species to improve in production, condition, and quality (Vegetation, Chapter 4). This would result in more nutritional forage being available to the Escalante wild horse herd and would allow some increase in their numbers. However, the additional forage made available by the removal of livestock could not be optimally utilized by wild horses due to the lack of available water during dry periods. The Escalante wild horse herd would be expected to increase from 17 to 38 head as a result of implementing this alternative. However, competition between wild horses and bighorn sheep for forage and water would intensify and possibly result in further conflicts as bighorn sheep numbers increase.

Since livestock grazing does not occur in the Spencer Bench-Harvey's Fear area, the implementation of this alternative would have little direct effect on wild horses. The small wild horse herd in this area has shown slight increases since 1969. This slight increase would be expected to continue, the herd increasing from seven to twelve head in the long term, with habitat remaining in poor to fair condition. A bighorn sheep transplant in this area is proposed by UDWR. Since water in this area is limited, the anticipated increase in wild horse numbers could limit the success of this transplant. Studies of bighorn sheep/wild horse conflicts have identified water as a major source of conflict (McQuivey, 1978).

In this alternative, wild horses would be allocated 314 AUMs (220 AUMs to the Escalante herd and 94 AUMs to the Spencer Bench herd) initially and 650 AUMs (494 AUMs for the Escalante herd and 156 AUMs to the Spencer Bench herd) in the long term (Chapter 2).

Conclusion

The forage allocated under this alternative for both herds would allow wild horses to increase from 24 to 50 head.

Multiple Resource Enhancement: ALTERNATIVE 3

Because of existing and potential conflicts between livestock, wild horses, and bighorn sheep for water and forage, this alternative would propose the removal of the existing two wild horse herds in the K/E EIS area (Chapter 2). The Escalante wild horse herd currently competes with bighorn sheep for water and forage in the Moody Canyon area, and is in direct competition with livestock for forage. The effect of removing wild horses in this area would eliminate these conflicts. Although no conflicts presently occur in the Spencer Bench-Harvey's Fear area, a bighorn sheep transplant has been proposed by UDWR. Removal of wild horses would enhance the success of this transplant.

The initial removal of wild horses would result in the long-term loss of 24 wild horses from public lands in the K/E EIS area.

Conclusion

This alternative would result in the loss of two wild horse herds from the K/E EIS area.

Adjustment to Grazing Capacity: ALTERNATIVE 4

The implementation of this alternative would affect the Escalante wild horse herd. Livestock grazing in this area would be reduced to the surveyed capacity and grazing would be restricted to a period "after seed ripe." Additionally, 314 AUMs of forage would be allocated to wild horses. These factors would result in a slight increase in forage production, vigor, and quality, and would reduce existing competition for forage. However, the lack of available water during dry periods would not allow the increase in forage production to be optimally utilized by wild horses. Furthermore, water developments proposed in this alternative would not occur in wild horse ranges and, therefore, would not alleviate this situation. As a result, no change in the current horse numbers (17 head) would be anticipated. Conflicts in the Escalante area currently exist between wild horses and bighorn sheep. Under this alternative these conflicts would continue, further reducing the opportunity for wild horses to benefit from forage production increases. These conflicts would become more pronounced during periods of drought because water is thought to be a limiting factor of habitat use.

Because no livestock grazing presently occurs in the Spencer Bench-Harvey's Fear wild horse area, implementation of this alternative would have little effect on this wild horse herd. Present trends would continue and

would result in the Spencer Bench-Harvey's Fear herd increasing from seven to twelve head.

Conclusion

Wild horses would be expected to increase from 24 to 29 head with implementation of this alternative.

Rangeland Management Recommendation: ALTERNATIVE 5

This alternative would propose the removal of both wild horse herds in the K/E EIS area (Chapter 2). Conflicts between livestock, wild horses, and bighorn sheep currently exist in the Escalante area and the potential exists for these conflicts to intensify as a result of a bighorn sheep transplant proposed by UDWR. The Escalante wild horse herd currently competes with bighorn sheep for water and forage in the Moody Canyon area and competes with livestock for forage (Chapter 3). These conflicts would be eliminated with the removal of wild horses. Since water is limited in the Spencer Bench-Harvey's Fear area, a proposed bighorn sheep transplant could result in conflicts with wild horses. Removal of wild horses would enhance the success of this sheep transplant.

The removal of wild horses would result in the long-term loss of 24 wild horses from public lands in the K/E EIS area.

Conclusion

This alternative would result in the loss of two wild horse herds from the K/E EIS area.

Livestock Optimization: ALTERNATIVE 6

This alternative would be a continuation of management proposed in Alternative 5, with additional vegetation treatments. Because of existing and potential conflicts between livestock, wild horses, and bighorn sheep (Chapter 2), wild horses would be removed from public lands.

Conclusion

This alternative would result in the loss of two wild horse herds from the K/E EIS area.

Unavoidable Adverse Impacts

The implementation of Alternative 1 would result in unavoidable adverse impacts to wild horses. This would occur primarily due to the overallocation of forage to livestock and the continued poor to fair condition of wild horse habitat.

In Alternatives 3, 5, and 6, the wild horses would be removed, causing the loss of two wild horse herds from the K/E EIS area.

Short-Term Uses and Long-Term Productivity

The overallocation of forage to livestock in Alternative 1 in the short term would result in a reduction of the Escalante wild horse herd in the long term if there would be another severe winter. It would be possible to lose all 17 head in the long term. Elimination of livestock grazing in Alternative 2 would result in an increase of both herds in the long term.

Irreversible/Irretrievable Commitment of Resources

Wild horse populations, even if eliminated, are considered to be a renewable resource and are retrievable by transplanting new animals. Their habitat is also considered renewable. Currently there are approximately 314 AUMs of forage consumed by wild horses each year, an annual irretrievable loss.

IMPACTS TO CULTURAL RESOURCES

The impacts of the grazing management systems as proposed in each alternative would be dependent upon the anticipated disturbance to the type of site. Adjustment of grazing capacities or implementation of specific management systems would not be considered detrimental to cultural resources. Only rangeland developments or vegetation treatments would be considered as having potential to physically disturb or affect cultural resources. Most rangeland developments, except reservoirs or catchments, could be moved slightly to avoid cultural resource impacts. In the case of reservoirs and catchments, significant sites to be inundated would be salvaged as per programmatic Memorandum of Agreement and Cooperative Agreement between BLM and the State Historic Preservation Officers (SHPO) for the States of Utah and Arizona (Appendix 2).

Vegetation treatments involve large tracts of land, and for this reason, they would have the potential to affect the largest number of cultural sites. Damage to these sites could be avoided. Standard Class 3 intensive inventories would be conducted prior to all ground disturbing projects and treatments. These inventories could miss a small number of sites.

Conclusion

Because site mitigation or even avoidance could involve some impact, the least ground disturbing alternative would be considered the most favorable to the conservation of cultural resources. For this reason, Alternatives 1 and 2 would be considered the most favorable. Any archaeological, historical, or cultural values that may be inadvertently destroyed as a result of implementing Alternatives 3, 4, 5, and 6 would be considered irretrievable. Destruction of cultural values would be considered a long-term loss.

IMPACTS TO VISUAL RESOURCES

The long and short-term significance of visual impacts created by range developments and vegetation treatments were derived using the visual resource contrast ratings and Visual Resource Management (VRM) classes (BLM Manual 8431). The potential visual contrast for each feature of a project was rated and impacts were quantified (table 4-8) using the following guidelines:

1. If the contrast rating scores meet the requirements for the VRM class (BLM Manual section 8411.72), the visual impact is considered minimal. Project would meet VRM Class objectives.

2. If the contrast rating exceeds the requirements for the VRM class, the impact is considered substantial. The project would not meet the objectives of the visual resource management class.

Class I areas were not included in the analysis because this class provides primarily for natural ecological changes only. Management activities would be restricted so that Class I areas would not be violated.

Proposed range developments and vegetation treatments were evaluated for each alternative based on their potential impacts to the existing visual resource management classes (Chapter 3). Potential impacts could result from the following:

1. Ground cover disturbances created during construction of vegetation treatments and range developments.

2. Creation of unnatural contrasts with the placement of unnatural appearing structures on the landscape.

3. Increased visual impacts resulting from concentrations of livestock around range developments (loss of vegetation, etc.).

Continuation of Present Management: ALTERNATIVE 1

Implementation of this alternative would not require placement of rangeland developments or vegetation treatments. As a result, no new visual contrasts would be created.

Livestock would continue to concentrate in riparian areas (Vegetation, Chapter 4) but the condition of riparian vegetation would remain unchanged. The color and textural qualities of riparian areas would also remain unchanged.

Conclusion

Because no rangeland developments would be involved and no change in the visual quality of riparian areas would be expected, visual resources would not be impacted.

TABLE 4-8

Visual Impact Analysis

Project	Major Contrasting Elements	Feature with Highest Contrast	IMPACT LEVEL VISUAL RESOURCE MANAGEMENT CLASSES							
			CLASS II		CLASS III		CLASS IV			
			Short Term	Long Term	Short Term	Long Term	Short Term	Long Term		
Fence	Line	Structure	-	0	0	0	0	0	0	
Cattleguard	Form	Structure	0	0	0	0	0	0	0	
Stocktrail	Line	Vegetation	-	-	0	0	0	0	0	
Pipeline	Line	Vegetation	-	-	-	-	0	0	0	
Water tank	Color, form	Structure	-	-	0	0	0	0	0	
Water trough	Form	Structure	0	-	0	0	0	0	0	
Reservoir	Line	Land	-	-	-	-	-	-	0	
Pumping station and well	Form, color	Structure	-	-	-	-	-	-	0	
Spring/seep development	Color	Vegetation	-	-	-	-	0	0	0	
Road	Line	Vegetation	-	-	-	-	0	0	0	
Rainfall catchment	Line	Structure	-	-	-	-	-	-	-	
Slickrock catchment	Line	Structure	-	-	0	0	0	0	0	
Spray/seed	Line, texture	Vegetation	-	-	-	-	0	0	0	
Chain/seed	Line, texture	Vegetation	-	-	-	-	0	0	0	
Plow/seed	Line, texture	Vegetation	-	-	-	-	0	0	0	
Burn/seed	Line, texture	Vegetation	-	-	-	-	0	0	0	

- Project would not meet the objectives of the VRM class.
 0 Project would meet the objectives of the VRM class.

Elimination of Livestock Grazing: ALTERNATIVE 2

Implementation of this alternative would require the construction of 973 miles of fence (table 2-1). Fencelines would meet VRM objectives for Classes III and IV (table 4-8). The short-term impacts created by fence construction to Class II areas would be substantial due to adverse impacts to line elements associated with initial surface disturbances. As vegetation became reestablished and surface disturbances diminished, the long-term impacts would be minimal in Class II areas. Impacts to visual resources caused by fence construction would only occur in allotments where fences would be located.

As a result of the elimination of livestock grazing, increased species diversity and improved condition of rangeland and riparian vegetation (table 4-1; Vegetation, Chapter 4) would improve the color and textural qualities of the landscape. Generally, these qualities would improve the aesthetic appearance of the EIS area.

Conclusion

The scenic qualities of rangeland and riparian areas would improve. Construction of 973 miles of fence would have a slightly adverse short-term impact on visual resources in allotments where they would be located.

Multiple Resource Enhancement: ALTERNATIVE 3

This alternative would require the construction of 125 miles of fence to protect floodplains, riparian areas, and fragile watersheds. The construction of fencelines would create substantial short-term adverse impacts in Class II areas due to the alteration of line elements associated with initial surface disturbances. Long-term impacts would be minimal due to the reestablishment of vegetation and diminished ground disturbances. Impacts to visual resources would occur only in allotments where fences would be constructed.

Localized improvements in scenic quality would be expected in allotments where livestock grazing would be adjusted to the surveyed capacity. The visual quality on 32 allotments would improve with the elimination of livestock grazing.

The elimination of grazing on 6,807 acres of riparian habitat would significantly improve riparian vegetation condition, especially shrubs (Vegetation, Chapter 4; table 4-1). Improved vegetation condition would enhance the color and textural appearance of riparian areas, thus improving scenic quality.

Conclusion

Generally, scenic quality would not be adversely affected by placement of fencelines. Scenic quality would improve in riparian areas with increased ground cover due to livestock elimination.

Adjustment to Grazing Capacity: ALTERNATIVE 4

This alternative requires the construction of 35 miles of fences, 171 water developments, and 17,417 acres of vegetation treatments on 21 allotments (table 2-1). The following discussion will analyze the impact of various rangeland improvements on each VRM class.

Class II

Approximately 6 percent of the planned vegetation treatments, 2 percent of water developments, and 2 percent of the fences would be located in Class II areas. Proposed fences, water troughs, and cattleguards would not impact Class II areas. However, all other proposed range developments (table 2-1) would have substantial impacts on Class II areas (table 4-8). These projects would not meet the VRM objectives defined for Class II areas.

Class III

Approximately 15 percent of the planned vegetation treatments, 17 percent of water developments, and 4 percent of fences would be located in Class III areas. Reservoirs, pumping stations, wells, windmills, and rainfall catchments would produce substantial adverse visual impacts to line, form, and color elements. The other proposed projects (table 2-1) would meet long-term objectives of VRM Class III.

Pipelines and spring developments would not meet VRM Class III objectives in the short term due to major disturbances to ground cover and surface soils during construction. As natural processes reduced the visual disturbances over the long term, these projects would conform to class standards.

Vegetation treatments would not meet VRM Class III objectives in the short term due to strong visual contrasts. Over the long term, as natural processes reduced visual contrasts, these projects would conform to Class III standards. Four types of vegetation treatments would be required by this alternative: burning, spraying, chaining, and plowing. The following discussion outlines the short-term visual impact on visual resources for each type of vegetation treatment.

Burning. Blackened debris and the total elimination of ground cover would result from burning. High soil exposure and visual contrast with the surrounding vegetation could be expected. Burning could also be a source of air pollution.

Spraying. The greatest impacts created by spraying with herbicides to eliminate vegetation would be the harsh color contrasts associated with "brownout".

Chaining. Strong visual contrasts and high soil exposure would be created as a result of the elimination of pinyon-juniper woodlands. Windrowed, piled, or uprooted pinyon-juniper debris left on treatment sites could be unattractive.

Plowing. High visual contrasts would result from the complete elimination of vegetation, and high soil exposure would result from plowing.

If the treatment sites would be reseeded immediately, the major visual contrasts would be of a short duration.

Class IV

Approximately 79 percent of the planned vegetation treatments, 81 percent of the water developments, and 94 percent of the fences would be located in Class IV areas.

Only rainwater catchments would fail to meet the management objectives of Class IV areas. The color and form contrasts associated with the collection areas, storage bags, earthen embankments, and stock water tanks would be responsible for strong visual contrasts. All other improvements would not significantly impact visual quality and would not require mitigation to meet Class IV objectives.

Livestock utilization of riparian areas would remain heavy even though livestock numbers would be reduced to the surveyed capacity. The continued heavy utilization of willows and grass species by livestock would result in little improvement of vegetation condition (Vegetation, Chapter 4). Little noticeable improvement in the scenic quality of riparian areas would be expected.

Conclusion

The development of rangeland improvements would have a very slight adverse impact on visual resources. Because most improvement projects would be placed in VRM Classes III and IV, impacts would be minor.

The scenic quality of riparian areas would not be significantly affected.

Rangeland Management Recommendation: ALTERNATIVE 5

Because the same type of rangeland improvements (table 2-1) required in Alternative 4 would be implemented in this alternative, impacts to visual quality would be similar. The greater magnitude of improvement projects would slightly increase unnatural visual contrasts. This alternative would require the construction of 117 miles of fence, 362 water developments, and 40,045 acres of vegetation treatments on 129 allotments. The following table indicates the approximate percentages of developments proposed for each VRM class.

<u>Proposed Development</u>	<u>Visual Resource Management Classes (percent)</u>		
	<u>II</u>	<u>III</u>	<u>IV</u>
Fence	3	30	67
Water developments	9	20	71
Vegetation treatments	8	17	75

To determine if specific rangeland developments or treatments would meet the objectives of a VRM class, refer to Alternative 4.

Vegetation treatments proposed to be located on public lands and in the viewsheds of Bryce Canyon National Park would be in VRM Class II areas. Vegetation treatments would not meet VRM Class II objectives (table 4-8) due to major disturbances to the characteristic landscape.

Livestock utilization of riparian areas would continue to be heavy even though specific management would be implemented on 129 allotments (Vegetation, Chapter 4). Scenic quality would be expected to improve slightly in riparian areas where specific management would reduce grazing pressure (Vegetation, Chapter 4).

Conclusion

Scenic quality would deteriorate slightly with the development of range-land improvement projects. Because the majority of these projects would be placed in VRM Classes III and IV, impacts would be minor. Riparian scenic quality would improve slightly from the present situation.

Livestock Optimization: ALTERNATIVE 6

This alternative would require the construction of 197,612 acres of vegetation treatments. The following table indicates the approximate percentages of vegetation treatments proposed in each VRM class and includes only those in addition to Alternative 5.

<u>Proposed Development</u>	<u>Visual Resource Management Classes (percent)</u>		
	<u>II</u>	<u>III</u>	<u>IV</u>
Vegetation treatments	9	31	60

The reduction of 197,612 acres of vegetation through treatments would create short-term unnatural contrast to the line, color, and textural qualities of the landscape. For specific short-term impacts associated with each type of vegetation treatment, see Alternative 4. Vegetation treatments would not meet VRM Class II objectives. VRM Class III standards would not be met in the short term due to major disturbances to vegetation and high soil exposures created during construction. With the reduction of disturbances over a period of time, treatment areas would conform to Class III standards. Treatments would meet the standards for Class IV areas.

The utilization of riparian vegetation would continue to be heavy (Vegetation, Chapter 4). Because the condition of riparian vegetation would be the same as in Alternative 5, scenery quality would be expected to be similar.

Conclusion

Visual quality would decrease slightly with the implementation of 197,612 acres of vegetation treatments. Because the majority of treatments would be located in VRM Class III and IV areas, adverse impacts would be

minimal. The scenic quality of riparian areas would improve slightly from the present condition.

Table 4-9 shows a summary of impacts to visual resources.

Unavoidable Adverse Impacts

There would be unavoidable adverse impacts to visual resources during the construction of rangeland developments and vegetation treatments in Alternatives 2 through 6. However, over the long term and by following the design restrictions in Appendix 3, these would be minimized.

Short-Term Uses and Long-Term Productivity

There would be no loss to long-term productivity from short-term uses.

Irreversible/Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources.

IMPACTS TO RECREATION

The following analysis discusses the impacts of the six livestock grazing alternatives on recreational activities, special management areas, and GCNRA.

Big game hunting visitor use days were projected for each grazing alternative using present and potential deer levels. The percentage difference between present deer levels and projected deer numbers (Wildlife, Chapter 4) was calculated. The percentage difference was multiplied by the 1978 hunter-day level, calculated for the K/E EIS area to determine changes to hunter-days. This methodology predicted the impact of varying deer populations per alternative on hunter use. This analysis did not consider changes in prices of consumer commodities or changes in deer hunting regulations on hunter-days.

Of the 54.2 miles of stream containing sport species, 20.5 miles are not presently grazed, nor would they be grazed in any of the six alternatives. Because grazing activities would not affect the quality of 20.5 miles of aquatic/riparian habitat, these areas would not be considered in the analysis. Only the 33.7 miles of trout stream which may be affected by the six grazing management alternatives will be subject to analysis.

The conversion of pinyon-juniper woodlands to sites producing forage through vegetation treatments (chaining) would not have a significant effect on fuelwood and Christmas tree collecting. Burning is primarily used to convert sagebrush to forage producing areas and would not affect pinyon-juniper stands. Alternatives 1, 2, and 3 would not alter fuelwood and Christmas tree collecting opportunities because vegetation treatments which would alter pinyon-juniper woodlands would not be required. The implementation of vegetation treatments (chaining) in Alternatives 4, 5, and 6 would result in a 0.5, 0.9, and 4.3 percent reduction in pinyon-juniper woodlands. Because

TABLE 4-9

Summary of Impacts to Recreation and Visual Resources

	ALTERNATIVES					
	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Big Game Hunting	Big game numbers would not change significantly. As a result, hunter use would not be expected to change.	The increase in projected deer numbers from 5,539 to 5,672 could increase hunter use by an additional 110 days.	Same as Alternative 2.	Same as Alternative 2.	The increase in projected deer numbers from 5,539 to 5,898 could increase hunter use by an additional 294 days.	Same as Alternative 5.
Sightseeing	No change in the quality of sightseeing opportunities.	Aesthetic appearance of EIS area would improve slightly.	Generally quality of sightseeing would improve. Scenic quality of riparian areas would improve.	Sightseeing opportunities would not be significantly affected.	Generally the same as Adjustment to Grazing Capacity Alternative.	Generally the same as Adjustment to Grazing Capacity Alternative.
Fishing	No change in fishing potential on 33.3 miles of trout stream. Opportunities on 0.4 mile of Deer Creek would decline.	Opportunities would improve on 33.7 miles of stream.	Opportunities would improve on 33.7 miles of stream.	Opportunities would remain unchanged on 26.8 miles of stream. Opportunities would decline on 6.9 stream miles.	Same as the Adjustment to Grazing Capacity Alternative.	Slight long-term decline in opportunities on 26.8 miles of stream. Opportunities would decline on 6.9 miles.
Off-road Vehicle Use (ORV)	No change.	Slight impact to ORV use due to construction of 973 miles of fence.	Generally no change.	ORV use would be restricted on 17,417 acres of vegetation treatments.	ORV use would be restricted on 40,045 acres of vegetation treatments.	ORV use would be restricted on 197,612 acres of vegetation treatments.
Special Management Areas	Quality of recreation opportunities would not change. Present livestock/recreationist conflicts would continue to exist (Recreation, Chapter 3).	All livestock/recreationist conflicts would be eliminated (Recreation, Chapter 3).	All existing livestock/recreationist conflicts would be eliminated (Recreation, Chapter 3).	Slightly unfavorable impact (Recreation, Chapter 4) on North Escalante Canyons and Phipps-Death Hollow ONA (Recreation, Chapter 3). Existing conflicts in The Gulch ONA and Deer and Calf Creek Recreation Areas.	Reduction in quality of recreation in Phipps-Death Hollow and North Escalante Canyon ONAs and Calf Creek Recreation Area. Removal of conflicts in The Gulch ONA and Deer Creek Recreation Area (Recreation, Chapter 3).	Same as Rangeland Management Recommendation.
Glen Canyon National Recreation Area (GCNRA)	No change in quality of recreational activities would be expected. Livestock/recreationist conflicts would continue to exist (Recreation, Chapter 3).	All livestock/recreationist conflicts would be eliminated (Recreation, Chapter 3).	All existing livestock/recreationist conflicts would be eliminated (Recreation, Chapter 3).	Unfavorable impact on recreation quality along Escalante River in GCNRA (Recreation, Chapter 4).	Same as Adjustment to Grazing Capacity Alternative.	Same as Adjustment to Grazing Capacity Alternative.

(continued)

TABLE 4-9 (concluded)

Visual Resources	ALTERNATIVES					
	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
	Visual resources would not be significantly impacted.	Scenic qualities of rangeland and riparian areas would improve. Slight adverse impact to visual resources due to construction of 973 miles of fence.	Generally visual resources would not be impacted. Scenic quality of riparian areas would improve.	Development of rangeland improvements would have a slight adverse impact on visual resources. Little noticeable improvement in riparian areas would be expected.	Development of rangeland improvements would have a slight adverse impact on visual resources. Scenic quality of riparian areas would improve slightly.	Visual quality would decrease slightly with development of vegetation treatments. Scenic quality of riparian areas would improve slightly.

pinyon-juniper chaining is primarily located in remote areas and visitor use is extremely light, Alternatives 4, 5, and 6 would not impact fuelwood or Christmas tree collecting.

Recreational sightseeing involving wild horses would remain unchanged for all alternatives. Because of the small size and remote locations of wild horse herds in the K/E area, there are limited possibilities of recreationists viewing horses. Therefore, any changes in horse populations per alternative would be insignificant from a recreational viewpoint.

Continuation of Present Management: ALTERNATIVE 1

Big game hunting opportunities would be expected to diminish as a result of the declining quality of 2,019 acres of important big game habitat. As a result of the decline of 2,019 acres of habitat from a fair to poor condition, projected deer numbers would decrease from 5,539 to 5,526 head (Wildlife, Chapter 4). The decline in projected deer numbers (13) would not affect hunter-days. Hunter access and mobility and off-road vehicle (ORV) use would not be altered because new roads and fences would not be required.

Species composition and diversity of rangeland and riparian vegetation would decline in the long term due to the continuation of existing rangeland management practices (Vegetation, Chapter 4). Because color and textural qualities of riparian vegetation would decline slightly and range improvements (which decrease scenic values) would not be necessary, the quality of recreational sightseeing and visitor-days would not be significantly affected (Visual Resources, Chapter 4).

The continuation of existing livestock grazing levels would not affect the fishing potential of 33.3 miles of trout streams in the EIS area. Fishing quality would be expected to decline on 0.4 mile of Deer Creek due to increased streambottom sedimentation and reduced water quality caused by livestock overutilization of riparian vegetation (Fisheries, Chapter 4). Visitor use would not be expected to change, although the quality of fishing opportunities would decline on 0.4 mile of stream.

Present livestock/recreationist conflicts in special management areas (Recreation, Chapter 3) would continue at their present magnitudes due to continuation of livestock season of use, stocking rates, and riparian condition in high recreation use areas. Recreational use would not be affected, but it is likely that recreational quality would continue to deteriorate. Existing livestock/recreationist conflicts (Recreation, Chapter 3) would continue in GCNRA, especially in the Escalante Canyons.

Conclusion

Big game hunting opportunities and hunter use would not be significantly affected by the decline of projected deer numbers from 5,539 to 5,526 head. Fishing opportunities would not change on 33.3 stream miles and would decline on 0.4 mile of stream. All other recreational activities would remain unchanged.

Elimination of Livestock Grazing: ALTERNATIVE 2

The improvement of 128,147 acres of important big game habitat and potential increases in projected deer numbers from 5,539 to 5,672 head as a result of the elimination of livestock grazing (Wildlife, Chapter 4) would improve hunting quality. The projected increase in deer numbers could result in an increase in hunter-days from 4,587 to 4,697, a 2.4-percent increase over 1978 hunter-days. Hunting opportunities would remain constant on the remaining 873,214 acres of habitat due to its static condition.

As a result of the elimination of livestock grazing, the improvement in species diversity and composition of rangeland and riparian vegetation would enhance the color and textural qualities of the landscape (Visual Resources, Chapter 4). The overall improvement in visual quality would improve the aesthetic appearance of the EIS area and thus improve sightseeing quality. The above-mentioned improvement in big game habitat and potential increase of wildlife numbers (Chapter 4, Wildlife) would improve viewing opportunities.

Fishing opportunities would improve on 33.7 miles of stream containing populations of brown and rainbow trout. The improvement of riparian vegetation and fish habitat would improve fishing opportunities (Fisheries, Chapter 4). Although fishing quality would improve on 33.7 stream miles, fishing pressure would not be expected to change, due to the remoteness of the fishing areas.

Approximately 973 miles of fence needed to enclose private lands would act as a barrier to ORV use. The placement of gates on most roads would decrease the barrier effect.

With the elimination of livestock grazing, the quality of recreational activities (hiking and camping) would improve in all special management areas and GCNRA. Existing livestock/recreationist conflicts (Recreation, Chapter 3) would be eliminated in confined canyons and the scenic quality of riparian areas would improve due to increased visual diversity (color, texture, form) (Visual Resources, Chapter 4). The elimination of livestock grazing would improve the recreational experience but would not be expected to result in an increase of backcountry users in special management areas and GCNRA.

Conclusion

This alternative would have an impact on big game hunting opportunities due to a potential increase of hunter-days from 4,587 to 4,697. Fishing quality would improve on 33.7 stream miles. The impacts to sightseeing would be favorable. Construction of new fencelines would have an impact on ORV use. Recreational quality would be improved in all special management areas and GCNRA.

Multiple Resource Enhancement: ALTERNATIVE 3

The elimination of livestock grazing on 6,807 acres of riparian areas and large reductions in livestock numbers would improve habitat conditions on 105,527 acres presently in fair condition. The improvement of 105,527 acres of habitat could increase projected deer numbers from 5,539 to 5,672 head.

This projected increase in deer numbers could result in a potential increase of hunter-days from 4,587 to 4,697, which would be a 2.4-percent increase over 1978 hunter-days. Restrictions on hunter movement would result from the construction of 125 miles of fence. However, impacts would be minimal because cattleguards or gates would be placed on most access roads.

Impacts to sightseeing would result from the 125 miles of new fence which would be visual intrusions and could reduce scenic quality (Chapter 4, Visual Resources). The aesthetic appearance of rangelands would improve with the reduction of stocking rates. The color, form, and texture of riparian vegetation should improve with the elimination of livestock grazing. The improved aesthetic appearance would improve the quality of sightseeing opportunities but would not affect visitor use. Opportunities for viewing wildlife would increase with the improvement of wildlife habitat.

The exclusion of grazing along 33.7 miles of trout stream would improve fish habitat. The gradual improvement of streamside vegetation would increase fish cover and food, and would reduce streambank erosion (Fisheries, Chapter 4). This would enhance fishing opportunities but would not affect fishing pressure due to the remoteness of the fishing areas.

The elimination of livestock grazing on all Outstanding Natural Areas and the riparian areas of Calf and Deer Creeks would remove livestock/recreationist problems (Recreation, Chapter 3). Existing livestock/recreationist conflicts would be eliminated and the scenic quality would improve in all special management areas and GCNRA (Visual Resources, Chapter 4). With the elimination of conflicts and improvement in visual resources, the quality of recreational experiences would improve for approximately 18,000 backcountry users of GCNRA and special management areas.

Conclusion

This alternative would have a favorable impact on hunting opportunities because of a potential increase in hunter-days from 4,587 to 4,697. The quality of recreational sightseeing and fishing opportunities would improve. Changes in the quality and opportunities for ORV use would be negligible.

The quality of recreational opportunities would improve in all special management areas and in GCNRA.

Adjustment to Grazing Capacity: ALTERNATIVE 4

The quality of 3,556 acres of important big game habitat would improve. Reductions in livestock numbers and the 40-percent browse requirement on seeded areas would be primarily responsible for improving wildlife habitat conditions (Wildlife, Chapter 4). The potential increase in projected deer numbers from 5,539 to 5,672 head could result in a potential increase of hunter-days from 4,587 to 4,697, a 2.4-percent increase over 1978 hunter-days. Hunting opportunities would not change on 997,805 acres of habitat where opportunities are presently limited due to low game populations. The construction of 35 miles of new fence would create additional barriers, but would not affect hunting opportunities.

The major impacts to sightseeing would be associated with the construction of rangeland improvements and vegetation treatments. The rangeland improvements would be visual intrusions and could degrade scenic quality (Visual Resources, Chapter 4). The continued livestock utilization of riparian areas would result in little noticeable improvement in scenic quality. Visitor use would not change.

The riparian and aquatic habitat would remain unchanged on 26.8 miles of stream in the short term and would have no effect on fishing opportunities. The decrease in quality of riparian and aquatic habitat on 6.9 miles of Deer and Boulder Creeks would result in a small decrease in sport fishing potential (Fisheries, Chapter 4). Although the quality of fishing opportunities would decline, visitor use would not change due to the remoteness of fish areas.

Rangeland improvements and new fences would provide additional hazards for ORV users. ORV use would be restricted on 17,417 acres of vegetation treatments until vegetation became established.

This alternative would have a slightly unfavorable impact on the North Escalante Canyons and Phipps-Death Hollow Outstanding Natural Areas. A decline in recreation quality could be expected along the Escalante River due to large AUM increases and degradation of riparian areas. The degradation of riparian areas would reduce scenic quality. Increased livestock numbers would increase the possibilities of livestock/recreationist conflicts. Existing conflicts (Recreation, Chapter 3) would not be changed in The Gulch Outstanding Natural Area, Calf Creek Recreation Area, and Deer Creek Recreation Area. Livestock would continue to concentrate in riparian areas, utilize streamside vegetation, and trample streambanks. These visible signs of livestock use would continue to impair recreation quality. This alternative would have an impact on the recreation quality along the Escalante River in GCNRA. The large increase in AUMs (1,638) would increase the probability of livestock/recreationist conflicts (Recreation, Chapter 3) for approximately 6,000 annual backcountry users.

Conclusion

This alternative would have an impact on big game hunting opportunities by increasing hunter days from 4,587 to 4,697. The quality of fishing opportunities would decline on 6.9 stream miles and remain unchanged on 26.8 stream miles. Changes in the quality of ORV use would be negligible. The quality of sightseeing opportunities would not be significantly affected.

A decrease in recreation quality along the Escalante River could be expected in the North Escalante Canyons and Phipps-Death Hollow Outstanding Natural Areas, and in GCNRA. The existing situation would not be altered in other special management areas (Recreation, Chapter 3).

Rangeland Management Recommendation: ALTERNATIVE 5

Approximately 21,600 acres of wildlife habitat would improve by reducing forage competition between game species and livestock. This would be accomplished by the development of new water sources, improvement of deer forage

through vegetation treatments, and reduction of livestock/deer season of use conflicts (Wildlife, Chapter 4). The 21,600-acre improvement in wildlife habitat quality could increase deer numbers (projected) from 5,539 to 5,898 head. The projected increase in deer numbers could increase hunter-days from 4,587 to 4,881, a 6.4-percent increase over 1978 hunter-days. Hunting opportunities would not improve on 979,761 acres of wildlife habitat due to low big game populations. Roads required to construct rangeland improvements would provide access and allow hunters more opportunities to utilize public lands. Construction of 117 miles of new fence would create additional barriers but would not have an effect on hunting opportunities.

The impacts to sightseeing would be similar to those outlined in the Adjustment to Grazing Capacity Alternative, but a greater number of rangeland improvements and vegetation treatments would be required, increasing the magnitude of impacts (Visual Resources, Chapter 4).

Fishing opportunities would not be altered on 26.8 miles of trout stream. A decrease in riparian and aquatic habitat quality on 6.9 miles of Deer and Boulder Creeks could result in a decrease in sport fishing potential. Although a decrease in fishing quality would occur on 6.9 stream miles, visitor use would not change due to the remoteness of fishing areas.

Rangeland improvements would provide additional hazards for ORV users. ORV use would be restricted on 40,045 acres of vegetation treatments until vegetation becomes established on these sites.

The increased livestock forage allocation required in this alternative would increase livestock/recreationist conflicts and decrease the scenic quality of riparian habitat bordering the Escalante River. This would have little effect, but would reduce the quality of the recreational experience in Phipps-Death Hollow and North Escalante Canyons Outstanding Natural Areas. Increased conflicts with livestock and decreased scenic quality would also reduce recreation quality in Calf Creek Recreation Area. The removal of livestock from The Gulch Outstanding Natural Area and Deer Creek Recreation Area during the peak recreation season (3/15-11/1) would eliminate livestock/recreationist conflicts (Recreation, Chapter 3). Recreational use occurs primarily in riparian areas. Areas which are not presently grazed (Antone Flat) or receive very little recreational use (benchlands) would not be affected.

The quality of the backcountry experience for approximately 6,000 annual users of the Escalante River Canyon of GCNRA would be reduced because of the 1,994 and 464-AUM increases in the Escalante River and Chimney Rock Allotments. Increased numbers of livestock would concentrate in Escalante Canyon, Harris Wash, Twenty-Five Mile Wash, and Coyote Gulch and would probably increase livestock/recreationist conflicts (Recreation, Chapter 3). Scenic quality would also be reduced due to the degradation of riparian habitat.

Conclusion

This alternative could increase deer numbers and increase hunter-days from 4,587 to 4,882, a 6.4-percent increase over 1978 hunter-days. Fishing opportunities would remain unchanged on 26.8 stream miles. Quality would

decrease on 6.9 miles of stream. Changes in the quality or quantity of opportunities for ORV use would be minimal. The quality of sightseeing would not be significantly affected.

A decrease in backcountry recreation quality along the Escalante River could be expected in the North Escalante Canyon and Phipps-Death Hollow Outstanding Natural Areas and GCNRA. Recreation quality would decrease in Calf Creek Recreation Area. Recreational conflicts would be eliminated in The Gulch Outstanding Natural Area and Deer Creek Recreation Area (Recreation, Chapter 3).

Livestock Optimization: ALTERNATIVE 6

Approximately 137,087 acres of wildlife habitat would improve as a result of reducing livestock/deer season of use conflicts and improving deer forage (Wildlife, Chapter 4). With the improvement in habitat, deer numbers could increase from 5,539 to 5,898 head. The potential increase in game numbers could increase hunter-days from 4,587 to 4,881, a 6.4-percent increase over 1978 hunter-days.

Adverse impacts to sightseeing would be associated with the vegetation treatments which could decrease the scenic quality of the landscape. Due to the continued utilization of riparian areas by livestock, scenic quality would not be altered (Visual Resources, Chapter 4). Although scenic quality would decline, visitor use would not be expected to change. The above-mentioned improvement in big game habitat and increase in wildlife numbers (Wildlife, Chapter 4) would improve viewing opportunities.

Fishing opportunities would decline on 26.8 stream miles in the long term due to the deterioration of fish habitat. Because of a decrease in riparian/aquatic habitat on 6.9 miles of Deer Creek and Boulder Creek, fishing opportunities would be expected to decline. Visitor use would not be expected to change due to the remoteness of fishing areas.

ORV use would be restricted on 197,612 acres of vegetation treatments until vegetation became established on these sites.

The increased livestock forage allocation required in this alternative would increase livestock/recreationist conflicts and would decrease the scenic quality of riparian habitat bordering the Escalante River. For a discussion of impacts to special management areas see Alternative 5.

The quality of the backcountry experience for approximately 6,000 annual users of the Escalante River Canyon in GCNRA would be reduced because of the 1,994 and 464-AUM increases in the Escalante River and Chimney Rock Allotments. Increased numbers of livestock would concentrate in Escalante Canyon, Harris Wash, Twenty-Five Mile Wash, and Coyote Gulch and would probably increase livestock/recreationist conflicts (Recreation, Chapter 4). Scenic quality would also be reduced due to the degradation of riparian habitat.

Conclusion

Implementation of this alternative could increase hunter use from 4,587 to 4,881 hunter-days. The quality of fishing opportunities would decline on 26.8 miles of stream, but visitor use would not be affected. Changes in the quality or quantity of opportunities for fishing and ORV use would be minimal. The quality of sightseeing opportunities would slightly decrease. A decrease in backcountry recreation quality along the Escalante River could be expected in the North Escalante Canyon and Phipps-Death Hollow Outstanding Natural Areas and GCNRA. Recreation quality would decrease in Calf Creek Recreation Area. Recreational conflicts would be eliminated in The Gulch Outstanding Natural Area and Deer Creek Recreation Area. Table 4-9 shows a summary of impacts to recreation.

Unavoidable Adverse Impacts

In Alternatives 1 through 6, unavoidable adverse impacts would not occur to big game hunting and sightseeing. In Alternatives 2 and 3, unavoidable adverse impacts would not occur to fishing opportunities, but Alternatives 1, 4, 5, and 6 would create unavoidable impacts. Alternatives 1, 2, and 3 would not create unavoidable impacts to recreational resources in special management areas nor to GCNRA (table 4-9). Under Alternatives 4, 5, and 6, unavoidable adverse impacts would occur to recreational resources in special management areas and GCNRA (table 4-9). Under Alternatives 2, 4, 5, and 6, unavoidable adverse impacts would occur to ORV use.

Short-Term Uses and Long-Term Productivity

The existing condition of recreational resources would not change under Alternative 1, with the exception of a decline of fishing quality on 0.4 stream mile in the long term. The elimination of livestock grazing under Alternatives 2 and 3 would improve the quality of all recreational resources with the exception of ORV use (construction of fences would hamper movement) in the long term. Adjusting grazing intensity to the surveyed capacity would not change existing recreational resources with the exception of big game hunting in the long term.

Improved big game habitat and potential increases in big game numbers would result in an increase of 110 hunter-days in Alternatives 2, 3, and 4, and an increase of 294 hunter-days in Alternatives 5 and 6 in the long term.

Irreversible/Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitments of recreational resources in any of the six proposed alternatives.

IMPACTS TO WILDERNESS

The wilderness management policy of the Department of the Interior is to continue resource uses on lands under wilderness review in a manner that maintains the suitability of an area for preservation as wilderness. As

outlined in the Interim Management Policy, rangeland management activities are not as restricted as other activities (Interim Management Policy and Guidelines for Lands Under Wilderness Review, 1979). Rangeland management activities involve a distinction between grazing uses that are grandfathered and those that are not. Grandfathered grazing use refers to grazing authorized and used during the 1976 grazing fee year. Any grazing use not authorized and used during the 1976 grazing fee year is considered nongrandfathered.

The six instant study areas (54,056 acres) and the 35 units (1,260,771 acres) identified for intensive inventory could be affected by the six Kanab/Escalante grazing management alternatives. An alternatives' level of livestock use and type of rangeland developments or treatments (table 2-1) could affect an inventory unit's suitability for wilderness preservation.

Implementation of any part of an alternative that would directly affect an intensive wilderness inventory unit and which would not meet the requirements outlined in Section 603 of the Federal Land Policy and Management Act on the interim management policy would be deferred pending congressional action of the suitability management regulations. If plans for specific management would be eliminated due to designation of wilderness areas, it would be necessary to redesign specific management systems.

Due to the present tentative boundary designations of intensive wilderness inventory units, a site-specific analysis was not conducted. However, the criteria that will govern grazing and the use, maintenance, and installation of rangeland improvements on lands under wilderness review are summarized below.

In both grandfathered and nongrandfathered grazing, changes in number and kind of livestock or season of use may be permitted as long as the changes would not cause a declining condition in vegetation or soil and the changes would not cause unnecessary and undue degradation of the lands. Grazing systems in operation during the 1976 grazing fee year may continue to be used or maintained. New grazing systems may be implemented as long as the rangeland improvements required to implement such a system would be permissible.

Rangeland improvements existing or under construction on October 21, 1976 may continue to be used and maintained. Temporary rangeland improvements may be installed if they would not cause unnecessary or undue degradation of the lands. New, permanent rangeland improvements, which would not be permissible under grandfathered regulations, may be approved for the purpose of enhancing wilderness values by protecting the natural condition of the rangeland. For further details concerning the wilderness interim management policy, see the Interim Management Policy and Guidelines for Lands Under Wilderness Review, U.S. Department of the Interior, BLM, December 12, 1979.

IMPACTS TO AIR QUALITY

Proposed grazing management systems would not cause a change in air quality.

Old study??

i) increase of fugit dust due to

i) trampling of crust → increase fug dust

4-98

ii) decrease of veg. surface roughness changes

CO₂ → O₂ conversion decrease

Vegetation treatments which would be proposed for 140,879 acres (in the form of burning or spraying vegetation) would cause short-term impacts. The treatments would cause immediate impacts (within a few days) on a given burn area, but they would probably occur over a 10-year period on 53 allotments. No burning would take place until permission would be granted by the Executive Secretary of the Utah Air Conservation Commission or his authorized representative (State of Utah Air Conservation Regulations, 10/13/78). Limiting the days of burning to those with good dispersion potential would minimize the effects of the gases and particulate matter in the air shed. Short-term National Ambient Air Quality Standards for carbon monoxide, particulate matter, and hydrocarbons could be approached or exceeded. Impacts from the burn would be felt over the immediate area of the treatment and would decrease rapidly with distance. Burning time of the 67,133 acres would be spread out in time and location so that a minimal short-term impact would be expected.

and
beyond
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redu
CO₂
build

Spraying of 73,746 acres would be accomplished by helicopter or fixed-wing aircraft. The duration of spray application of 2,4-D on sagebrush would depend on the wind conditions and the number of aircraft used in application. Wind conditions during spraying would have to be light to allow spray to settle to the ground. The actual amount of herbicide that would become airborne would be unknown, but with the use of low volatile amines, studies have shown the impacts to be negligible (Josephine Final Timber Management Environmental Statement, BLM).

Conclusion

Proposed grazing management systems would not change air quality in the area. Impacts from burning would be minimal due to the precautions required by the Executive Secretary of the Utah Air Conservation Commission. Spraying of sagebrush with 2,4-D would cause minimal impacts due to the limited number of hours of spraying each day, the low wind spraying conditions, and the volatile formulation of 2,4-D being used.

LIST OF PREPARERS

Kanab/Escalante EIS Team

Name and Title	Assignment	Education	Federal Experience
Dennis Curtis, Project Manager	Review	BS Geography	11 years
Bob Dusenbury, Supervisory Environmental Specialist	Team Leader	BS Range and Forestry Management	25 years
Dave Kauffman, Natural Resource Specialist	Environmental Coordination	BS Range and Forestry Management	6 years
Ervin Larsen, Range Conservationist	Vegetation and Livestock	BS Range and Forestry Management	15 years
Bill Wiley, Hydrologist	Soils, Water Resources	BS Geography, Hydrology	1 year
Ron Tucker, Wildlife Biologist	Wildlife, Fisheries, Wild Horses, Threatened/Endangered	BS Wildlife Management, MS Range Animal Science	1 year
Glen Yankus, Outdoor Recreation Planner	Recreation, VRM, Wilderness, Land Use	BS Biology, MA Parks/Recreation	1 year
Doug McFadden, Archaeologist	Cultural Resources	BS Anthropology	5 years
Jay K. Carlson, Economist	Socioeconomics	BS Resource Management MS Resource Economics	2 years
Al Larson, Air Quality Specialist	Climate, Air Quality, Topography, Geology	BS Chemical Engineering	1 year
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Terry Lewis, Writer/Editor	Editing	BA English, MA English	1 year
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Don Duff	Fisheries	Utah State Office
Donny Sparks	Quality Control	Washington Office

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MENT ARE SENT

SPECIAL INTEREST GROUPS

Ada County Fish and Game League
American Horse Protection Association, Inc.
American Fisheries Society, Bonneville Chapter
Audubon Society
Council on Utah Resources
Defenders of the Outdoor Heritage
Defenders of Wildlife
Enchanted Wilderness Association
Environmental Action
Environmental Awareness
Environmental Defense Fund
Escalante Cattlemen's Association
Friends of the Earth
Good Earth
ISSUE
Izaak Walton League
Kanab Cattlemen's Association
Kanab/Escalante Livestock Permittees
National Council of Public Land Users
National Farm Bureau
National Parks & Recreation Association
National Stock Grower's Association
National Wildlife Federation
Natural Resources Defense Council
Nature Conservancy
Oregon Environmental Council
Pacific Legal Foundation
Pro-Utah, Inc.
Public Lands Council
Rocky Mountain Center on Environment
Rocky Mountain Sportsmen Association
Save Our Canyons Committee
Sierra Club
Society for Range Management
Trout Unlimited, Utah Chapter
Utah Archaeological Society
Utah Audubon Society
Utah Cattlemen's Association
Utah Farm Bureau
Utah Mining Association
Utah Nature Study Society
Utah Sportsmen Association
Utah Wildlife & Outdoor Recreation Federation
Utah Wool Growers' Association
WFOA



Weber County Trails
Wilderness Society of America
 National Office
 Utah Chapter
Wildlife Society
Women's Conservation Council of Utah

LOCAL GOVERNMENTS, COMMISSIONS, AND ASSOCIATIONS

Coconino County Commission
Five-County Association of Governments
Garfield County Commission
Kane County Commission
Washington County Commission

STATE GOVERNMENT AND UNIVERSITIES

Arizona State Historic Preservation Officer
Brigham Young University
Dixie College
Southern Utah State College
University of Utah
Utah Clearing House
Utah Department of Agriculture
Utah Department of Natural Resources
Utah Division of State Lands
Utah Division of Parks and Recreation
Utah Division of State Lands - Forestry and Fire Control
Utah Division of Water Rights
Utah Division of Water Resources
Utah Division of Wildlife Resources
Utah State Clearing House
Utah State Historic Preservation Office, Department of Development Services
Utah Outdoor Recreation Agency
Utah State Planning Office
Utah State University Extension Service, Panguitch Utah
Utah State University, Logan, Utah
 College of Natural Resources, Recreation Officer
 Cooperative Extension Service
 Economic Research Service
 Reference and Extension Library

UTAH CONGRESSIONAL DELEGATION

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Department of Agriculture
 Agricultural Stabilization and Conservation Service
 Forest Service
 Dixie National Forest
 Regional Office, Region 4
 Soil Conservation Service

Department of the Army, Corps of Engineers
Environmental Protection Agency
Heritage Conservation and Recreation Service
National Park Service
Office of the Solicitor
U.S. Fish and Wildlife Service
U.S. Geological Survey
Water and Power Resources Service

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Five-M Ranch
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APPENDIX 1

Multiple Use Management Framework Plan Recommendations

The following sets of tables were developed by each area manager and proposed as alternative methods to utilize the available livestock forage on each allotment within the five planning units. They are listed in the following order:

1. Canaan Mountain portion of the Virgin River Planning Unit
2. Escalante Planning Unit
3. Paria Planning Unit
4. Vermilion Planning Unit
5. Zion Planning Unit

Each set of planning unit tables is further divided into two sets of alternative management systems: interim management (short term) and specific management (long term).

The interim management tables are the base recommendations of Alternative 4, Adjustment to Livestock Grazing Capacity. They show the proposed interim management on all 210 allotments, including: 21 allotments (identified by footnote) presently under specific management and included in the specific management tables, 158 allotments that would have continuous seasonal management, and 31 allotments on which livestock grazing would be eliminated.

In order to understand the specific management tables the reader should first see what changes would be made in the interim management, such as adjustments to carrying capacity (determined by the Range Survey, 1975-79) and developments on potentially suitable areas. These interim management actions would occur prior to specific management on any given allotment.

The specific management tables reflect the proposed type of grazing management systems, vegetation treatments, and rangeland developments needed to accomplish management goals and reach forage potentials.

The specific management tables are the base recommendations of Alternative 5, Rangeland Management Recommendation. They show only the 129 allotments that would have specific management in the long term. The remaining 81 allotments not shown would include 59 allotments that would be in continuous seasonal management (footnoted in interim management tables) and 22 allotments that would have an elimination of livestock grazing.

A

TABLE 1

CANAAN MOUNTAIN: MFP Interim Management

Allotment	Livestock Numbers and Class ^a	Present Situation			Area Manager's Recommendation				Potentially Suitable Lack of Water Federal AUMs Acres	
		Season of Use	Federal AUMs	Acres	Season of Use	Licensed Use	Suitable Federal AUMs	Federal Acres		Percent Change in AUMs
Big Plains ^b	1C	Yearlong	15	664.00	Yearlong	12	7	196	-53	...
Buttermilk	10C	5/16-10/15	50	1,714.00	7/1-10/31	40	38	1,474	-36	...
Canaan Mountain	56C	6/1-9/30	224	7,794.64	7/1-10/31	160	158	6,591	-29	...
Canaan Ranch ^b	24C	11/1-5/31	168	2,755.17	Yearlong	24	20	919	-88	...
Cottonwood Point	35C	Yearlong	424	8,705.60	.....	...	...	.....	.....	...
(Upper)	....	.....	(405)	.....	7/1-10/31	108	108	3,372	-73	...
(Lower) ^b	....	.....	(19)	.....	Yearlong	12	5	210	-74	...
Cottonwood	11C	Yearlong	131	3,379.85	.....	...	...	.....	.....	...
(North)	....	.....	(117)	.....	10/1-5/31	80	80	1,610	-32	...
(South) ^b	....	.....	(14)	.....	Yearlong	12	12	380	-14	...
Goat Ranch	122C	6/1-9/30	486	8,501.28	6/1-9/30	208	207	5,467	-57	58
Grafton Mesa	35C	5/1-10/31	210	1,854.30	.....	...	2	90	-99	13
Grafton Wash	6C	12/16-4/30	25	1,778.13	10/16-2/28	36	35	954	+40	...
Grapevine	30C	6/1-9/30	120	4,764.00	7/1-10/31	24	26	540	-78	...
Horse Valley	35C	5/1-10/31	210	4,218.50	7/1-10/31	72	70	1,898	-67	...
Maxwell Canyon	7C	5/15-10/31	40	3,568.75	7/1-10/31	40	40	1,242	0	...
Park	1C	Yearlong	16	640.00	7/1-10/31	24	25	640	+56	...
Riverview Ranch	2C	Yearlong	22	863.33	Yearlong	24	21	605	-5	...
Rockville	11C	1/1-2/28	21	307.89	1/1-2/28	10	10	308	-52	...
Russel Fields ^b	5C	Yearlong	60	633.00	Yearlong	12	14	352	-77	...
Upper South Creek	45C	5/1-10/31	270	2,367.00	No grazing	...	0	0	-100	...
Well Springs	13C	6/1-2/28	120	2,192.00	6/1-2/28	27	28	1,306	-77	...
TOTAL	436C		2,612	56,701.44		925	906	28,154	-65	71
										2,326

^aClasses of livestock are: C = Cows; H = Horses; S = Sheep.

^bContinuous seasonal that carries over into specific management.

TABLE 2
 CANAAN MOUNTAIN: MFP Specific Management

Priority Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Proposed Licenced Use	Surveyed and/or Treatment AUMs	
											Total AUMs	Treatment AUMs
...	Big Plains	196	Continuous seasonal	1	Spcr, Putr	.....	0	...	Yearlong	12	7	7
9	Buttermilk	1,474	Deferred	1	Hija	.....	36	...	7/1-10/31	40	38	74
3	Canaan Mountain	6,591	Deferred	1	Putr	.....	353	...	7/1-10/31	160	158	511
...	Canaan Ranch	919	Continuous seasonal	1	Spcr, Epne	.....	0	...	Yearlong	24	20	20
5	Cottonwood Point	3,372	Deferred	2	Putr, Epne	.....	95	...	7/1-10/31	108	108	203
	Cottonwood Point	210	Continuous seasonal	1	Atca, Spcr	.....	0	...	Yearlong	12	5	5
2	Cottonwood	1,610	Deferred	2	Putr, Hija	Spray/seed 296 acres	9	37	10/1-5/31	120	117	126
	Cottonwood	380	Continuous seasonal	1	Putr, Hija	.....	0	...	Yearlong	12	12	12
1	Goat Ranch	7,244	Deferred	2	Putr, Orby	Spray/seed 700 acres Chain/seed 1,168 acres	45	221	6/1-9/30	488	486	531
6	Grafton Mesa	639	Deferred	1	Hija	Reservoir 1	17	...	7/1-9/30	15	15	32
10	Grafton Wash	954	Deferred	1	Hija	.....	19	...	10/16-2/28	36	35	54
11	Grapevine	540	Deferred	1	Hija, Epne	.....	12	...	7/1-10/31	24	26	38
8	Horse Valley	1,898	Deferred	1	Hija	Spring 1	48	...	7/1-10/31	40	40	52
12	Maxwell Canyon	1,242	Deferred	1	Atca, Spcr	Reservoir 1	12	...	7/1-10/31	40	40	52
13	Park	640	Deferred	1	Hija	.....	7	...	7/1-10/31	24	25	32

(continued)

TABLE 2 CANAAN MOUNTAIN (concluded)

Prior- ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased with Management	Percent Change AUMs	Season of Use	Proposed Licensed Use	Surveyed and/or Treat- ment AUMs	Total AUMs ^c
7 Riverview Ranch	605	Rest rotation	1	Atca, Hija	Spring 1	.....	12	-5	Yearlong resting every 3 years	24	21	33
14 Rockville	308	Deferred	1	Putr	.....	.....	5	-52	1/1-2/28	10	10	15
... Russel Fields	352	Continuous seasonal	1	Spcr, Epne	.....	.....	0	-77	Yearlong	12	14	14
... Upper South Creek	0	None	1	Putr, Pofe	.....	.....	0	-100	No grazing	.....	0	0
4 Well Springs	<u>1,306</u>	Deferred	<u>2</u>	Hija, Putr	Fence 1.5 miles Spring 1 Pipeline 1 mile	Chain/seed <u>736 acres</u>	<u>24</u>	<u>-77</u>		<u>117</u>	<u>120</u>	<u>144</u>
TOTALS	30,480		24			2,900 acres	694	-65		1,350	1,327	2,021

^aContains acres that are potentially suitable due to lack of water.

^bRepresents proposed stocking levels. Changes from actual surveyed AUMs are the result of balancing cattle numbers and season of use.

^cTotal of surveyed and/or treatment AUMs plus potential AUMs with management.

TABLE 3
 ESCALANTE: MFP Interim Management

Allotment	Livestock Numbers and Class ^a	Present Situation			Area Manager's Recommendation			Potentially Suitable Lack of Water Federal Acres	
		Season of Use	AUMs	Federal Acres	Season of Use	Suitable AUMs	Federal Acres		
Alvey Wash	241C	5/16-9/30	1,086	48,606	6/16-10/31	1,086	10,519	27	348
Big 8own Bench	295C	10/16-2/28	1,328	^c 16,508	10/16-3/15	831	^c 14,957	.....	.....
	152C	3/1-3/31	152						
	20C	4/1-4/30	20						
Boulder Creek	10C	4/1-5/31	20	1,705	9/1-10/31	34	772	.....	.....
	30C	8/16-10/15	60						
Boulder Stock Trail	.....	.....	135	2,598	.....	135	2,598	.....	.....
Cedar Washes	245C	6/16-9/30	860	11,567	7/16-10/30	648	8,137	.....	.....
Chimney Rock	539C	11/1-6/15	4,043	31,942	11/1-6/15	2,783	30,476	.....	.....
Circle Cliffs	291C	11/1-3/31	1,530	^c 29,779	11/1-3/31	895	^c 8,338	.....	.....
Collets	30C	6/16-9/15	90	15,252	7/16-8/15	26	588	.....	.....
Oeath Hollow	194C	11/1-3/31	970	17,883	11/1-3/31	255	6,364	.....	73
	23C	4/1-5/15	35					.....	1,203
Deer Creek	142C	11/1-2/28	540	17,447	^d 11/1-2/28	404	6,182	.....	148
	32C	4/1-6/15	66		4/1-4/30			.....	2,025
Dry Hollow	108C	4/21-6/20	216	1,307	Accept proposal	18	297	.....	.....
Escalante River Lower River	339C	9/1-4/15	2,547	^c 67,891	9/1-3/30	2,268	^c 49,729	.....	33
Phipps Range	336C	11/1-5/31	2,376	^c 41,641	10/1-3/30	280	4,669	.....	.....
					10/1-3/31	1,884	^c 29,061	.....	380
Haymaker	50C	11/1-12/31	100	3,328	11/1-12/31	76	1,621	.....	.....
King Bench	483C	11/1-3/31	2,415	48,268	11/1-3/31	1,113	17,641	.....	295
Lakes	327C	6/1-9/30	1,308	^c 23,301	6/1-9/30	848	17,706	.....	.....
Last Chance Escalante	258C	5/1-10/15	1,419	51,020	6/1-10/15	1,100	6,190	.....	.....
	258C	10/16-4/30	1,667	^e 178,204	10/16-4/30	1,387	79,280	.....	.....
Long Neck	21C	5/1-5/31	21	610	Accept proposal	5	130	.....	.....
Lower Cattle	1,138C	10/1-4/15	6,877	72,611	10/1-4/15	4,101	61,783	.....	.....
McGath Point	40C	3/16-6/15	120	3,440	11/1-1/31	120	2,193	.....	.....

(continued)

TABLE 3 ESCALANTE (concluded)

Allotment	Livestock Numbers and Class ^a	Present Situation		Area Manager's Recommendation		Potentially Suitable Lack of Water Federal Acres			
		Season of Use	Federal AUMs Acres	Season of Use	Suitable Federal AUMs Acres				
Moody	320C	11/1-3/31	1,600	44,086	11/1-3/31	635	12,283	101	1,915
Mudholes	200C	6/1-9/30	800	15,405	7/16-9/30	438	10,853	.....	.....
Muley Twist	.....	11/1-5/31	*	* All grazing use within Capital Reef National Park is to be suspended in 1981. *	*	*	*	*	*
Navajo Bench	.....	.....	No use presently allotted nor proposed	.....	*	*	*	*	*
Pine Creek	144C	5/16-6/15	144	3,822	9/16-10/15	78	2,952	.....	.....
Rattlesnake Bench	.....	.....	No use presently allotted nor proposed	.....	*	*	*	*	*
Rock Creek	194C	10/1-5/31	1,544	92,570	10/1-7/15	1,662	28,163	+8	39
Salt Water Creek	22C 27C	3/16-6/15 10/16-12/15	120	10,210	10/16-3/15	120	4,396	0	.....
Soda	200C	10/1-5/31	1,600	66,048	10/1-5/31	1,600	51,389	0	.....
Steep Creek	150C 23C 55C	11/16-1/15 12/1-3/31 5/16-6/15	300 92 55	10,414	11/16-1/15	220	4,157	-51	.....
Upper Cattle	1,510C	11/1-6/15	10,278	114,793	11/1-6/15	5,773	94,447	-27	.....
Wagon Box	101C 50C 10H 31C	11/1-2/28 3/1-4/15 12/1-2/28 12/1-3/31	404 75 30 124	25,256	11/1-3/31	442	9,239	-30	26
White Rock	30C	12/1-1/31	60	1,302	12/1-1/31	42	707	-30	.....
Wide Hollow	75C	5/1-8/10	350	6,471	7/16-10/15	204	5,120	-42	.....
Willow Gulch	161C	11/1-5/31	945	10,215	11/1-3/31	390	8,315	-59	.....
ESCALANTE TOTAL	8,221C 10H	.....	45,302	801,233	.....	29,147	482,809	-30	1,044
PARIA TOTAL	452C	.....	3,211	270,774	.....	3,049	107,443	+4	39
GRAND TOTAL	8,673C 10H	.....	48,513	1,072,007	.....	32,196	590,252	-27	1,083

^aClasses of livestock are: C = Cows; H = Horses; S = Sheep.
^bAUMs may vary from surveyed capacity due to rounding of cattle number or AUMs.
^cFederal acres include Glen Canyon National Recreation Area acres.
^dSeason of 11/1-3/31 is also acceptable.
^eIncludes 22,989 acres in Glen Canyon National Recreation Area.
^fUsed same season as existing AMP.

TABLE 4

ESCALANTE: MFP Specific Management

Prior-ity Allotment	Suitable Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat-ment and Acres	Potential AUMs Increased With Manage-ment	Percent Change AUMs	Season of Use	Surveyed AUMs ^a	Total AUMs
2	Alvey Wash ^c 10,867	Rest rotation	3	Agcr, Orhy, Putr	Springs 2 Pipeline 8 miles Cattleguard 1 Fence 2.6 miles Reservoir 1 Troughs 6	Sagebrush plow/seed 1,440 acres	635	+73	6/15-10/31	1,086	1,877
1	Big Bown Bench 14,957 ^d	Winter	1	Orhy, Atca	Reservoirs 3 Fence 0.4 mile		382	-19	10/1-3/31	831	1,213
1	Boulder Creek 772	Winter	1				46	0	9/1-10/31	34	80
1	Boulder Stock Trail 2,598						131			135	266
3	Cedar Washes 8,137	Deferred rotation	2	Orhy, Hija, Agcr	Retention Dam 4 Springs 2 Fence 2.5 miles	Sagebrush burn/seed 860 acres Pinyon-juniper chain/ seed 340 acres	877	+52	6/15-9/30	648	1,310
1	Chimney Rock 30,476 ^d	Rest rotation	4	Orhy, Hija, Epne	Fence 0.8 mile Seep 1 Spring 1 Pipeline 2 miles Well 1		877	-9	11/1-6/15	2,785	3,662
2	Circle Cliffs ^c 8,338	Rest rotation	4	Agcr, Elju, Atca	Windmill 1 Pipeline 1.5 miles Troughs 3 Water catch-ment 1 Seep 1 Fence 1.7 miles	Sagebrush plow/seed 2,642 acres	583	+13	11/1-5/15	897	1,726
2	Collets 588	Summer/fall	1	Orhy, Atca	Seep 1		8	-62	7/16-8/15	25	34
1	Death Hollow 7,567	Winter	1	Orhy, Atca	Seeps 4 Reservoirs 4		365	-31	11/1-3/31	330	695
3	Deer Creek ^c 8,207	Winter	3	Orhy, Atca	Stock tanks 4		280	+38	11/16-2/28 4/1-4/30	554	834

Revised 1/2/80

(continued)

TABLE 4 ESCALANTE (continued)

Prior-ity Allotment	Suitable Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Surveyed AUMs ^a	Total AUMs ^b
1 Dry Hollow	297		...	.....	.....	.....	(16)	-100	No use	^e (18)	(34)
Escalante ^c River and Silver Falls (consolidated)	54,398	Rest rotation	8	Atca, Epne, Orhy, Spcr	Cattleguard 1 Slickrock dam 1	.....	1,296	0	9/1-3/30	^f 2,547 (191 surveyed AUMs not applied to BPQ)	3,843
3 Forty-Mile Ridge	38,800	Rest rotation	3	Orhy, Atca, Epne, Agsp	Fence 11.8 miles Cattleguards 3 Water catchments 3 Troughs 16 Springs 4	.....	1,496	+63	11/1-6/15 10/1-5/21 12/1-5/31	^f 1,800 (33 surveyed AUMs not applied to BPQ)	3,872
2 Haymaker	1,621	Winter	1	Orhy, Spcr	Retention dam 1	.....	121	0	11/1-12/31	100	221
2 King Bench	23,037	Winter	1	Orhy, Atca	Slickrock water catchments 2 Equip existing well 1	.....	824	-8	11/1-3/31	1,406	2,230
3 Lakes	^d 17,706	Rest rotation	3	Agsm, Putr	Fence 4.5 miles Springs 4	.....	1,253	+60	6/1-9/30	845	2,098
2 Last Chance ^c											
Escalante Paria	5,190 79,280	Rest rotation	3	Orhy, Agcr, Atca	Wells 3 Reservoir 1 Fence 0.3 mile Stocktrail 0.5 mile Ponds 5 Cattleguards 2 Seep 1 Troughs 3	Chain/seed 1,160 acres in Escalante Chain/seed 5,980 acres	65 1,818	+4 +52	5/1-10/15 10/16-4/30	1,100 91,389	1,484 3,495
1 Long Neck	130	.....	...	.....	.....	.....	(14)	-100	No use	^e (5)	(19)

(continued)

TABLE 4 ESCALANTE (continued)

Prior-ity Allotment	Suitable Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased with Management	Percent Change AUMs	Season of Use	Surveyed AUMs	Total AUMs
1	Lower Cattle ^C 61,783	Deferred rotation	3	Orhy, Atca	Fence 6 miles Well 1 Pipeline 16 miles Seep and tank 1 Stocktrail 0.5 mile Overflow 0.25 mile Troughs 6 Cattleguard 1 Enclosed storage 1	.....	1,056	-25	10/1-4/15	4,101	5,128
5	McGath Point 2,193	Winter	1	Orhy	.....	.....	108	+90	10/1-12/31	120	228
1	Moody ^d 14,198	Winter	1	Orhy, Atca	Springs 1 Reservoir 1 Fence 3 miles	.....	399	-29	11/1-3/31	740	1,139
4	Mudholes 10,853	Fall	1	Agsm, Putr	.....	.....	750	+38	7/1-8/25	356	1,106
1	Muley Twist 0	.....	...	.....	.....	.....	.....	...	No use	.....	.....
1	Navajo Bench 0	.....	...	.....	.....	.....	.....	...	No use	.....	.....
5	Pine Creek 2,952	Rest rotation	1	Orhy	Fence 0.5 mile Water catchment 1	.....	184	+128	5/16-6/15 10/20-12/19	77	328
1	Rattlesnake Bench 0	.....	...	.....	.....	.....	.....	...	No use	.....	.....
4	Rock Creek ^C 36,516	Deferred rotation	...	.....	Fence 3 miles Springs 3	.....	369	+54	9/1-6/30	2,009	2,378
4	Salt Water Creek 4,396	Winter	1	Spcr ^e	Fence 0.25 mile	.....	230	+210	10/1-3/31	142	372
4	Soda ^C 51,389	Rest rotation	3	Orhy, Agsp, Atca, Epne	Springs 6 Fence 0.7 mile Water catchment 1 Stocktrail 0.2 mile Corral 1	.....	657	+41	10/1-5/31	1,600 ^f (168 surveyed AUMs not included in BPQ)	2,257

(continued)

TABLE 4 ESCALANTE (concluded)

Prior-ity Allotment	Suitable Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Surveyed AUMs ^g	Total AUMs ^h
1 Steep Creek	4,157	Winter	2	Orhy, Epne	Stock tank 1	.....	78	-33	11/16-1/15 11/16-2/15	220	298
1 Upper Cattle ^c	94,447	Rest rotation	4	Orhy, Atca	Pipeline 28 miles Storage tanks 7 Fence 2.5 miles Springs 2 Reservoirs 3 Ring tanks 10 Stocktrail 1 mile	.....	5,292	+8	11/1-6/15	5,773	11,065
4 Wagon Box	^d 10,059	Winter	1	Orhy, Atca	Reservoirs 2 Seep 1	.....	511	+55	11/1-3/31	471	982
3 White Rock	707	Winter	1	Orhy, Atca	.....	.....	34	-27	12/1-1/30	42	76
4 Wide Hollow	5,120	Deferred rotation	2	Orhy, Epne	Fence 1.5 miles Water catchment 1 Reservoirs 2 Spring maintenance 1	Plow/seed 610 acres Spray/seed 485 acres	320	+87	5/15-8/15	204	654
2 Willow Gulch	<u>8,315</u>	Winter	<u>1</u>	Orhy, Atca	Fence 2 miles	.....	<u>453</u>	<u>-11</u>	11/1-3/31 11/1-1/31	<u>390</u>	<u>843</u>
TOTALS Escalante	504,225		69				18,970	+10		29,958	50,003
Paria	<u>115,796</u>		<u>---</u>				<u>2,187</u>	<u>+83</u>		<u>3,398</u>	<u>5,873</u>
GRAND TOTAL	620,051		69		13,897 acres		21,157	+15		33,356	55,876

^aRepresents proposed stocking levels. Changes from actual surveyed AUMs are the result of balancing cattle numbers and season of use.
^bTotal of surveyed AUMs plus potential AUMs with management and treatment.
^cAllotments presently under an AMP.
^dAcres include BLM and Glen Canyon National Recreation Areas.
^eAlthough suitable or potentially suitable AUMs are available, grazing use is not being proposed for this allotment.
^fSurveyed AUMs above the present base property qualifications (BPQ) have not been proposed for use in these allotments.
^gIn order to balance summer and winter range, 1,585 AUMs were not included.

TABLE 5

PARIA MFP Interim Management

Allotment	Present Situation			Area Manager's Recommendation			Potentially Suitable Lack of Water Federal AUMs
	Livestock Numbers and Class	Season of Use	Federal ^b AUMs	Season of Use	Suitable Federal ^b AUMs	Change in AUMs	
Blue Pools	55C	8/1-5/31	553	10/1-3/31	516	8,425	-7
Bunting Well	10C	6/1-11/30	60	6/1-11/30	120	1,680	+100
Cedar Mountain	248C 3H	6/1-10/15	1,130	6/1-10/15	810	9,970	-28
Clark Bench	175C 5H	8/1-5/31	1,800	^b 8/1-5/31	1,800	23,270	0
Cockscomb ^d	9C	12/16-4/15	37	11/16-3/15	36	1,036	-3
Cottonwood	381C 10H	11/1-5/31	2,737	11/1-5/31	2,737	31,242	0
Coyote	292C	11/1-5/31	2,044	^e 11/1-5/31	2,044	21,544	0
Deer Range	85C	8/1-10/15	213	8/1-10/15	213	2,280	0
Dry Valley	195C	7/1-10/31	^f 668	7/1-10/31	9668	96,382	0
East Clark Bench	80C	11/1-5/15	520	11/1-5/15	429	4,784	-17
Ferry Swale			1,535	* * * ADMINISTERED BY ARIZONA STRIP DISTRICT OFFICE * * *			
Flat Top	45C	8/1-5/31	450	8/1-5/31	390	4,865	-13
Harvey's Fear	* * * * Unallotted * * * *			* * * Nonuse * * *		3,197	
Headwaters ⁱ	582C	ⁱ 5/1-6/10	ⁱ 774	5/1-6/10			
	328C	5/1-9/30	1,640	5/1-9/30	5,930	^j 53,370	0
	703C	11/1-3/31	3,515	11/1-3/31			
Judd Hollow	172C	11/1-5/31	1,204	10/1-3/31	696	9,745	-42
Lower Hackberry	96C	11/1-3/31	480	11/1-3/31	250	5,117	-48
Lower Warm Creek	40C 5H	11/1-3/31	225	11/1-3/31	110	2,645	-51
Mud Springs	64C	7/16-10/15	194	7/16-10/15	123	3,807	-36
Havajo Bench	* * * Nonuse * * *		^k 832	Nonuse		3,039	
Nipple Bench	190C	12/1-4/30	950	11/1-3/31	515	10,645	-46
Round Valley	125C	11/1-3/31	625	11/1-3/31			-100
Rushbeds	54C	11/1-4/30	324	11/1-4/30	246	5,076	-24
Spencer Bench	* * * Nonuse * * *		^k 264	Nonuse		2,186	
Upper Hackberry	^l 125C ^m 149C	11/1-3/15 4/16-6/15	862	^l 11/1-3/15 ^m 4/16-6/15	578	8,759	-33

(continued)

TABLE 5 PARIA (concluded)

Allotment	Livestock Numbers and Class ^a		Present Situation		Area Manager's Recommendation			Potentially Suitable Lack of Water Federal Acres	
	Season of Use	Federal ^b Acres	Season of Use	AUMs	Season of Use	Suitable AUMs	Federal ^b Acres	Percent Change in AUMs	AUMs
Upper Warm Creek	11/1-5/31	1,547	68,265	11/1-3/31	837	11,193	-46	640	8,725
Wahweap	12/1-4/30	400	11,223	11/15-3/31	194	5,609	-51	.....	.....
TOTALS		4,504C 38H	759,722		19,754	245,035	-20	.....	.....
								n3,745	n70,047

^aClasses of livestock are: C = Cows; H = Horses; S = Sheep.
^bIncludes Glen Canyon National Recreation Area.
^cAUMs may vary from survey due to balancing livestock numbers and season of use.
^dContinuous seasonal allotment that carries into specific management.
^eSeason the same as existing AMP.
^fSixty-three AUMs based on 41 percent Federal range; 42 AUMs used in conjunction with private land.
^gBLM is licensing 157 of these AUMs on 1,670 acres in Kodachrome State Park which is State land under a Recreation and Public Purpose patent. If grazing interferes with the intent of the patent, the AUMs will be deducted from the allotment.
^hOperator presently hauls water to make use of these AUMs.
ⁱSeason times cattle numbers does not equal total AUMs because some operators' season varies from that shown. Proposed acres to be grazed is actual acreage grazed.
^jAcres and AUMs unavailable due to inaccessibility.
^kAUMs entirely in suspended nonuse (not included in total).
^lApplies to native range.
^mApplies to seedings.
ⁿIncludes AUMs and acres potentially suitable in Round Valley and East Clark Bench Allotments where suitability is based on hauling water: 376 AUMs and 5,169 acres in Round Valley; 136 AUMs and 1,200 acres in East Clark Bench. Considers 1,670 acres grazed in Kodachrome State Park and 11,927 acres reduction from proposed in Headwater Allotment. Also includes acres and AUMs unavailable due to inaccessibility.

TABLE 6
PARIA MFP Specific Management

Prior-ity	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased With Manage- ment	Percent Change AUMs	Season of Use	Surveyed AUMs ^b	Total AUMs ^c
1	Blue Pools Flat Top (consolidated) 13,290	Rest rotation	3	Orhy, Atca	Reservoir 1 Fence 4 miles	.....	236	-10	8/1-5/31	900	1,136
2	Bunting Well Cedar Mountain East Clark Bench Judd Hollow (consolidated) 27,379	Rest rotation	3	Orhy	Troughs 2 Pipeline 2.5 miles Water catch- ment 2 Fence 1 mile Tank 1	.....	595	-25	6/1-5/31	2,196	2,791
15	Clark Bench ^d 27,257	Deferred rotation	3	Orhy, Atca, Cela	Reservoir 1 Pipeline 7 miles Slickrock catchment 1	.....	451	+14	8/1-5/31	2,060	2,511
16	Cottonwood ^d 42,716	Rest rotation	6	Aggr, Hija Cela	Seeps 3 Pipeline 9 miles Spring 1 Water catch- ment 1 Fence 2 miles Reservoir 1	.....	570	+19	11/1-5/31	3,255	3,825
14	Coyote ^d 33,483	Rest rotation	6	Aggr, Orhy, Cela	Water catch- ment 1 Storage tank maintenance 1 Storage tank 1 Slickrock catchment 1 Stocktrail maintenance 1 mile Fence 0.5 mile	.....	501	+24	11/1-5/31	2,527	3,028
11	Deer Range 2,280	Summer/ fall	1	Orhy, Putr, Cemo	Pipeline 0.5 mile Trough 1 Slickrock catchment 1	.....	6	0	8/1-10/15	213	219

(continued)

TABLE 6 PARTIA (continued)

Priority Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Surveyed AUMs	Total AUMs
2 Dry Valley	7,467	Summer/fall	2	Orny, Hija	Fence 3.5 miles Reservoirs 3 Cattleguard 1	.....	42	+20	7/1-10/31	9801	9843
19 Harvey's Fear	.....	Nonuse	...	.....	.....	.....	.....	0	Nonuse	.....	.....
13 Headwaters ^d (Upper Paria) (Upper Wahweap)	53,370	Rest rotation	9	Agcr, Elju, Putr, Orny, Spcr, Cemo	Pipeline 8 miles Fence 5 miles Reservoirs 3	.....	1,131	0	5/1-9/30 11/1-3/31	5,930	7,061
5 Lower and Upper Hackberry (consolidated)	19,006	Winter and rest rotation	4	Agcr, Spcr, Epne, Putr, Cemo	Well 1 Pipeline 3 miles Fence 3 miles Troughs 4	Plow/seed 200 acres Chain/seed 600 acres	216	-16	11/1-3/31 4/16-6/15	960	1,346
7 Lower Warm Creek	2,645	Winter	1	Epne, Orny	.....	.....	53	-51	11/1-3/31	110	163
6 Mud Springs	4,716	Summer/fall	1	Orny, Agsm, Putr, Cemo	Reservoirs 3 Spring 1 Tank 1 Fence 0.5 mile	.....	127	-20	7/16-10/15	156	283
18 Navajo Bench	.....	Nonuse	...	.....	Trough 1	.....	.....	0	Nonuse	.....	.....
9 Nipple Bench	16,852	Rest rotation	3	Hija, Atca	Water catchment 1 Pipeline 2.5 miles Reservoir 1 Fence 3.5 miles	.....	294	-7	12/1-4/30	885	1,179
4 Round Valley	5,169	Winter	1	Eula, Orny, Agsm, Hija	Stock tanks 2 Reservoirs 2 Pipeline 1.5 miles Seep 1	.....	157	-40	11/1-3/31	375	532
10 Rushbeds	6,766	Rest rotation	3	Orny, Spcr	Spring 1 Slickrock catchment 5 Fence 4 miles	.....	148	-0	11/1-4/30	324	472

(continued)

TABLE 6 PARTIA (concluded)

Prior- Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased With Manage- ment	Percent Change AUMs	Season of Use	Surveyed AUMs	Total AUMs
8 Upper Warm Creek	19,918	Rest rotation	3	Orchy, Hija, Atca	Fence 1.25 miles Reservoirs 3 Pipeline 2.5 miles Storage tanks 3 Springs 3	.....	464	-5	11/1-5/31	1,477	1,941
3 Wahweap	5,609	Winter	1	Hija, Atca	Reservoir 1 Springs 2 Water catch- ment 1 Stocktrail 1 mile	.....	91	-52	11/15-3/31	194	285
TOTALS	287,923		54			800 acres	5,082	-6		22,363	27,615

^aContains acres that are potentially suitable due to lack of water.

^bRepresents proposed stocking levels. Changes from actual surveyed AUMs are the result of balancing cattle numbers and season of use.

^cTotal of surveyed AUMs plus potential AUMs with management and treatment.

^dAllotments presently under an AMP.

^eOf 1,670 acres, BLM is licensing 157 AUMs in Kodachrome State Park which is a Recreation and Public Purpose (R&PP) patent. If this grazing use ever interferes with the intent of this R&PP, these AUMs will be deducted from the allotment.

TABLE 7
VERMILION MFP Interim Management

Allotment	Livestock Numbers and Class ^a	Present Situation		Area Manager's Recommendation			Potentially Suitable Lack of Water Federal AUMs Acres		
		Season of Use	Federal AUMs	Season of Use	Suitable AUMs	Federal Acres			
Airport	20C	7/16-8/15	20	468	7/1-8/31	8	468	-60	...
Art Canyon	70C	5/16-10/15	350	9,092	7/1-3/31	155	5,120	-56	...
Barracks Point	134C	8/16-10/15	268	7,915	9/1-10/15	40	1,814	-85	43 2,151
Boot	9C	6/1-10/31	45	2,491	7/1-11/30	37	747	-18	9 140
Brown Canyon	10C	5/1-10/31	20	1,730	11/16-12/15	.....	.....	-100	15 296
Buck Pasture	25C	6/1-9/31	100	2,740	7/1-11/30	39	970	-61	.....
Bunting Canyon ^b	6C	11/1-2/28	24	339	7/1-3/31	4	65	-83	.....
Carmel Junction	22C	6/1-10/31	112	2,063	Allow exchange of use on State land	.....	.....	-100	.....
Cedar Ridge ^b	.....	.....	.....	87	12/1-2/28	6	87	+100	.....
Chris Spring	58C	5/16-10/31	318	4,703	6/1-10/15	153	3,940	-52	.....
Clay Flat	30C	5/1-11/31	210	5,420	7/1-3/31	80	2,250	-62	.....
Cougar Canyon	11C	6/16-11/15	55	1,546	10/1-2/15	.....	.....	-100	13 530
Dishpan	.....	.....	.....	210	.....	.....	.....	-100	7 210
Driveway	.....	.....	.....	860	.....	.....	.....	-100	19 560
Dry Lake ^c	101C	10/26-11/25	74	1,839	10/16-11/15	60	1,839	-16	.....
Eight-Mile Gap ^b	5C	12/1-4/30	25	449	5/15-3/31	15	449	-40	.....
Elephant Cove	72C	5/1-10/31	432	7,604	7/1-10/31	105	5,250	-76	.....
Farm Canyon	64C	6/1-10/15	243	3,363	7/1-3/31	100	2,850	-59	.....
Fishtail	46C	7/1-11/30 or 11/1-4/15	230	3,249	9/1-3/31	52	1,640	-77	.....
Five-Mile Mountain	217C	11/1-4/30	1,302	15,387	11/1-3/31	170	5,620	-87	216 7,442
Flag Point	.....	.....	.....	380	No AUMs	.....	.....	-100	.....
Flood Canyon	40C	6/1-10/31	200	6,191	7/1-10/31	39	990	-80	.....
Flume Hollow (mostly in Zion)	7C	5/1-11/30	f 49	220	.....	.....	.....	-100	.....
FAR	25C	6/1-9/30	100	4,397	7/1-10/15	68	2,209	-32	.....
Glasseye	.....	.....	.....	7,427	Unallocated	91	2,380	.....	.....
Granary Ranch	14C	7/1-11/30	70	1,809	9/1-10/31	.....	.....	-100	11 280

(continued)

TABLE 7 VERMILION (continued)

Allotment	Livestock Numbers and Class ^a		Present Situation		Area Manager's Recommendation		Potentially Suitable Lack of Water Federal AUMs Acres		
	Season of Use	AUMs	Season of Use	Federal Acres	Season of Use	Suitable Federal AUMs Acres			
Gravel Pit ^b	2C	24	3/1-2/28	191	10/1-3/31	8	191	-67	...
Harris Flat	53C	265	5/16-10/15	4,350	7/1-10/31	140	3,410	-47	...
Hells Bellows ^b	22C	121	5/1-10/15	2,019	9/1-3/31	45	505	-63	...
Johnson Canyon	58C	271	6/26-11/15	8,139	7/1-11/15	132	4,310	-51	2
Johnson Lake	69C	345	6/1-10/31	10,150	7/1-10/31	267	7,640	-23	53
Johnson Point	27C	136	11/1-1/31	2,277	11/1-3/31	40	930	-70	...
Johnson Ranch	59C	265	6/1-10/15	5,642	7/1-3/31	40	853	-85	53
John R. Flat	43C	258	5/1-10/31	10,007	11/16-3/15	150	5,668	-42	12
Kanab Creek ^c	32C	100	11/1-1/31	4,042	11/16-3/15	21	627	-70	...
Kane Spring	98C	490	6/1-10/31	10,944	7/1-10/31	300	8,980	-39	...
Kinnikinnic ^c	30C	90	7/1-9/30	4,601	7/1-11/31	105	3,450	+42	...
Locke Ridge	48C	240	12/1-4/30	4,232	After 7/1, off by 4/1	114	2,057	-53	...
Lone Forty ^b	3C	18	3/1-2/28	40	Yearlong	.....	.....	-100	1
Lost Springs ^b	17C	4	.....	601	Yearlong	6	295	+50	.....
Lost Spring ^b	.....	.....	.....	60	Yearlong	.....	.....	-100	.....
Lower Hog	17C	52	8/1-10/31	2,340	8/1-10/15	28	710	-46	.....
Meadow Canyon	96C	240	9/1-9/30 10/16-11/30	4,715	After 7/1, off by 4/1	.....	.....	-100	166
Mollies Nipple	360C	3,436	3/1-2/28	93,080	Existing AMP	2,700	49,205	-21	231
Neaf ^b	3C	34	3/1-2/28	1,215	Yearlong	.....	.....	-100	9
Oak Springs ^c	29C	145	4/1-8/31 or 6/1-10/31	2,459	7/1-10/31	76	1,459	-39	.....
Old Fort ^b	5C	35	4/1-10/31	2,151	Yearlong	5	165	-86	.....
Pine Springs	112C	448	11/16-3/15	8,503	11/16-3/15	284	7,976	-37	.....
Poverty Flat	67C 56C	414	11/1-12/30 11/1-3/30	9,651	11/1-12/31	56	2,048	-86	.....
Red Butte	26C 32C	238	7/1-9/30 7/1-11/30	5,321	7/1-3/31	196	5,166	-18	.....
Red Canyon	26C 298C	577	7/1-11/30 11/16-12/30	11,831	7/1-12/31	135	4,159	-77	56
Red Knoll ^c	45C	175	6/1-10/31	4,935	7/1-10/31	140	4,755	0	.....

(continued)

TABLE 7 VERMILION (concluded)

Allotment	Livestock Numbers and Class ^a		Present Situation		Area Manager's Recommendation			Potentially Suitable Lack of Water Federal AUMs
	Season of Use	AUMs	Federal Acres	Season of Use	Suitable AUMs	Federal Acres	Percent Change in AUMs	
Rock Springs	6/16-11/15	505	6,732	6/16-11/15	139	4,292	-72	...
School Section ^b	1/1-10/31	20	430	10/1-10/31	2	40	-90	...
Seaman	8/1-1/30	126	6,849	8/1-11/30	33	970	-74	28 800
Seeps	3/1-2/28 12/1-3/31	452	4,002	12/1-2/28	30	980	-93	...
Sethy's Canyon	6/1-10/31	260	7,630	7/1-3/31	80	2,290	-69	...
Sheep Spring ^c	6/1-10/31	220	3,166 d ₁₄₅	9/1-11/30	79	890	-58	...
Sink Holes	11/16-4/30 11/4-4/30	459	6,667	9/1-1/31	108	4,161	-76	...
Sunnyside	3/1-2/28	12	350	11/1-2/28	12	290	0	...
Thompson Point	7/1-10/31	64	1,511	11/1-2/28	28	736	-56	...
Trail Canyon	3/1-2/28	210	6,886	7/1-3/31	108	2,505	-49	...
Trail Well	11/1-3/31	f ₉₀	1,300	11/1-2/28	20	420	-78	...
Twin Hollow	6/1-10/31	100	1,210	Nonuse	.....	.....	-100	16 710
Upper Hog	6/1-10/31	100	4,343	7/1-9/30	28	603	-72	...
Vermilion	6/1-9/1 10/1-1/15 2/16-5/15	2,432	31,906	Existing AMP	1,750	22,937	-28	...
Virgin River	12/1-4/30	230	3,799	10/1-3/31	108	1,900	-53	...
Water Canyon	6/1-10/31	335	3,170	10/1-3/31	23	680	-93	...
White Sage	5/10-6/5	75	2,195	6/16-3/31	21	1,025	-72	18 370
Willis Canyon	6/1-6/30	16	1,166	10/1-11/30	4	280	-75	...
Willow Spring	5/16-10/31	110	2,700	Wants to go right into long-term (6/1-10/15)	60	2,130	-45	...
Yellow Jacket	500	500	10,036		280	6,967	-44	...
TOTAL	3,778C	18,983	414,257		9,126	9,206,758	-52	978 32,258

^aGlasses of livestock are: C = Cows; H = Horses; S = Sheep.

^bContinuous seasonal that carries into specific management.

^cAllotments partially continuous seasonal that carries into specific management.

^dContinuous seasonal acres.

^eContinuous seasonal AUMs.

^fAUMs include part in Zion Planning Unit.

^gAUM and acreage totals do not include 91 AUMs and 2,380 acres listed in the table for Glasseye Allotment. These AUMs will not be allocated in the interim.

Revised 1/2/80

TABLE 8
VERMILLION MFP Specific Management

Priority Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Surveyed and/or Treatment AUMs	Total AUMs ^c
44 Airport	468	ASR ^d	1	Hija	.....	.....	36	-60	7/1-8/31	8	44
19 Art Canyon	5,120	Deferred rotation	2	Orhy, Putr	Fence 1.6 miles Spring repair 3	.....	137	-56	6/1-3/31	155	292
25 Barracks Point	3,965	ASR ^d	1	Orhy, Putr	Seep 1 Reservoir 1	.....	125	-69	9/1-10/15	84	209
37 Bout	887	ASR ^d	1	Orhy, Putr	Operator to haul water to use 9 AUMs	.....	20	0	7/1-11/30	46	66
36 Buck Pasture	970	ASR ^d	1	Spgr, Putr	Spring 1	.....	18	-62	7/1-11/30	39	57
3 Chris Spring Willow Spring (consolidated)	3,940 2,130	Deferred rotation	2	Spgr, Putr	Pipeline 0.5 mile	.....	124	-33	6/1-10/15	216	340
16 Clay Flat	2,250	ASR ^d	1	Putr, Orhy	.....	.....	75	-62	7/1-3/31	80	155
49 Cougar Canyon	530	Rest rotation	1	Orhy, Hija	Operator to haul water to use AUMs	.....	14	-42	6/16-11/15	15	29
50 Dishpan (unlicensed)	210	ASR ^d	1	Orhy, Hija	Operator to haul water to use AUMs	.....	6	.....	11/1-3/31	6	12
47 Driveway	560	ASR ^d	1	Putr, Orhy	Operator to haul water to use AUMs	.....	16	.....	7/1-3/31	19	35
9 Dry Lake	1,839	ASR ^d	1	Spgr, Putr	.....	.....	63	-16	10/16-11/15	60	123
2 Kane Springs Elephant Cove Harris Flat (consolidated)	8,980 5,250 3,410	Deferred rotation	3	Spgr, Putr	Well 1 Fence main-tenance 2 miles Pipeline 5 miles Reservoir 1 Water catch-ments 2	Spray/seed 1,050 acres	451	-44	6/1-10/31	620	1,071

(continued)

TABLE 8 VERMILION (continued)

Prior- ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased With Manage- ment	Percent Change AUMs	Season of Use	Surveyed and/or Treatment AUMs ^c	Total AUMs ^c
14 Farm Canyon	2,850	ASR ^d	...	Orhy, Putr	Pipeline 0.1 mile Trough 1 Cattleguard 1	.....	49	-59	7/1-3/31	100	149
32 Fishtail	1,640	ASR ^d	1	Bogr, Putr	.....	.....	34	-77	9/1-3/31	52	86
12 Five-Mile Mountain	13,062	Rest rotation	3	Agcr, Orhy, Putr	Protection fence 5.5 miles Troughs 3 Water catch- ment 1	Burn/seed 2,900 acres	429	-41	11/1-4/30	714	1,143
7 FAR	2,209	ASR ^d	1	Orhy	Pipeline 0.125 mile Trough 1,000 gallons	.....	99	-32	7/1-10/15	68	167
15 Johnson Canyon	5,380	Rest rotation	3	Spgr, Putr	Pipeline extension 1.25 miles	.....	e225	-16	7/1-11/15	e134	e359
6 Johnson Lake Glasseye Flood Canyon	8,970 2,380 990	Rest rotation	3	Orhy, Putr	Pipeline 3 miles Fence 3.25 miles	Chain/seed 350 acres	264	-46	6/1-10/31	495	759
35 Johnson Point	930	ASR ^d	1	Orhy, Bogr	.....	.....	8	-70	11/1-3/31	40	48
28 Johnson Ranch	2,220	ASR ^d	1	Orhy, Putr	Operator to haul water to use 53 AUMs	.....	32	-83	7/1-3/31	93	125
22 Kanab Creek John R. Flat Brown Canyon (consolidated)	627 6,048 296	ASR ^d	1	Orhy, Putr	Operator to haul water to use 21 AUMs	.....	201	-49	11/16-3/15	192	393
21 Kinnikinnic	3,450	Rest rotation	1	Orhy, Putr	Well 1 Windmill 1 Storage 1 Troughs 3 Pipeline 0.5 mile	.....	85	-22	4/16-7/15 first year 8/1-11/31 second year	105	190

(continued)

TABLE 8 VERMILION (continued)

Prior-ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat-ment and Acres	Potential AUMs Increased With Manage-ment	Percent Change AUMs	Season of Use	Surveyed and/or Treatment AUMs	Total AUMs ^c
13 Meadow Canyon Locke Ridge (consolidated)	4,715 2,057	Deferred rotation	2	Orhy, Putr	Slickrock reservoir 1 Pipeline from well 1.5 miles Trough 1	.....	116	-41	8/16-3/15	280	396
8 Lower Hog	710	ASR ^d	1	Orhy	.....	.....	9	-23	8/1-10/15	28	37
4 Mollies ^f Nipple	57,585	ASR and ^d rest rotation	6	Agcr, Putr	Reservoir 1 Spring 1 Pipeline 4.5 miles Wet seep 1	Burn/seed 1,850 acres	2,431	-15	Yearlong	2,928	5,359
45 Seeps	980	ASR ^d	1	Orhy	Reopen well 1 Pipeline 1 mile Trough 1	.....	50	-93	12/1-2/28	30	80
30 Oak Springs ^f	1,459	ASR ^d	1	Orhy, Putr	Horizontal drilling 1 Trough 1 Cattleguard 1	.....	44	-55	5/1-10/31 and 7/1-10/31 alternating	76	120
31 Pine Springs	7,976	Winter	1	Spcr, Putr	Well mainten-tenance 1 Slickrock catchment 1	.....	164	-36	11/16-3/15	284	448
29 Poverty Flat	2,048	ASR ^d	1	Spcr, Putr	Reservoir 1	.....	44	-86	11/1-12/31	56	100
27 Red Butte	5,166	ASR ^d	1	Orhy, Putr	Well trough 1 Windmill 1	.....	76	-18	7/1-3/31	196	72
26 Red Canyon	6,033	ASR ^d	1	Orhy, Putr	Windmill 1 Trough 1	.....	155	-66	7/1-12/31	152 42	349
18 Red Knoll	4,755	ASR ^d	1	Orhy, Putr	.....	.....	116	.....	7/1-3/31	140	256
20 Rock Springs	4,292	Deferred rotation	2	Orhy, Putr	Pipeline 1 mile Reservoir maintenance 1	.....	102	-72	6/16-11/15	140	242
48 Granary Ranch	280	ASR ^d	1	Bogr	Operator to haul water to use 11 AUMs	.....	4	-84	9/1-10/31	11	15

(continued)

TABLE 8 VERMILION (continued)

Prior-ity	Allo-tment	Suit-able ^a Fede-ral Acres	Graz-ing Sys-tem	Num-ber of Pas-tures	Key Spe-cies	Livestock Fac-ilities and Units	Land Treat- ment and Acres	Poten-tial AUMs In-creased With Man-age- ment	Per-cent Change AUMs	Sea-son of Use	Sur-veyed and/or Treat-ment AUMs	Total AUMs ^c
33	Seaman	1,770	ASR ^d	...	Hija, Orhy	Operator to haul water to use 28 AUMs	.....	87	-52	8/1-11/30	60	147
17	Sethy's Canyon	2,290	ASR ^d	1	Orhy, Putr	Reservoir 1	.....	49	....	7/1-3/31	80	129
40	Sheep Springs ^f	890	ASR ^d	1	Putr	.....	.....	0	-8	9/1-11/30	80	80
46	Sunnyside	290	ASR ^d	1	Hija	.....	.....	4	-8	11/1-2/28	12	16
5	Trail Canyon	2,505	Deferred rotation	3	Spcr, Putr	.....	.....	36	-49	7/1-3/31	108	144
42	Trail Well	420	ASR ^d	1	Spcr, Putr	.....	.....	8	-77	11/1-2/28	20	28
38	Thompson Point	736	ASR ^d	1	Orhy, Putr	.....	.....	20	-56	11/1-2/28	28	48
24	Sink Holes	4,161	ASR ^d	1	Orhy, Putr	.....	.....	110	-76	9/1-1/31	108	218
43	Twin Hollow	710	ASR ^d	1	Orhy, Spcr	Operator to haul water to use 15 AUMs	.....	21	-84	11/1-2/28	15	36
41	Upper Hog	603	ASR ^d	1	Orhy, Putr	.....	.....	4	-72	7/1-9/30	28	32
1	Vermillion ^f	22,937	Rest rotation	11	Orhy, Putr	Well 1 Windmill 1 Storage tank 1 Trough 1 Pipeline 2.5 miles	Plow/seed 225 acres Burn 1,650 seeded acres	613	-27	Revised AMP	1,782	2,395
39	Virgin River	1,900	ASR ^d	1	Spcr, Putr, Atca	Pipeline 0.5 mile	.....	14	-53	10/1-3/31	108	122
34	Water Canyon	880	ASR ^d	1	Orhy, Atca	Protection fence 0.25 mile	.....	16	-93	10/1-3/31	23	39
10	White Sage	1,395	ASR ^d	1	Orhy, Hija	Operator to haul water to use 18 AUMs	.....	86	-48	6/16-3/31	39	125
11	Willis Canyon	280	ASR ^d	1	Spcr, Atca	.....	.....	11	-75	10/1-11/30	4	15

(continued)

TABLE 8 VERMILION (concluded)

Prior- ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased With Manage- ment	Percent Change AUMs	Season of Use	Surveyed and/or Treatment ^b AUMs	Total AUMs ^c
23 Yellow Jacket	6,967	Deferred rotation	4	Spgr, Agcr, Putr	Pipeline 1 mile Troughs 2	.....	124	-44	5/16-3/15	280	404
TOTAL	238,351		81			8,025 acres	7,025	-45		10,479	17,504

^aContains acres that are potentially suitable due to lack of water.

^bRepresents proposed stocking levels. Changes from actual surveyed AUMs are the result of balancing cattle numbers and season of use.

^cTotal of surveyed and/or treatment AUMs plus potential AUMs with management.

^dAfter seed ripe - season may vary.

^ePart of the acres and AUMs are in Zion Planning Unit as follows: 1,010 Federal suitable acres, 58 potential AUMs with treatment, 50 AUMs with management, 34

^fsurveyed AUMs, totaling 142 AUMs.

^gAllotment presently under an AMP.

TABLE 9
ZION MFP Interim Management

Allotment	Livestock Numbers and Class ^a	Present Situation		Area Manager's Recommendation		Potentially Suitable Lack of Water Federal AUMs Acres		
		Season of Use	Federal AUMs	Season of Use	Suitable Federal AUMs Acres			
Alton ^b	4C	6/1-10/31	20	80	5	80	-75	...
Bald Knoll	40C	5/6-10/15	214	6,701	25	860	-88	...
Ben Hollow	15C	5/1-10/15	83	30	.....	.....	-100	...
Black Mountain ^b	67C	10/1-11/30	134	1,210	42	869	-69	...
Black Rock	211C	6/1-10/15	950	18,044	662	12,759	-30	...
Buck Knoll	43C	7/1-10/15	151	4,745	168	3,475	11	250
Burnt Cedar Point	25C	6/1-10/31	125	2,980	105	2,430	-16	...
Burnt Flat ^b	6C	6/1-10/31	30	866	20	726	-33	...
Calf Pasture	57C	8/16-10/15	114	2,291	124	1,191	9	60
Cave Creek ^b	4C	6/1-9/30	16	770	26	410	62	...
Coal Mine	20C	10/1-11/30	40	255	3	95	-93	...
Cogswell Point	5C	6/15-7/15	5	230	.....	.....	-100	...
Coop Creek	16C	5/1-9/30	80	430	.....	.....	-100	...
Cottonwood Springs	80C	6/1-10/31	430	3,176	95	2,236	-78	...
Cove ^b	8C	6/1-10/31	40	160	8	160	-80	...
Oser Spring Point	217C	5/16-10/31	1,194	21,662	534	10,618	-55	43
Dry Wash	19C	6/1-10/31	95	1,441	35	570	-63	...
Oump	20C	6/16-10/15	80	201	7	201	-91	...
Elbow Falls ^c	45C	6/16-10/15	180	2,945	^d 35	^e 727	-67	...
					Elbow Pasture 7/1-10/31	25	765	.....
					Elbow Pasture 6/15-3/31	25	765	.....
Elbow Springs	56C	8/1-10/15	140	2,364	.....	.....	-100	...
Elkheart Cliffs	.....	.....	.....	681	.....	.....	0	.....

(continued)

TABLE 9 ZION (continued)

Allotment	Livestock Numbers and Class ^a	Present Situation		Area Manager's Recommendation		Potentially Suitable Lack of Water Federal AUMs	Acres			
		Season of Use	Federal AUMs	Season of Use	Suitable Federal AUMs					
First Point ^f	65C	11/1-3/31 5/1-9/30	650	6,216	11/1-3/31 7/16-9/30 AMP	405	3,955	...	-38	...
Flume Hollow ^{b f}	7C	5/1-11/30	49	775	9/1-11/30	9	190	...	-82	...
Ford Well	97C	6/10-9/10	291	7,981	Graze during dormant season October to March first 2 years, then graze only after seed ripe 7/16-9/30	222	6,601	...	-24	...
Four-Mile	15C	6/16-10/15	60	1,695	7/1-10/31	60	1,695	...	0	...
Gardner Hollow ^b	8C	5/1-10/31	48	2,200	5/1-10/31	30	840	...	-38	...
Glendale Bench	43C	8/1-10/31	129	1,784	7/1-10/31	72	1,784	...	-44	...
Gordon Point ^b	100S	5/16-6/30	70	386	6/1-10/31	40	386	...	-43	...
Hay Canyon ^b	.....	.....	.....	811	8/1-10/31	18	170	...	100	...
Hogs Heaven ^b	108C	5/16-10/15	540	1,771	6/1-10/15	45	880	...	-92	...
Isolated Tracts ^c	20C	6/16-10/15	80	1,510	7/16-10/31	d21 46	e510 920	...	-16	...
Johnson Canyon ^f	58C	6/26-11/15	271	2,553	See Vermilion	33	985	...	-88	...
Levanger Lakes ^b	3C	3/1-12/20	29	890	6/1-11/15	33	740	...	14	...
Lower Herd ^b	30C	5/1-10/15	165	860	8/1-10/31	24	385	...	-85	...
Lower North Fork ^b	6C	5/1-9/30	30	840	9/1-10/31	2	60	...	-93	...
Lydia ^{b g}	18C	3/1-2/28	216	3,336	3/1-2/28	58	669	...	-73	...
Lydia's Canyon ^b	16C	6/1-6/30	16	466	.....	.....	.....	...	-100	...
Meadow Canyon ^b	7C	6/1-10/31	35	1,733	6/1-10/31	25	1,453	...	-29	...
Mill Creek	75C	6/1-9/30	300	13,479	7/16-10/15	132	2,819	16	-56	490
Neuts Canyon ^b	37C	7/1-9/30	111	2,479	6/16-9/15	147	1,441	...	32	...
North Fork ^b	4C	6/1-9/30	16	280	6/1-9/30	30	280	...	88	...
Orderville ^b Gulch	50C	5/16-10/15	250	4,857	5/16-9/15	200	850	125	-20	1,501
Red Hollow ^b	17C	5/1-10/31	102	801	5/1-10/31	30	450	...	-71	...
Robinson Creek ^b	12C	6/1-11/15	66	536	9/1-11/30	24	436	...	-64	...

(continued)

TABLE 9 ZION (concluded)

Allotment	Livestock Numbers and Class		Present Situation		Area Manager's Recommendation		Potentially Suitable	
	Season of Use	AUMs	Federal Acres	Season of Use	Suitable AUMs	Federal Acres	Change in AUMs	Lack of Water Federal AUMs
Rocking Chair ^b	6/1-6/30	162	1,631	6/1-6/30	61	1,561	-62	...
Sink Valley	6/1-10/15 7/1-8/31	342 186	8,329	7/1-10/15 7/16-10/31	177	4,216	-66	27
Spencer Bench	7/1-10/15	224	2,220	7/1-10/15	98	1,668	-56	...
Spring ^b Hollow	.....	.....	510	10/1-10/31	8	330	100	...
Stewart ^b Creek	.....	.....	325	5/1-10/31	6	325	100	...
Sugar Knoll	3/16-7/15	112	2,648	Rest for 2 years than graze after seed ripe 7/1-10/15	15	620	-87	...
Swains Creek	5/16-7/15	108	371	7/1-10/15	18	341	-83	...
Swallow Park ^f	5/1-11/30	1,232	11,594	5/1-11/30	868	9,994	-30	33
Syler Knoll ^b	5/1-10/31	108	415	5/1-10/31	4	100	-96	...
Table ^b g Mountain	5/16-10/15	335	2,254	7/1-9/30	127	1,262	-62	...
Timber Mountain	7/1-9/30	375	6,664	7/16-10/15	403	6,664	7	...
Upper North ^b g Fork	6/1-9/30	88	810	8/1-9/30	3	30	-97	...
Upper Place ^b	6/1-10/15	50	1,715	6/1-10/15	23	635	-54	...
Willow Creek ^b	.....	.....	1,158	5/15-10/31	30	389	-100	...
Zion Park ^b	5/1-7/31	162	1,298	.....	.....	.....	-100	...
Zion ^b	5/1-10/31	1,434	11,012	5/1-10/31	270	5,152	-81	64
TOTAL		12,561	182,455		5,736	99,958	-54	381
		2,778C 4H 436S						2,516 8,660

^aClasses of livestock are: C = Cows; H = Horses; S = Sheep.
^bAllotment totally continuous seasonal that carries into specific management.
^cAllotment partially continuous seasonal that carries into specific management.
^dAllotment totally continuous seasonal that carries into specific management.
^eContinuous seasonal AUMs.
^fContinuous seasonal acres.
^gPresent qualifications include AUMs in Vermilion Planning Unit.
^hReduction in suitable AUMs due to riparian fencing.
 Revised 1/2/80

TABLE 10

ZION MFP Specific Management

Prior- ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased with Manage- ment	Percent Change AUMs	Season of Use	Surveyed and/or Treatment AUMs ^b	Total AUMs ^c
14 Bald Knoll	860	Rest rotation	3	Aggr, Agin, Putr	Fence 3.7 miles Troughs 2	Chain/seed 640 acres Burn/seed 1,279 acres	50	+50	6/1-10/15	6322	372
2 Black Rock ^d	12,759	Rest rotation	3	Orhy, Agin, Aggr, Putr	Fence 2.3 miles Pipeline 2.8 miles Trough 1 Cattleguard 1 Storage tank 1	Burn/chain/seed 2,010 acres Burn/chain/seed 2,240 acres Burn 3,350 acres of existing seeding	300	+49	6/1-10/15	61,417	1,717
8 Buck Knoll Spencer Bench	5,393	Deferred rotation	2	Orhy, Aggr, Putr	Maintain fence 2 miles Maintain res- ervoir 1 Reservoir 1 Trough 1	Chain/seed 340 acres Burn/seed 1,330 acres	40	+2	7/1-10/15	382	422
16 Burnt Cedar Point	2,340	Fall ^f	1	Aggr, Orhy, Putr	Pipeline 0.75 mile Trough 1 Maintain spring 1	Spray 275 acres	69	+6	7/1-11/15	6133	202
10 Calf Pasture	2,231	Deferred rotation	2	Orhy, Putr, Agin	Pipeline ex- tension 1.5 miles Troughs 2 Pipeline 0.5 mile Spring 1 Pasture fence 1 mile	Burn/spray/seed 1,382 acres	...	+64	8/16-10/15	6415	415
18 Coal Mine	95	Fall ^f	1	Stco	.....	.....	2	-90	10/1-11/30	4	6
9 Cottonwood Four-Mile	4,696	Rest rotation	3	Aggr, Stco, Putr	Fence 2.25 miles Wells 2 Pipeline 2.5 miles Troughs 3 Water catch- ment 1 Pipeline 0.25 mile Trough 1	Burn/chain/seed 1,285 acres Burn/seed 770 acres	50	-32	6/16-10/15	456	506

(continued)

TABLE 10 ZION (continued)

Priority	Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treat- ment and Acres	Potential AUMs Increased With Manage- ment	Percent Change AUMs	Season of Use	Surveyed and/or Treatmgnt AUMs ^b	Total AUMs ^c
4	Deer Spring Point	11,773	Rest rotation	3	Agcr, Agin, Putr	Fence 5.5 miles Pipeline 5.75 miles Troughs 7 Spring 1 Water catch- ment 1	Burn/spray/seed 7,735 acres Chain/spray/seed 4,230 acres	250	+110	6/1-10/31	2,502	2,752
19	Dry Wash	570	Fall ^f	1	Agin, Putr	.....	.....	22	.....	9/1-11/15	35	57
20	Dump	201	Fall ^f	1	Orhy	.....	.....	5	.....	9/1-10/31	7	12
3	First Point ^d	3,955	Rest rotation	3	Agcr, Putr	Water catch- ment 1 Troughs 2 Pipeline 1.5 miles	Burn/spray/seed 2,540 acres Burn/spray 2,000 acres	0	+75	5/1-12/31	1,139	1,139
5	Ford Well	6,601	Rest rotation	3	Agin, Agcr	Windmill/well/ trough 1 Water catch- ment 1 Pipeline 1 mile Troughs 3 Equip existing well/trough 1 Pasture fence 4 miles Seep 1	Burn/spray/seed 6,870 acres	...	+334	6/1-9/30	1,264	1,264
15	Glendale Bench	1,784	Fall ^f	1	Stco, Agcr	Pipeline 0.5 mile Trough 1	Burn/seed 600 acres	60	+12	7/1-10/31	144	204
12	Isolated Tracts Lower Sink	2,273	Deferred rotation	2	Agcr, Orhy,	Spring 1 Pipeline 4 miles Trough 1	Burn/seed 1,210 acres	28	+189	Spring/fall use after implementation of improvements	240	268
13	Johnson Canyon	985	Rest rotation	1	Agcr	.....	Chain/seed 450 acres	20	-66	See Vermilion	91	111
7	Mill Creek	3,309	Rest rotation	3	Agcr, Agin Putr	Troughs 3 Well 1 Storage tanks 2 Pipeline 1.5 miles Reservoirs 3 Boundary fence 7 miles	Burn/spray/seed 9,410 acres	...	+367	6/1-9/30	1,401	1,401

(continued)

TABLE 10 ZION (concluded)

Prior-ity Allotment	Suitable ^a Federal Acres	Grazing System	Number of Pastures	Key Species	Livestock Facilities and Units	Land Treatment and Acres	Potential AUMs Increased With Management	Percent Change AUMs	Season of Use	Surveyed and/or Treatment AUMs	Total AUMs
II Sink Valley	3,871	Deferred rotation	2	Agcr, Orhy, Putr	Spring 1 Pipeline 2.75 miles Troughs 2 Reservoir 1 Cattleguard 1	Plow/seed 615 acres Burn/seed 332 acres	31	-52	Spring/fall	^e 252	283
21 Sugar Knoll	620	Fall ^f	1	Hija, Putr	.....	.....	18	-87	7/1-10/15	15	33
22 Swains Creek	34	Fall ^f	1	Orhy, Putr	.....	.....	4	-83	7/1-10/31	18	22
1 Swallow Park ^d	10,694	Rest rotation	3	.....	Water catchment 1 Pipeline 3.75 miles Troughs 5 Storage tank 40,000 gal. Fence 2 miles	Burn/spray/seed 6,710 acres Spray/plow/seed 565 acres Spray 1,680 acres	40	+94	5/1-11/30 5/16-11/30	^e 2,393	2,433
6 Timber Mountain	6,664	Deferred rotation	2	Stco, Putr, Agin	Water catchment 1 Troughs 2 Fence 1.5 miles Pipeline 1/8 mile	Burn/spray/chain/seed 2,110 acres Spray 4,314 acres	...	+293	7/1-10/15	^e 1,474	1,474
TOTALS	82,105		42			966,272 acres	989	+20		14,104	15,093

^aContains acres that are potentially suitable due to lack of water.
^bRepresents proposed stocking levels. Changes from actual surveyed AUMs are the result of balancing cattle numbers and season of use.
^cTotal of surveyed and/or treatment AUMs plus potential AUMs with management.
^dAllotment presently under an AMP.
^eAllotments where present surveyed AUMs plus treatment potential exceed Class I qualifications.
^fFall grazing system is after seed ripe.
^gThis acreage exceeds acreage needed to balance pastures and is not the same acreage shown for Alternatives 4 and 5 in table 2-1 (see Chapter 2, Vegetation Treatments for explanation).

APPENDIX 2

Cultural Resources Memorandums of Understanding

The following memorandums of understanding have been developed by BLM and the State Historic Preservation Officers in the States of Utah and Arizona. These memorandums address cultural resource protection measures that would be required to comply with 36 Code of Federal Regulations 800, Protection of Historic and Cultural Properties.

CULTURAL RESOURCES
MEMORANDUM OF UNDERSTANDING
KANAB/ESCALANTE GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT
BETWEEN
THE BUREAU OF LAND MANAGEMENT
AND
THE STATE OF ARIZONA

I. PURPOSE

The Bureau of Land Management, hereinafter referred to as the Bureau, is preparing the Kanab/Escalante Grazing Management Environmental Impact Statement (Kanab/Escalante EIS) under the provisions of the National Environmental Policy Act of 1969. The Bureau has determined that cultural values could be damaged or lost as a result of actions proposed in the Kanab/Escalante EIS. The following kinds of actions are proposed on public lands administered by the Bureau:

- a. Pipeline construction
- b. Reservoir construction
- c. Fenceline construction
- d. Spring and well development
- e. Vegetation manipulation (chaining, burning, plowing, spraying, seeding)

The Arizona State Historic Preservation Office, hereinafter referred to as the State is interested in assuring that cultural values in Arizona be protected. The Bureau and the State have consulted and agree as to the measures outlined in this agreement which should be

undertaken to protect these values should authorization be granted to use public lands in Arizona administered by the Bureau for the purpose of any of the above-mentioned proposed actions. In this agreement, "cultural resources" means data and sites which have archaeological, historical, architectural, or cultural importance and interest.

Investigators will be qualified to evaluate these "cultural resources". Qualifications of investigators will be submitted to the State Historic Preservation Officer.

II. AUTHORITY

This agreement is authorized under the Federal Land Policy and Management Act of 1976 and the National Historic Preservation Act of 1966. It is in accord with Bureau policies and programs. It does not abrogate nor amend any other agreement between the Bureau and the State.

III. RESPONSIBILITIES AND PROCEDURES

The Bureau will comply with 36 CFR 800 in identifying sites which are listed in or eligible for inclusion in the National Register of Historic Places.

A. As part of the planning and environmental analysis required prior to major grazing management decisions, the Bureau will search for archaeological and historical literature concerning the Kanab/Escalante area. Literature and records searches have been conducted for all public lands that would be affected by the Kanab/Escalante proposal.

B. After completing the planning and environmental analysis process, should the proposed management be implemented, the Bureau will enforce the following stipulations:

1. Prior to initiation of ground-disturbing activities, literature searches and intensive surveys will be undertaken on all areas which would be disturbed.
2. Wherever possible and feasible, cultural resources will be avoided by construction and related activities. This will be accomplished mainly by regulating vegetation manipulation activities and adjusting the location of other facilities such as pipelines and fences. Significant cultural resources facing inundation due to proposed reservoir construction will be salvaged to recover data that would otherwise be lost.
3. A professional archaeologist may be required to be present when ground-disturbing operations are underway.
4. Subsurface cultural resources that are encountered during any construction will be professionally recovered if there is no other recourse in such a situation.

C. Wherever it is not possible and feasible to avoid sites that contain cultural values, the Bureau will consult with the State to

determine the most satisfactory means of mitigating damage, as required by 36 CFR 800.

D. The Bureau will provide cultural resource reports, technical reports, and other pertinent material to the State.

E. The State will provide the Bureau with a letter for use as an exhibit in the Kanab/Escalante EIS to the effect that the procedures herein proposed by the Bureau, if correctly implemented, will satisfy the State's interest.

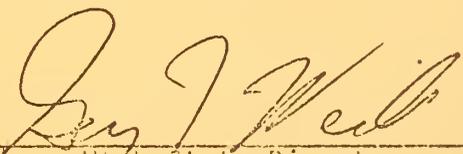
IV. IMPLEMENTATION

A. This agreement will become effective on the date of the last signature on this agreement.

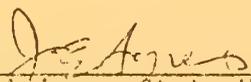
B. Either party may request revision or cancellation of this agreement by written notice, not less than 30 days prior to the time when such action is proposed.

C. Any problems resulting from this agreement which cannot be resolved by the Bureau and the State will be dealt with pursuant to the procedures of the Advisory Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR 800) for resolution.

Jan 21, 1980
Date


Utah State Director
Bureau of Land Management
Department of the Interior

2/28/80
Date


Arizona State Historic
Preservation Officer

CULTURAL RESOURCES

MEMORANDUM OF UNDERSTANDING

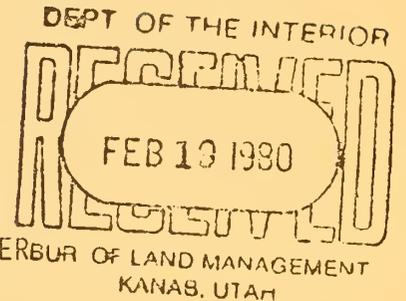
KANAB-ESCALANTE GRAZING MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

BETWEEN

THE BUREAU OF LAND MANAGEMENT

AND THE

UTAH STATE HISTORIC PRESERVATION OFFICER
BUREAU OF LAND MANAGEMENT
KANAB, UTAH



I. PURPOSE

The Bureau of Land Management, hereinafter referred to as the Bureau, is preparing the Kanab-Escalante Grazing Management Environmental Impact Statement (Kanab-Escalante EIS) under the provisions of the National Environmental Policy Act of 1969. The Bureau has determined that cultural values could be damaged or lost as a result of actions proposed in the Kanab-Escalante EIS. The following kinds of actions are proposed on public lands administered by the Bureau:

- a. Pipeline construction
- b. Reservoir construction
- c. Fenceline construction
- d. Spring and well development
- e. Vegetation manipulation (chaining, burning, plowing, spraying)

The Utah State Historic Preservation Office, hereinafter referred to as the SHPO, is interested in assuring that cultural values in Utah be protected. The Bureau and the SHPO have consulted and agree

as to the measures, outlined in this agreement, which should be undertaken to protect these values should authorization be granted to use public lands in Utah administered by the Bureau for the purpose of any of the above mentioned proposed actions. In this agreement, "cultural resources" means data and sites which have archaeological, historical, architectural, or cultural importance and interest.

II. AUTHORITY

This agreement is authorized under the Federal Land Policy and Management Act of 1976 and the National Historic Preservation Act of 1966. It is in accord with Bureau policies and programs. It does not abrogate nor amend any other agreement between the Bureau and the State.

III. RESPONSIBILITIES AND PROCEDURES

The Bureau will comply with 36 CFR 800 in identifying sites which are listed in or eligible for inclusion in the National Register of Historic Places.

A. As part of the planning and environmental analysis required prior to major grazing management decisions, the Bureau has searched for archaeological and historical literature records concerning the Kanab-Escalante area.

B. After completing the planning and environmental analysis process, should the proposed management be implemented, the Bureau will enforce the following stipulations:

1. Prior to initiation of ground-disturbing activities, literature searches and intensive surveys will be undertaken on all areas which would be disturbed.
2. Wherever possible and feasible, cultural resources will be avoided by construction and related activities. This will be accomplished mainly by regulating vegetation manipulation activities and adjusting the location of other facilities such as pipelines and fences. Significant cultural resources facing inundation due to proposed reservoir construction will be salvaged, according to 36 CFR 1210 standards, to recover data that would otherwise be lost.
3. A professional archaeologist may be required to be present when ground-disturbing operations are underway.
4. Subsurface cultural resources that are encountered during any construction will be salvaged as there is no other recourse in such a situation.

C. Wherever it is not possible and feasible to avoid sites that contain cultural values, the Bureau will consult with the SHPO to determine the most satisfactory means of mitigating damage, as required by 36 CFR 800.

D. The Bureau will provide cultural resource reports, technical reports, and other pertinent material to the State.

E. The SHPO will provide the Bureau with a letter for use as an exhibit in the Kanab-Escalante EIS to the effect that the procedures herein proposed by the Bureau, if correctly implemented, will satisfy the SHPO's interest.

IV. IMPLEMENTATION

A. This agreement will become effective on the date of the last signature on this agreement.

B. Either party may request revision or cancellation of this agreement by written notice, not less than 30 days prior to the time when such action is proposed.

C. Any problems resulting from this agreement which cannot be resolved by the Bureau and the SHPO will be referred to the Secretary of the Interior and the Governor of Utah for resolution.

Jan 21, 1980
Date

Gary J. Weib
Utah State Director
Bureau of Land Management
Department of the Interior

Jan. 29, 1980
Date

William T. Smith
Utah State Historic
Preservation Officer

APPENDIX 3

Summary of Project Design Specifications

General Specifications	Seedings	Spraying and Burning	Water Developments (pipelines, troughs, springs, and wells)	Fences
<p>1. Existing access to project sites will be used wherever possible. Disturbance at all project sites will be held to an absolute minimum.</p>	<p>1. Determine feasibility by examination of physical site factors such as soil texture, climatic factors, slope, exposure, soil depth, and erosion susceptibility before fences, water facilities, or vegetation treatments are developed.</p>	<p>1. Examination of physical site factors prior to action.</p>	<p>1. Actual work in springs and stream beds done by hand where possible. If machinery is needed in these areas, it will be selected to minimize disturbance.</p>	<p>1. Off-road vehicular traffic during construction will be held to a minimum.</p>
<p>2. Disturbed areas will be reseeded as soon as possible with a mixture of grasses, forbs, and shrubs. Native species will be used as much as possible.</p>	<p>2. Seed mixture required, containing grass, forb, and browse species. Seeding prescription will be tailored to each site by BLM resource area specialists.</p>	<p>2. Prescribed fire plan and spraying plan required that will identify application procedures, environmental conditions where allowed, controls, and coordination responsibilities.</p>	<p>2. After construction of spring head boxes, troughs, pipelines, and well sites, the areas will be cleaned up and refuse removed.</p>	<p>2. Fence posts will be so constructed to blend with surroundings except where visibility is required for safety.</p>
<p>3. Clearing of the project sites will be held to a minimum.</p>	<p>3. After seeding, areas will be rested from livestock use for at least two growing seasons or until perennial forage becomes established.</p>	<p>3. Projects will not exceed State and EPA pollution standards. Application of chemicals will conform to EPA regulations and BLM requirements.</p>	<p>3. Cuts, fills, and excavations will be dressed and seeded to blend with surroundings. Pipelines will be buried where possible.</p>	<p>3. Where fences will cross existing roads, either gates or cattle-guards will be installed.</p>
<p>4. BLM will conduct intensive field (Class III) inventories of specific areas that would be impacted by implementing activities prior to approval. If historic or cultural properties are identified every effort will be made to avoid adverse effects. However, where that is not possible BLM will consult with the SHPO and Advisory Council on Historic Places in accordance with the Programmatic Memorandum of Agreement by and between the Bureau and Council dated January 14, 1980, which sets forth a procedure for developing appropriate mitigative measures to lessen the impact of adverse effects.</p>	<p>4. After seeding, restrict off-road vehicle use until vegetation becomes established.</p>	<p>4. Configuration and patterns will be in conformance with VRM guidelines.</p>	<p>4. Original water sources will be protected, fenced if required, and an off-stream watering supply will be provided near the site.</p>	<p>4. Gates will be installed along fencelines at regular intervals.</p>

(continued)

APPENDIX 3 (continued)

General Specifications	Seedlings	Spraying and Burning	Water Developments (pipelines, troughs, springs, and wells)	Fences
<p>5. Threatened and endangered species clearance will be required for all project sites prior to new construction.</p>	<p>5. Seedlings will be designed to provide maximum "edge effect" with "islands" of cover in open portions of the seeding.</p>	<p>5. Steep drainages and areas within an estimated 0.25 mile of riparian areas, reservoirs, springs, and livestock water developments, will not be treated. See NOTE below.</p>	<p>5. Size of storage tanks and troughs will be designed to accommodate expected needs of livestock and wildlife using each source.</p>	<p>5. Right-of-way clearance will be held to a minimum. Disturbed areas will be rehabilitated where possible.</p>
<p>6. A supplementary environmental assessment will be prepared to include site specific mitigating measures prior to project construction. This assessment will be site specific and supplement the analysis contained in this EIS.</p>	<p>6. Seedings done in important and critical big game habitat will be seeded with desirable browse species to reach a 40-percent target composition.</p>	<p>6. Timing for spraying will be determined by plant growth and soil moisture. Seedings may or may not follow on a case-by-case basis. Desirable plants in remnant population will determine need.</p>	<p>6. Water will be left at the site for wildlife. Wells will be cased to prevent cave-ins and well sites will be fenced.</p>	<p>6. In big game areas, fences will meet BLM Manual design specifications to accommodate wildlife movement.</p>
<p>7. No range developments will be constructed or installed in areas designated as frail watershed.</p>	<p>7. If after two years of rest on new seedings less than 60 percent of the desired plant composition is not attained, reseed as needed and follow with another 2 years of rest.</p>	<p>7. After determination of which acres will be treated by spraying in each allotment, an environmental assessment will analyze application methods and chemicals to be used on approved Denver Service Center list.</p>	<p>7. Storage structures will be designed to provide water for wildlife. Drinking ramps will be installed and heights will not prohibit young wildlife from obtaining water.</p>	<p>7. All fences will be in conformance with VRM guidelines.</p>
<p>8. VRM Class guidelines will be followed in the construction of range developments.</p>	<p>.....</p>	<p>8. Burning will be conducted in the fall and on slopes less than 15 percent. In sagebrush, burning will be done after desiccation and prior to seed ripeness of the sagebrush. Seeding will follow immediately.</p>	<p>8. Water development will be compatible with visual resource management guidelines.</p>	<p>8. Fences will not be constructed where natural barriers or rocky slopes can be used. This will reduce fencing costs and amount of visual impact.</p>
<p>9. Implementation of any part of an alternative not meeting requirements of Section 603 of FLPMA or the interim management policy would be deferred pending Congressional action on suitability recommendations.</p>	<p>.....</p>	<p>9. "Cooperative Sage Grouse Guidelines" developed in conjunction with BLM Tech. Note "Habitat Requirements and Management Recommendations for Sage Grouse" and the Western State Sage Grouse Committee "Guidelines" will be followed in the course of developing plans for vegetation treatment.</p>	<p>9. Water developments will not be operational until seedings have been determined to be successful.</p>	<p>9. Pastures will not be fenced until sites for seedings are surveyed, and seedings are successful, and permanent water is provided.</p>

NOTE: The actual dimensions of a buffer strip will be determined on-the-ground on a case-by-case basis. This will occur during AMP development. (continued)

APPENDIX 3 (concluded)

General Specifications	Seedings	Spraying and Burning	Water Developments (pipelines, troughs, springs, and wells)	Fences
.....	10. Where possible, water for wildlife will be maintained year-long at established water facilities. Offsite water or access to water will be provided for livestock and wildlife where water sources are fenced for protective purposes.	.....

APPENDIX 4

Summary of Expected Wildlife Forage Shortages on Federal Land by Allotment and Alternative

Allotment and Species	Projected Demand	Available	WILDLIFE FORAGE												
			Alternative 1 Long-Term Shortage	Alternative 2 Long-Term Shortage	Alternative 3 Long-Term Shortage	Alternative 4 Long-Term Shortage	Alternative 5 Long-Term Shortage	Alternative 6 Long-Term Shortage							
Elkheart Cliffs															
Deer	3	0	3	0	0	3	0	3	0	3	0	3	0	3	
North Fork															
Deer	24	14	10	0	0	10	0	10	0	10	0	10	0	10	
Spring Hollow															
Deer	5	0	5	0	0	8	0	5	0	5	0	5	0	5	
Mollies Nipple															
Deer	781	335	446	0	22	424	0	446	235	211	218	0			
Pine Springs															
Deer	52	30	22	0	0	22	0	22	23	0	85	0			
Boulder Creek															
Elk	^d 18	11	^d 0	0	11	0	0	7	9	0	9	0			
Deer Creek															
Elk	^d 190	137	^d 0	0	206	0	0	53	71	0	71	0			
Steep Creek															
Elk	^d 228	142	^d 0	0	11	75	0	86	35	51	35	51			
Total Deer			486	0	459		486	229				18			
Total Elk				0	75		146	51				51			

^a Additional AUMs in Alternative 2 would be a result of elimination of livestock.
^b Additional AUMs in Alternative 3 would result from elimination of livestock from GCNRA, Outstanding Natural Areas, riparian areas, and fragile watersheds.
^c Additional AUMs in Alternatives 4, 5, and 6 would be a result of vegetation treatments, rangeland developments, and management.
^d Elk numbers would not be expected to double in Alternative 1.

NOTE: All figures are shown in animal unit months (AUMs).

APPENDIX 5

Multiple Use Allocations

Allotment	Other Resource Enhanced	Allocation to Other Resources		Allocation to Livestock	
		Short term	Long term	Short term	Long term
<u>CANAAN MOUNTAIN PLANNING UNIT</u>					
Cottonwood Point	Riparian zones	6	6	144	114
Grafton Wash	Riparian zones	7	7	29	29
Grapevine	Riparian zones	3	3	21	21
Horse Valley	Riparian zones	5	5	65	65
Maxwell Canyon Park	Riparian zones	4	4	34	34
Riverview	Riparian zones	2	2	23	23
		<u>3</u>	<u>3</u>	<u>21</u>	<u>21</u>
Canaan Mountain Totals		30	30	307	307
<u>ESCALANTE PLANNING UNIT</u>					
Big Bown Bench	Wildlife, riparian zones, watershed	59	59	757	757
Boulder Creek	Riparian zones, watershed	29	29	5	5
Chimney Rock	Wildlife, watershed	445	445	2,338	2,338
Circle Cliffs	Riparian zones	7	7	1,112	1,112
Death Hollow	Wildlife, watershed	176	176	79	79
Deer Creek	Riparian zones, watershed	404	404	0	0
Escalante River	Wildlife, riparian zones, watershed, ONAs, GCNRA	2,616	2,616	89	89
Forty-Mile Ridge	GCNRA	962	962	1,034	1,034
Haymaker	ONAs	33	33	43	43
King Bench	Riparian zones, watershed, ONAs	1,075	1,075	0	0
Lakes	GCNRA	233	233	612	612

(continued)

APPENDIX 5 (continued)

Allotment	Other Resource Enhanced	Allocation to Other Resources		Allocation to Livestock	
		Short term	Long term	Short term	Long term
Last Chance	Wildlife, riparian zones, watershed	1,413	1,413	1,677	1,677
Lower Cattle	ONAs, GCNRA, wildlife, watershed	1,344	1,344	2,771	2,771
McGath Point	Riparian zones, watershed	120	120	0	0
Moody	Wildlife, watershed ONAs, GCNRA	639	639	0	0
Pine Creek	Riparian zones, watershed	77	77	0	0
Rock Creek	Riparian zones, GCNRA, wildlife, watershed	1,647	1,647	95	95
Salt Water Creek	Riparian zones, ONAs, watershed	140	140	0	0
Soda	GCNRA	1,347	1,347	425	425
Steep Creek	Riparian zones, ONAs	19	19	201	201
Upper Cattle	Riparian zones, watershed, ONAs, GCNRA	5,773	5,773	0	0
Wagon Box	Wildlife, watershed, GCNRA	302	302	143	143
Willow Gulch	Riparian zones, ONAs	<u>225</u>	<u>225</u>	<u>165</u>	<u>165</u>
Escalante Totals		19,085	19,085	11,546	11,546
<u>PARIA PLANNING UNIT</u>					
Blue Pools	GCNRA	266	266	250	250
Bunting Well	Riparian zones, watershed	10	10	110	110
Clark Bench	Riparian zones	11	11	1,789	1,789
Cottonwood	Riparian zones	195	195	2,542	2,542
Coyote	Wildlife, watershed, riparian zones	355	355	1,689	1,689

(continued)

APPENDIX 5 (continued)

Allotment	Other Resource Enhanced	Allocation to Other Resources		Allocation to Livestock	
		Short term	Long term	Short term	Long term
Dry Valley	Riparian zones	4	4	664	664
East Clark Bench	Riparian zones, watershed	9	9	420	420
Headwaters	Riparian zones, watershed	133	133	5,797	5,797
Lower Hackberry	Riparian zones	9	9	241	241
Lower Warm Creek	Watershed, GCNRA	110	110	0	0
Nipple Bench	Wildlife, riparian zones, watershed	139	139	376	376
Upper Hackberry	Riparian zones, watershed	39	39	539	539
Upper Warm Creek	Wildlife, riparian zones, watershed	837	837	0	0
Wahweap	Riparian zones, watershed	<u>14</u>	<u>14</u>	<u>180</u>	<u>180</u>
Paria Totals		2,131	2,131	14,597	14,597
<u>VERMILION PLANNING UNIT</u>					
Art Canyon	Riparian zones, wildlife	155	3	0	152
Dry Lake	Wildlife	62	0	0	62
Elephant Cove	Wildlife	150	0	0	150
FAR	Wildlife	68	0	0	68
Farm Canyon	Wildlife	100	0	0	100
Five-Mile Mountain	Watershed	170	170	0	0
Flood Canyon	Wildlife	39	0	0	39
Glasseye	Watershed	189	189	0	0
Gravel Pit	Riparian zones	3	3	5	5
Harris Flat	Wildlife	140	0	0	140
Hells Bellows	Riparian zones	18	18	27	27
John R. Flat	Riparian zones, wildlife	150	5	0	145

(continued)

APPENDIX 5 (continued)

Allotment	Other Resource Enhanced	Allocation to Other Resources		Allocation to Livestock	
		Short term	Long term	Short term	Long term
Johnson Canyon	Wildlife	132	0	0	132
Johnson Lakes	Wildlife	267	0	0	267
Kane Springs	Wildlife	300	0	0	300
Kinnikinnic	Wildlife	128	0	0	128
Old Fort	Wildlife	5	0	0	5
Poverty Flat	Wildlife, riparian zones	56	56	0	0
Red Canyon	Wildlife	135	0	0	135
Red Knoll	Wildlife	175	0	0	175
Rock Springs	Riparian zones	10	10	139	139
Sethy's Canyon	Wildlife	80	0	0	80
Sink Holes	Wildlife	108	0	0	108
Trail Canyon	Wildlife, watershed	108	37	0	71
Upper Hog	Riparian zones	12	12	16	16
Vermilion	Wildlife, watershed	1,750	31	0	1,719
Vermilion River	Riparian zones	48	48	60	60
Water Canyon	Riparian zones	23	23	0	0
Willis Canyon	Riparian zones	4	4	0	0
Willow Springs	Wildlife	60	0	0	60
Yellow Jacket	Wildlife	<u>280</u>	<u>0</u>	<u>0</u>	<u>280</u>
Vermilion Totals		7,635	641	265	7,259
<u>ZION PLANNING UNIT</u>					
Bald Knoll	Wildlife, riparian zones	25	1	0	24
Black Rock	Wildlife	662	0	0	662
Buck Knoll	Wildlife, watershed	168	168	0	0
Burnt Flat	Wildlife, watershed	20	20	0	0
Cottonwood Springs	Wildlife, watershed	95	95	0	0
Deer Spring Point	Watershed	534	534	0	0

(continued)

APPENDIX 5 (concluded)

Allotment	Other Resource Enhanced	Allocation to Other Resources		Allocation to Livestock	
		Short term	Long term	Short term	Long term
Dry Wash	Wildlife, watershed	35	35	0	0
Elbow Falls	Riparian zones, watershed	60	60	0	0
First Point	Wildlife	405	0	0	405
Ford Well	Wildlife	222	0	0	222
Four-Mile	Wildlife, watershed	60	60	0	0
Gardner Hollow	Wildlife	30	0	0	30
Glendale Bench	Wildlife, watershed	72	72	0	0
Isolated Tracts	Wildlife, watershed	65	65	0	0
Lower North Fork	Riparian zones	2	2	0	0
Meadow Canyon	Wildlife, watershed	25	25	0	0
Mill Creek	Wildlife, watershed	132	132	0	0
Neuts Canyon	Riparian zones	3	3	144	144
Orderville Gulch	Riparian zones	3	3	197	197
Red Hollow	Wildlife	30	0	0	30
Rocking Chair	Wildlife	61	0	0	61
Sink Valley	Wildlife	177	0	0	177
Spring Hollow	Wildlife, watershed	8	8	0	0
Sugar Knoll	Wildlife, watershed	15	15	0	0
Swains Creek	Wildlife, watershed	18	18	0	0
Swallow Park	Wildlife	868	0	0	868
Table Mountain	Riparian zones	4	4	123	123
Upper North Fork	Riparian zones	3	3	0	0
Upper Place	Wildlife, watershed riparian zones	23	21	0	2
Zion	Wildlife, riparian zones, watershed	<u>270</u>	<u>270</u>	<u>0</u>	<u>0</u>
Zion Totals		4,193	1,712	464	2,945
TOTAL		33,074	23,599	27,179	36,654

APPENDIX 6

Implementation Schedules by Allotment

Allotment	Suitable Federal Acres	Vegetation Treatments		Water Developments		Fences		Pipelines		Alternative ^a										
		Alter- native 5	Alter- native 6	Cost 1979	Alter- native 5	Alter- native 6	Number	Cost 1979	Dollars	Miles	Cost 1979	Dollars	Miles	4	5	6				
<u>CANAAN MOUNTAIN PLANNING UNIT</u>																				
Goat Ranch	7,244	1,868	0	52,304	0	3	63,000	0	0	1.25	1,650	1	1	0	1	3	3	0	0	0
Cottonwood	1,650	296	0	8,288	0	3	9,900	0	0	0	0	1	1	0	1	3	3	0	0	0
Canaan Mountain	6,659	0	0	0	0	3	5,100	0	0	0	0	1	1	0	1	2	2	0	0	0
Well Springs	1,306	7,360	0	20,608	0	1	1,700	1.5	3,600	1	1,320	1	1	0	2	4	4	0	0	0
Cottonwood Point	3,372	0	0	0	0	3	9,900	0	0	0	0	1	1	0	2	3	4	0	0	0
Grafton Mesa	639	0	0	0	0	1	3,300	0	0	0	0	1	1	0	2	3	3	0	0	0
Riverview Ranch	605	0	0	0	0	1	1,700	0	0	0	0	1	1	0	3	4	4	0	0	0
Horse Valley	1,897	0	0	0	0	1	1,700	0	0	0	0	1	1	0	3	4	4	0	0	0
Buttermilk	1,474	0	0	0	0	0	0	0	0	0	0	1	1	0	3	3	3	0	0	0
Grafton Wash	954	0	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Grapevine	540	0	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Maxwell Canyon	1,242	0	0	0	0	1	3,300	0	0	0	0	1	1	0	4	5	5	0	0	0
Park	650	0	0	0	0	0	0	0	0	0	0	1	1	0	5	5	5	0	0	0
Rockville	308	0	0	0	0	0	0	0	0	0	0	1	1	0	5	5	5	0	0	0
Big Plains ^C	196	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Canaan Ranch ^C	919	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Cottonwood Point ^C	210	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Cottonwood ^C	380	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Russel Fields ^C	352	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Upper South Creek ^C	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
<u>ESCALANTE PLANNING UNIT</u>																				
Big Bown Bench	14,957	0	0	0	0	3	9,900	0.4	960	0	0	1	1	0	1	2	2	0	0	0
Boulder Creek	772	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0
Boulder Stock Trail	2,598	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0

(continued)

APPENDIX 6 (continued)

Allotment	Suitable Federal Acres	Vegetation Treatments		Water Developments		Fences		Pipelines		Alternative ^a									
		Alter- native 5	Alter- native 6	Cost 1979 Dollars	Alter- native 5	Alter- native 6	Number	Cost 1979 Dollars	Miles	Oollars Miles Oollars	Cost 1979 Dollars	4		5		6			
												S	F	L	S	F	L	S	F	L
Chimney Rock	30,476	0	0	0	0	3	13,400	0.8	1,920	2	2,640	1	2	2	1	2	2	0	0
Death Hollow	7,567	0	0	0	0	8	20,000	0	0	0	0	1	1	0	1	2	2	0	0
Dry Hollow	297	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
Long Neck	130	0	130	0	2,600	0	0	0	0	0	0	1	1	0	1	1	0	1	3
Lower Cattle	61,783	0	0	0	0	4	20,700	6	14,400	16.5	21,780	1	1	0	1	2	2	0	0
Moody	14,198	0	0	0	0	2	5,000	4	9,600	0	0	1	2	2	1	2	2	0	0
Muley Twist ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
Navajo Bench ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
Rattlesnake Bench ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
Steep Creek	4,157	0	0	0	0	1	3,300	0	0	0	0	1	1	0	1	2	2	0	0
Upper Cattle	94,447	0	9,682	0	193,120	22	89,800	2.5	6,000	28	36,960	1	3	3	1	3	3	3	5
Alvey Wash	10,867	1,440	0	21,600	0	3	6,700	2.6	6,240	8	10,560	2	4	4	2	4	4	0	0
Circle Cliffs	8,338	2,642	1,616	13,976	35,552	2	30,700	1.7	4,080	1.5	1,980	1	1	0	2	4	4	4	6
Collets	588	0	0	0	0	1	1,700	0	0	0	0	1	1	0	2	3	3	0	0
Haymaker	1,621	0	0	0	0	1	3,300	0	0	0	0	1	1	0	2	3	3	0	0
King Bench	23,037	0	0	0	0	2	58,000	0	0	0	0	1	1	0	2	3	3	0	0
Last Chance	84,470	7,140	0	200,000	0	8	44,900	3	7,200	0	0	2	5	5	2	5	5	0	0
Willow Gulch	8,315	0	880	0	24,640	0	0	2	4,800	0	0	1	1	0	2	3	3	3	5
Cedar Wash	8,137	1,200	1,365	22,420	30,030	6	16,600	2.5	6,000	0	0	1	1	0	3	4	4	4	6
Ooer Creek	8,207	0	0	0	0	4	18,000	0	0	0	0	3	4	4	3	4	4	0	0
Lakes	17,706	0	7,617	0	114,255	4	6,800	5	12,000	0	0	1	1	0	3	4	4	4	6
White Rock	707	0	0	0	0	0	0	0	0	0	0	1	1	0	3	3	3	0	0
Forty-Mile Ridge	38,800	0	440	0	9,680	7	93,800	11.8	28,320	0	0	1	1	0	3	4	4	4	6
Mudholes	10,853	0	3,383	0	50,745	0	0	0	0	0	0	1	1	0	4	4	4	0	0
Rock Creek	36,516	0	0	0	0	3	87,000	3	7,200	0	0	4	5	5	4	5	5	0	0
Salt Water Creek	4,396	0	0	0	0	0	0	0.25	600	0	0	1	1	0	4	4	4	0	0
Soda	51,389	0	2,000	0	30,000	8	49,200	0.7	1,680	0	0	4	5	5	4	5	5	5	7
Wagon Box	10,059	0	0	0	0	2	5,000	0	0	0	0	1	1	0	4	5	5	0	0

(continued)

APPENDIX 6 (continued)

Allotment	Suitable Federal Acres	Vegetation Treatments			Water Developments		Fences		Pipelines		Alternative ^a												
		Alter- native 5	Alter- native 6	Cost 1979	Alter- native 5	Alter- native 6	Number	Oollars	Miles	Oollars	Miles	Cost 1979	4			5			6				
													S	F	L	S	F	L	S	F	L		
Wide Hollow	5,120	1,095	960	18,700	26,880	3	35,600	1.5	3,600	0	0	1	1	1	0	4	6	6	6	8	8	8	8
McGath Point	2,193	0	0	0	0	0	0	0	0	0	0	1	1	0	0	5	5	5	0	0	0	0	0
Pine Creek	2,952	480	148	13,440	3,256	1	29,000	0.5	1,200	0	0	1	1	0	5	7	7	7	9	9	9	9	9
Escalante River	54,398	0	0	0	0	2	58,000	0	0	0	0	3	5	5	5	6	6	6	0	0	0	0	0
<u>PARIA PLANNING UNIT</u>																							
Blue Pools ^e	13,290	0	0	0	0	1	3,300	4	9,600	0	0	1	1	0	1	2	2	0	0	0	0	0	0
Bunting Well ^f	27,379	0	0	0	0	2	33,500	0	0	3.5	4,620	1	1	0	1	2	2	0	0	0	0	0	0
Harvey's Fear ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
Ory Valley	7,467	0	0	0	0	3	9,900	3.5	8,400	0	0	1	1	0	1	2	2	0	0	0	0	0	0
Wahweap	5,609	0	0	0	0	4	8,400	0	0	0	0	1	1	0	1	2	2	0	0	0	0	0	0
Round Valley	5,169	0	1,050	0	23,100	5	17,300	0	0	1.5	1,980	1	1	0	2	3	3	3	5	5	5	5	5
Lower Hackberry ^g	19,006	800	8,130	21,200	216,200	1	10,000	3	7,200	3	3,960	1	1	0	2	4	4	4	6	6	6	6	6
Mud Springs	4,716	0	2,519	0	63,252	5	16,100	0.5	1,200	0	0	1	1	0	2	3	3	3	5	5	5	5	5
Lower Warm Creek	2,645	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	2	0	0	0	0	0	0
Upper Warm Creek	19,918	0	0	0	0	10	38,500	1.25	3,000	2.5	3,300	1	1	0	3	4	4	0	0	0	0	0	0
Nipple Bench	16,852	0	0	0	0	2	32,800	5.25	12,600	3.5	4,620	1	1	0	3	4	4	0	0	0	0	0	0
Rushbeds	6,766	0	3,290	0	85,640	6	146,700	4	9,600	0	0	1	1	0	3	4	4	4	6	6	6	6	6
Deer Range	2,280	0	4,555	0	126,340	1	29,000	0	0	0.5	660	1	1	0	3	4	4	4	6	6	6	6	6
Headwaters	53,370	0	48,536	0	754,132	3	9,900	5	12,000	8.0	10,560	1	2	2	4	5	5	5	7	7	7	7	7
Coyote	33,484	0	385	0	8,470	3	62,500	0.5	1,200	0	0	1	2	2	4	5	5	5	7	7	7	7	7
Clark Bench	27,257	0	0	0	0	2	30,700	0	0	7.0	9,240	1	2	2	4	5	5	0	0	0	0	0	0
Cottonwood	42,716	0	1,750	0	47,560	4	38,500	2	4,800	9.0	11,880	1	2	2	4	5	5	5	7	7	7	7	7
Cockscomb ^c	1,036	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
<u>VERMILION PLANNING UNIT</u>																							
Airport	468	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Root	887	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Clay Flat	2,250	0	640	0	14,080	0	0	0	0	0	0	1	1	0	1	1	0	1	3	3	3	3	3
Oishpan	210	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0

(continued)

APPENDIX 6 (continued)

Allotment	Suitable Federal Acres	Vegetation Treatments		Water Developments		Fences		Pipelines		Alternative ^a												
		Alter-native 5	Acres	Alter-native 6	Cost 1979 Dollars	Number	Cost 1979 Dollars	Miles	Cost 1979 Dollars	Miles	4		5									
											native 5	native 6	S	F	L	S	F	L	S	F	L	
Driveway	560	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Dry Lake ^c	1,839	0	310	0	6,820	0	0	0	0	0	1	1	0	1	1	0	1	0	1	3	3	3
Fish Tail	1,640	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Johnson Point	930	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Johnson Ranch	2,220	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Kanab Creek ^h	6,971	0	1,945	0	38,900	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Lower Hog	710	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Red Knoll	4,755	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Granary Ranch	280	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Seaman	1,770	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Sheep Spring	890	0	40	0	880	0	0	0	0	0	1	3	3	1	1	0	1	0	1	3	3	3
Sunnyside	290	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Trail Canyon	2,505	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Trail Well	420	0	420	0	8,400	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Thompson Point	736	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Sink Holes	4,161	0	2,040	0	57,120	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Twin Hollow	710	0	610	0	17,080	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Upper Hog	603	0	100	0	2,200	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Willis Canyon	280	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
White Sage	1,395	0	570	0	15,960	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0
Chris Spring ⁱ	6,070	0	780	0	15,600	0	0	0	0	0	1	1	0	2	3	3	3	3	5	5	5	5
Kane Springs ^j	17,640	1,050	1,040	21,000	20,800	4	71,300	1	2,400	1	1	1	0	2	4	4	4	4	6	6	6	6
FAR	2,209	2	970	0	21,340	0	0	0	0	0	1	1	0	2	3	3	3	3	5	5	5	5
Johnson Lakes ^k	12,340	350	640	9,800	17,920	0	0	3.25	7,800	3.0	1	1	0	2	4	4	4	4	6	6	6	6
Meadow Canyon and Locke Ridge	6,772	0	2,585	0	64,090	1	29,000	0	0	1.5	1	1	0	2	3	3	3	3	5	5	5	5
Mollies Nipple	57,585	0	14,598	0	333,294	3	6,700	0	0	4.5	1	2	2	2	3	3	3	3	5	5	5	5
Vermilion	22,937	1,875	7,515	9,900	199,470	3	19,000	0	0	2.5	1	3	3	2	4	4	4	4	6	6	6	6
Art Canyon	5,120	0	0	0	0	0	0	1.6	3,840	0	1	1	0	2	4	4	4	4	0	0	0	0
Farm Canyon	2,850	0	0	0	0	0	0	0	0	0.1	1	1	0	2	4	4	4	4	0	0	0	0

(continued)

APPENDIX 6 (continued)

Allotment	Suitable Federal Acres	Vegetation Treatments				Water Developments		Fences		Pipelines		Alternative ^a									
		Alter-native 5	Alter-native 6	Cost 1979 native 5	Alter-native 6	Number	Cost 1979 Dollars	Miles	Cost 1979 Dollars	Miles	Cost 1979 Dollars	4			5			6 ^b			
												S	F	L	S	F	L	S	F	L	
Five-Mile Mountain	13,062	2,900	6,180	43,500	92,700	1	29,000	5.5	13,200	0	0	1	1	0	3	5	5	5	5	7	7
Johnson Canyon	5,380	450	2,240	9,000	44,800	0	0	0	0	1.25	1,650	1	1	0	3	5	5	5	5	7	7
Kinnikinnic	3,450	0	0	0	0	2	14,500	0	0	0.5	660	1	1	0	3	4	4	0	0	0	0
Sethy's Canyon	2,290	0	0	0	0	1	3,300	0	0	0	0	1	1	0	3	4	4	0	0	0	0
Poverty Flat	2,048	0	880	0	24,640	1	3,300	0	0	0	0	1	1	0	4	5	5	5	7	7	7
Red Butte	5,166	0	300	0	6,600	1	10,000	0	0	0	0	1	1	0	4	5	5	5	7	7	7
Red Canyon	6,033	0	0	0	0	0	0	0	0	0	0	1	1	0	4	5	5	0	0	0	0
Rock Springs	4,292	0	260	0	5,200	0	0	0	0	1.0	1,320	1	1	0	4	5	5	5	7	7	7
Virgin River	1,900	0	0	0	0	0	0	0	0	0.5	660	1	1	0	4	5	5	0	0	0	0
Water Canyon	880	0	0	0	0	0	0	0.25	600	0	0	1	1	0	4	5	5	0	0	0	0
Barracks Point	3,965	0	1,050	0	29,400	2	5,000	0	0	0	0	1	1	0	5	6	6	6	8	8	8
Cougar Canyon	530	0	0	0	0	0	0	0	0	0	0	1	1	0	5	5	0	0	0	0	0
Seeps	980	0	1,920	0	53,760	0	0	0	0	0	0	1	1	0	5	6	6	6	8	8	8
Oak Springs	1,459	0	280	0	6,160	1	10,000	0	0	1.0	1,320	1	1	0	5	6	6	6	8	8	8
Pine Springs	7,976	0	2,778	0	55,600	1	29,000	0	0	0	0	1	1	0	5	6	6	6	8	8	8
Yellow Jacket	6,967	0	957	0	21,060	0	0	0	0	1.0	1,320	1	2	2	5	6	6	6	8	8	8
Buck Pasture	970	0	270	0	7,560	1	1,700	0	0	0	0	1	1	0	5	6	6	6	8	8	8
Flag Point ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Bunting Canyon ^c	339	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Cedar Ridge ^c	87	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Eight-Mile Gap ^c	449	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Gravel Pit ^c	191	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Hells Bellows ^c	2,019	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Lone Forty ^c	40	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Lost Springs ^c	60	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Lost Springs Gap ^c	60	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Neaf ^c	1,215	0	883	0	16,755	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Old Fort ^c	2,151	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
School Section ^c	430	0	40	0	600	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Twin Hollow ^d	1,210	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Carmel Junction ^d	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0

(continued)

APPENDIX 6 (continued)

Allot- ment	Suitable Federal Acres	Vegetation Treatments				Water Developments		Fences		Pipelines		Alternative ^a							
		Alter- native 5		Alter- native 6		Number	Cost 1979 Dollars	Miles	Cost 1979 Dollars	Miles	Cost 1979 Dollars	4		5		6 ^b			
		Acres	Cost 1979 Dollars	Acres	Cost 1979 Dollars							S	F	L	S	F	L	S	F	L
ZION PLANNING UNIT																			
Swallow Park	10,694	1,605	32,100	123,880	2	33,500	2	4,800	3.75	4,950	1	3	3	1	3	3	3	5	5
Black Rock	12,759	1,621	2,629	24,315	1	4,500	1	5,520	2.8	3,696	1	3	3	1	3	3	3	5	5
First Point	3,955	1,516	2,934	22,740	0	0	0	0	1.5	1,980	1	3	3	1	3	3	3	5	5
Ooer Spring	11,773	4,013	8,158	80,260	3	32,400	3	9,600	7.25	9,570	1	1	0	1	3	3	3	5	5
Ford Well	6,601	455	6,415	9,100	3	40,700	3	9,600	1.0	1,320	1	1	0	1	3	3	3	5	5
Buck Knoll and Spencer Bench	5,393	1,556	114	23,340	1	3,300	1	0	0	0	1	1	0	2	4	4	4	6	6
Calf Pasture	2,231	0	1,382	0	1	1,700	1	2,400	2.0	2,640	1	1	0	2	4	4	4	6	6
Cottonwood and Four-Mile	4,696	2,055	0	30,825	3	49,000	3	5,400	2.75	3,630	1	1	0	2	4	4	0	0	0
Mill Creek	3,309	1,142	8,268	22,840	6	28,900	6	16,800	1.5	1,980	1	1	0	2	4	4	4	6	6
Timber Mountain	6,664	0	6,424	0	1	29,000	1	3,600	0.13	172	1	1	0	2	3	3	3	5	5
Bald Knoll	860	1,221	698	18,315	0	0	0	8,880	3.7	8,880	0	1	1	0	3	5	5	7	7
Glendale Bench	1,784	475	125	7,125	0	0	0	0	0.5	660	1	1	0	3	5	5	5	7	7
Isolated Tracts and Lower Sink	2,273	100	1,110	1,500	1	1,700	1	1,700	0	4	5,280	1	1	0	3	5	5	7	7
Johnson Canyon	985	0	0	0	0	0	0	0	0	0	1	1	0	3	4	4	0	0	0
Sink Valley	3,871	947	0	14,205	2	5,000	2	0	2.75	3,630	1	1	0	3	5	5	0	0	0
Burnt Cedar Point	2,340	0	79	0	632	0	0	0	0.75	990	1	1	0	4	5	5	5	7	7
Coal Mine	95	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Ory Wash	570	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Oump	201	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Sugar Knoll	620	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Swains Creek	34	0	0	0	0	0	0	0	0	0	1	1	0	4	4	4	0	0	0
Alton ^c	80	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
Ben Hollow ^d	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
Black Mountain ^c	869	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
Burnt Flat ^c	726	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0

(continued)

APPENDIX 6 (concluded)

Allotment	Suitable Federal Acres	Vegetation Treatments		Water Developments		Fences		Pipelines		Alternative ^a													
		Alter-native 5	Alter-native 6	Cost 1979 Dollars	Alter-native 5	Alter-native 6	Number	Cost 1979 Dollars	Miles	Cost 1979 Dollars	Miles	S	F	L	S	F	L	S	F	L			
Willow Creek ^c	389	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	
Zion ^c	5,152	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	
Zion Park ^d	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	
Number of Allotments Implemented														189									
		First Year																					
		Second Year																					
		Third Year																					
		Fourth Year																					
		Fifth Year																					
		Sixth Year																					
		Seventh Year																					
		Eighth Year																					
		Ninth Year																					

^a Alternatives 1 and 2 do not have management, treatments, or facilities proposed. Alternative 2 would have a 3 to 5-year implementation period. Alternative 3 would have reductions and construction of 125 miles of fence spread over a 3-year period. Approximately one-third of the allotments would be affected each year.

^b Vegetation treatments and rangeland developments to be implemented under Alternative 6 would be in addition to those proposed in Alternative 5. Therefore, the implementation schedule in this column applies to those additional items that would be implemented on 58 allotments.

^c Continuous seasonal allotments.

^d Allotments eliminated.

^e Combined with Flat Top Allotment.

^f Combined with Cedar Mountain, East Clark Bench, and Judd Hollow Allotments.

^g Combined with Upper Hackberry Allotment.

^h Combined with John R. Flat and Brown Canyon Allotments.

ⁱ Combined with Willow Spring Allotment.

^j Combined with Elephant Cove and Harris Flat Allotments.

^k Combined with Glasseye and Flood Canyon Allotments.

NOTE: S = Starting year F = Finishing year L = Total years lapsed from implementation.

This is the best estimate of an implementation schedule. The actual implementation sequence would depend on the willingness of the rangeland users to cooperate and the availability of funding and manpower. Implementation of any part of an alternative that would affect an intensive wilderness inventory unit and not meet the requirements in Section 603 of FLPMA would be deferred until Congress designates wilderness areas.

APPENDIX 7

Proposed Vegetation Treatments - Alternative 6

Allotment	Chain/ Seed	Spray/ Seed	Plow/ Seed	Burn/ Seed	Spray	Burn	Seed	Cost
Cedar Wash	.....	.....	1,365	.....	.....	.....	.....	\$ 30,030
Circle Cliffs	.....	.....	1,616	.....	.....	.....	.....	35,552
Forty-Mile Ridge	.....	.....	440	.....	.....	.....	.....	9,680
Lakes	.....	.....	.....	7,617	.....	.....	.....	114,255
Long Neck	.....	130	.....	.....	.....	.....	.....	2,600
Mudholes	.....	.....	.....	3,383	.....	.....	.....	50,745
Pine Creek	.....	.....	148	.....	.....	.....	.....	3,256
Soda	.....	.....	.....	2,000	.....	.....	.....	30,000
Upper Cattle	1,858	6,542	.....	.....	.....	.....	1,282	182,864
Wide Hollow	960	.....	.....	.....	.....	.....	.....	26,880
Willow Gulch	880	.....	.....	.....	.....	.....	.....	26,640
Bald Knoll	233	.....	.....	465	.....	.....	.....	13,499
Black Rock	.....	.....	.....	2,629	.....	.....	.....	39,435
Buck Knoll	23	.....	.....	91	.....	.....	.....	2,009
Burnt Cedar Point	.....	.....	.....	.....	79	.....	.....	632
Calf Pasture	.....	1,382	.....	.....	.....	.....	.....	27,640
Deer Spring Point	.....	7,952	.....	.....	206	.....	.....	160,688
First Point	.....	1,602	.....	1,332	.....	.....	.....	52,020
Ford Well	.....	6,415	.....	.....	.....	.....	.....	128,300
Glendale Bench	.....	.....	.....	125	.....	.....	.....	1,875
Isolated Tracts, Lower Sink	.....	.....	.....	1,110	.....	.....	.....	16,650

(continued)

APPENDIX 7 (continued)

Allotment	Chain/ Seed	Spray/ Seed	Plow/ Seed	Burn/ Seed	Spray	Burn	Seed	Cost
Mill Creek	.....	8,268	.....	.....	.....	.....	.....	165,360
Swallow Park	.....	5,670	.....	.....	1,310	.....	.....	123,880
Timber Mountain	2,110	.....	.....	.....	4,314	.....	.....	93,592
Barracks Point	1,050	.....	.....	.....	.....	.....	.....	29,400
Buck Pasture	270	.....	.....	.....	.....	.....	.....	7,560
Chris Spring	.....	780	.....	.....	.....	.....	.....	15,600
Clay Flat	.....	.....	640	.....	.....	.....	.....	14,080
Dry Lake	.....	.....	310	.....	.....	.....	.....	6,820
Five-Mile Mountain	.....	.....	.....	6,180	.....	.....	.....	92,700
Flood Canyon	640	.....	.....	.....	.....	.....	.....	17,920
FAR	.....	.....	970	.....	.....	.....	.....	21,340
John R. Flat	.....	1,945	.....	.....	.....	.....	.....	38,900
Johnson Flat	.....	2,240	.....	.....	.....	.....	.....	44,800
Johnson Point	.....	930	.....	.....	.....	.....	.....	18,600
Kane Springs	.....	1,040	.....	.....	.....	.....	.....	20,800
Locke Ridge	.....	.....	.....	110	.....	.....	.....	1,650
Meadow Canyon	1,930	45	.....	500	.....	.....	.....	62,440
Mollies Nipple	4,088	2,485	6,965	1,060	.....	.....	.....	333,294
Neaf	270	.....	.....	613	.....	.....	.....	16,755
Oak Springs	.....	.....	280	.....	.....	.....	.....	6,160
Pine Springs	.....	2,778	.....	.....	.....	.....	.....	5,560
Poverty Flat	880	.....	.....	.....	.....	.....	.....	24,640
Red Butte	.....	.....	300	.....	.....	.....	.....	6,600

(continued)

APPENDIX 7 (concluded)

Allotment	Chain/ Seed	Spray/ Seed	Plow/ Seed	Burn/ Seed	Spray	Burn	Seed	Cost
Rock Creek	.....	260	.....	.....	.....	.....	.....	5,200
School Section	.....	.....	.....	40	.....	.....	.....	600
Seeps	1,920	.....	.....	.....	.....	.....	.....	53,760
Sheep Spring	.....	.....	40	.....	.....	.....	.....	880
Sink Holes	2,040	.....	.....	.....	.....	.....	.....	57,120
Swallow Park	.....	1,340	.....	.....	.....	.....	.....	26,800
Trail well	.....	420	.....	.....	.....	.....	.....	8,400
Twin Hollow	610	.....	.....	.....	.....	.....	.....	17,080
Upper Hog	.....	.....	100	.....	.....	.....	.....	2,200
Vermilion	5,690	.....	1,825	.....	.....	.....	.....	199,470
White Sage	570	.....	.....	.....	.....	.....	.....	15,960
Willow Spring	.....	31	.....	.....	.....	.....	.....	620
Yellow Jacket	240	717	.....	.....	.....	.....	.....	21,060
Cottonwood	1,510	.....	240	.....	.....	.....	.....	47,560
Coyote	.....	.....	385	.....	.....	.....	.....	8,470
Deer Range	4,355	.....	200	.....	.....	.....	.....	126,340
Headwaters	13,680	2,091	10,961	5,790	160	15,854	.....	754,132
Mud Springs	1,959	.....	.....	560	.....	.....	.....	63,252
Round Valley	.....	.....	1,050	.....	.....	.....	.....	23,100
Rushbeds	2,480	810	.....	.....	.....	.....	.....	85,640
Upper Hackberry	<u>7,250</u>	<u>.....</u>	<u>.....</u>	<u>880</u>	<u>.....</u>	<u>.....</u>	<u>.....</u>	<u>216,200</u>
TOTAL ACRES	198,894	55,873	27,835	34,485	6,069	15,854	1,282	3,839,530

APPENDIX 8

Livestock Forage Condition

Livestock forage condition is the present state of livestock forage in relation to the quality and quantity of what the given vegetation type or area is capable of producing. Standards used in evaluating livestock forage condition were based on vegetation composition and soil surface factors (SSF) (BLM Manual 7317.1 and 7322.11B8).

To arrive at livestock forage condition, a plant list was prepared for the survey area and the plants classified as desirable, intermediate, and least desirable for livestock forage.

Desirable Plants

Desirable plants are those which are palatable, productive, and nutritious forage species, often dominant under climax or near climax conditions, are long-lived, and have extensive root systems to aid in protecting the watershed against erosion. This category includes the important key forage species (grasses, forbs, browse, and shrubs) which are to be maintained or increased by intensive livestock management.

Intermediate Plants

Intermediate plants are of secondary importance in the climax and are usually associated with or indicators of ecological successional stages. They replace the desirables as condition deteriorates and replace the least desirables as condition improves. In comparison to desirable plants, they might be less palatable to grazing animals or more resistant to grazing use.

Least Desirable Plants

Least desirable plants consist principally of annuals, invaders, noxious, and other low value forage plants. All annuals and poisonous species are included in this classification.

The standards to determine each condition class are:

1. Good Condition. Composition is 40 percent or more of both desirable and intermediate species. At least 20 percent is made up of desirable species. SSF is less than 40.

2. Fair Condition. Composition is 15 to 39 percent desirable and intermediate species with 5 or more percent desirable species. SSF is less than 60. Also, those ecosystems with 60 percent or more intermediate species and less than 5 percent desirable species will be rated "fair condition" when the SSF is less than 60.

3. Poor Condition. Composition is less than 15 percent desirable and intermediate species. SSF is more than 60. It should be noted that if the SSF of an ecosystem is more than 60, the site is rated as poor condition regardless of the plant composition.

APPENDIX 9

Methodology Used to Determine Suitability

Rangeland Suitability Criteria and Standards

The BLM has developed a basic rangeland suitability guide to aid field personnel of BLM. It assists in adjusting grazing capacities and the amount of suitable rangeland available for grazing by domestic livestock, while bearing in mind the various aspects of the plant-soil environment. These Rangeland Suitability Criteria and Standards are founded on as many reputable sources of research information as possible in four parameters of major influence (productivity, slope, distance from water, and soil erosion).

The Forest Service, in analyzing rangelands, uses the term "suitability" to define land adaptable to livestock use. Suitable rangeland means forage-producing land which can be grazed on a sustained-yield basis under an attainable management system. Suitable rangeland can be grazed without causing damage to the basic soil resource of the specific or adjacent areas. This term is often confused with the common term "usable". Many areas can be grazed by livestock and are, therefore, usable; but they cannot be grazed year after year without damage to the soil resource. Thus, rangeland that can be grazed by livestock can be called usable, but may not be suitable because of the resulting damage to the sites. Rangeland is suitable only if it can be grazed on a sustained-yield basis without damage to the basic soil resource (Forest Service Handbook, 1964).

The Rangeland Suitability Criteria and Standards are arranged in table 1-1. Figure 1-1 is a graph of the relationship of slope versus distance based on the table in the key.

Each individual office can adapt or adjust the key, within certain limits, to specific unique management situations. A suitability guide for Cedar City District has been prepared.

Adjustments for specific standards to specific allotments would occur at the most limiting parameter of influence that would most affect the Suitability Criteria (Brady, 1974; Odum, 1971; Stoddart et al., 1975).

These criteria were used in the field during the rangeland survey (1975-79) to delineate areas as being suitable or unsuitable for livestock grazing. Based on this delineation, suitable areas were surveyed. In some cases (less than an estimated 10 percent of the acreage), it was not possible to delineate suitability specifically because small scattered outcrops of rocks and steep slopes were often interspersed throughout a writeup area. In these instances, suitability was determined on the basis of a percentage for the entire writeup area. This percentage in turn was used in the calculation of forage capacity (BLM manual 4412.11A).

It is not anticipated that rangelands identified as "unsuitable" for grazing would be fenced and all grazing prohibited except in unusual special conditions where threatened and endangered species, very critical wildlife habitat, and scenic beauty necessitate fencing as the only means of providing

protection. Instead, unsuitable rangeland would not be given carrying capacity for domestic livestock. Additionally, no rangeland improvements, e.g., water developments, would be located in unsuitable areas and no management actions e.g., salting, would be taken which deliberately attract grazing animals into unsuitable rangelands.

TABLE 1

Rangeland Suitability Guidelines for Cedar City District, BLM

1.	Service area of water is greater than 3 miles (flat terrain)			PS
2.	If service area of water is less than 3 miles, then a or b:			
	a. Current and/or potential production of usable perennial forage is less than 16 pounds per acre (capacity is less than 50 acres per AUM)			U
	or			
	b. Current and/or potential production of usable perennial forage is greater than 16 pounds per acre (capacity is greater than 50 acres per AUM)			S
3.	If Soil Surface Factor (SSF) is 60 or greater, then a or b:			
	a. Potential to reduce SSF through proper livestock management is less than 10 percent.			U
	or			
	b. Potential to reduce SSF through proper livestock management is greater than 10 percent within 20 years.			PS
4.	If SSF is less than 60, then a or b:			
	a. If SSF is 40 to 60, then 1 or 2:			
	1. Slope is greater than 20 percent			U
	or			
	2. Slope is less than 20 percent			S
	b. If SSF is less than 40, see table below.			
	<u>Slope Percent</u>	<u>Distance Up Slope</u>	<u>Suitable</u>	<u>Unsuitable</u>
	0-20%	to 3 miles	X	...
	21-30%	to 0.6 miles over 0.6 miles	X ...	... X
	31-40%	to 0.4 miles over 0.4 miles	X ...	... X
	41-50%	to 0.3 miles over 0.3 miles	X ...	... X
	greater than 51% slope		...	X

PS = Potentially Suitable U = Unsuitable S = Suitable

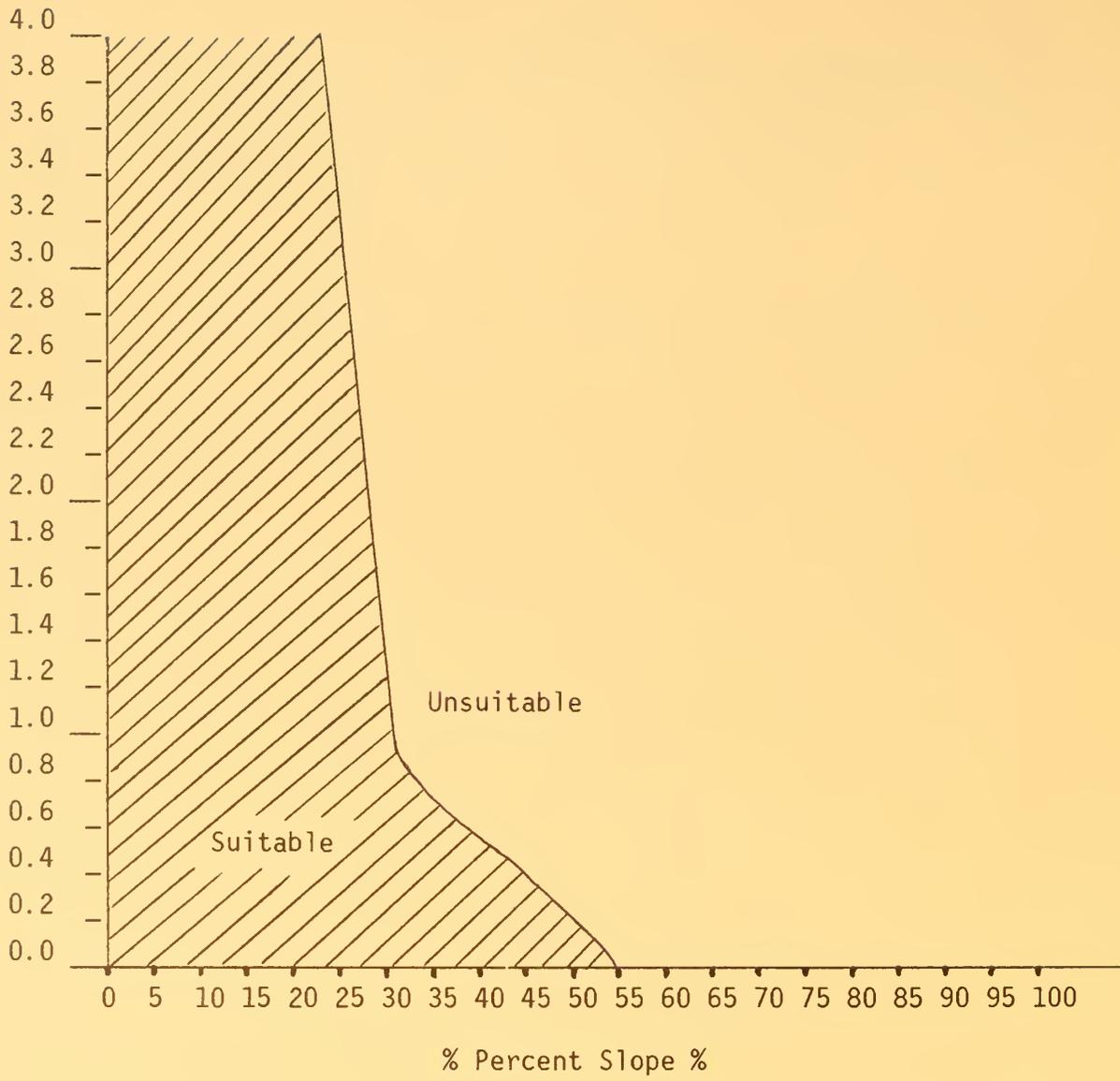


FIGURE 1

Relationship of Slope and Distance Up Slope (or from water)
Which Indicates Suitable/Unsuitable Grazing Land

APPENDIX 10

Livestock Forage and Riparian Impact Summary

The expected livestock forage production, condition, and trend, and riparian vegetation condition and trend are shown by alternative and allotment in table 1. Production indicated would be after vegetation treatment and better management practices have succeeded (Appendixes 20 and 21). Long-term AUMs available in Alternative 6 reflect those AUMs that would be gained in Alternative 6 due to additional treatments.

Unallotted and unsuitable allotments would be: Muley Twist, Rattlesnake Bench, Navajo Bench (Paria and Escalante), Ferry Swale, Harvey's Fear, Spencer Bench, Ben Hollow, Cogswell Point, Coop Creek, Elbow Springs, Elkheart Cliffs, Lydia's Canyon, Zion Park, Upper South Creek, Short Creek, Carmel Junction, Flag Point, Flume Hollow, and Lost Springs Gap.

APPENDIX 10

Livestock Forage and Riparian Impact Summary

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
ALLOTMENTS IN GOOD CONDITION												
ESCALANTE PLANNING UNIT												
Haymaker (3,328)												
Condition (acres)	G1,621 Static	G1,621 Static	G1,621 Up	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static	G1,621 Static
Apparent trend	76	100	.....	43	76	76	76	76	76	76	76	76
Initial (AUMs)	.....	68	.....	43	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bunting Well (2,630)												
Condition (acres)	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up	G1,680 Up
Apparent trend	120	60	.....	110	120	120	120	120	120	120	120	120
Initial (AUMs)	.....	120	.....	110	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	Poor /static	Poor /static	Good /static	Good /static	Good /static	Good /static	Good /static	Good /static	Good /static	Good /static	Good /static	Good /static
PARIA PLANNING UNIT												
Cottonwood (83,998)												
Condition (acres)	G41,176 Static	G41,176 Static	G41,176 Up	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static	G41,176 Static
Apparent trend	2,737	2,737	.....	2,542	3,114	3,114	3,114	3,114	3,114	3,114	3,114	3,114
Initial (AUMs)	.....	2,737	.....	2,542	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	Poor/up	Poor/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Poor/up	Poor/up	Poor/up	Poor/up	Poor/up
Coyote (44,141)												
Condition (acres)	G31,943 Static	G31,943 Static	G31,943 Up	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static	G31,943 Static
Apparent trend	2,044	2,044	.....	1,689	2,387	2,387	2,387	2,387	2,387	2,387	2,387	2,387
Initial (AUMs)	.....	2,044	.....	1,689	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	Poor /static	Poor /static	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Poor/up	Poor/up	Poor/up	Poor/up	Poor/up
Dry Valley (11,355)												
Condition (acres)	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static	G7,467 Static
Apparent trend	668	668	.....	664	668	668	668	668	668	668	668	668
Initial (AUMs)	.....	668	.....	664	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	Poor/up	Poor/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Poor	Poor	Poor	Poor	Poor
East Clark Bench (9,555)												
Condition (acres)	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static	G5,984 Static
Apparent trend	429	520	.....	420	428	428	428	428	428	428	428	428
Initial (AUMs)	.....	386	.....	420	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization
Flat Top (5,245) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	G4,865 Static 390	G4,865 Static 450 390	G4,865 Up	G4,865 Static 390 390	G4,865 Static 390 390	CONSOLIDATED WITH BLUE POOLS	
Lower Warm Creek (33,242) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	G9,690 Static 110	G9,690 Static 225 99	G9,690 Up	G9,690 Static	G9,690 Static 110 110 123	G9,690 Static 110 123	G9,690 Static 123
Upper Warm Creek (68,265) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	G19,918 Static 837	G19,918 Static 1,547 711	G19,918 Up	G19,918 Up 180 180	G19,918 Up 837 837	G19,918 Up 837 1,071	G19,918 Up 837 1,071
ALLOTMENTS IN FAIR CONDITION							
ESCALANTE PLANNING UNIT							
Alvey Wash (48,606) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F10,867 Static 1,086	F10,867 Static 1,040 1,086	F10,867 Up	F10,867 Static 1,040 1,040	F10,867 Static 1,086 1,145	F10,867 Static 1,145 1,307	F10,867 Static 1,145 1,307
Big Bown Bench (16,508) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F14,957 Static 816	F14,957 Static 1,500 816	F14,957 Up	F14,957 Static 739 739	F14,957 Static 816 816	F14,957 Static 816 1,007	F14,957 Static 816 1,007
Boulder Creek (1,705) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F772 Poor 34	F772 Poor 80 29 Fair/ static	F772 Up	F772 Up	F772 Up 34 34 Fair/up	F772 Up 34 57 Fair/up	F772 Up 34 57 Fair/up

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Cedar Wash (11,567) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F8,137 Static 648 648	F8,137 Static 860 648	F8,137 Up	F8,137 Static 648 648	F8,137 Static 648 648	F8,137 Static 726 852	F8,137 Static 726 929					
Chimney Rock (31,942) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F30,476 Static 2,783	F30,476 Static 4,043 2,783	F30,476 Up	F30,476 Static 2,340 2,340	F30,476 Static 2,783 2,783	F30,476 Static 2,783 3,002	F30,476 Static 2,783 3,002					
Circle Cliffs (29,779) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F8,338 Static 1,119 Poor Poor/ static	F8,338 Static 1,530 1,119 Poor/ declining	F8,338 Up Excellent /up	F8,338 Static 1,119 1,119 Excellent /up	F8,338 Static 1,119 1,119 Poor/ static	F8,338 Static 1,225 1,516 Fair/up	F8,338 Static 1,225 1,574 Fair/up					
Death Hollow (17,883) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F7,567 Static 255	F7,567 Static 1,005 204	F7,567 Up	F7,567 Static 79 79	F7,567 Static 255 255	F7,567 Static 330 513	F7,567 Static 330 513					
Deer Creek (17,447) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F8,207 Static 404 Fair/ static	F8,207 Static 602 323 Fair/ static	F8,207 Up Good/ static	F8,207 Static Good/ static	F8,207 Static 404 404 Fair/ static	F8,207 Up 554 694 Fair/ static	F8,207 Up 554 694 Fair/ static					
Dry Hollow (1,307) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F297 Static 18 Good/ static	F297 Static 216 18 Good/ static	F297 Static Good/ static	F297 Static 18 18 Good/ static	F297 Static Good/ static	F297 Static Good/ static	F297 Static Good/ static					
Escalante River (67,891) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F54,763 Static 2,705 Fair/ static	F54,763 Static 2,547 2,705 Fair/ static	F54,763 Up Good/ static	F54,763 Static Good/ static	F54,763 Static 2,737 2,737 Poor/ static	F54,763 Static 2,737 3,061 Poor/ static	F54,763 Static 2,737 3,061 Poor/ static					

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allocation and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Forty-Mile Ridge (41,641)						
Condition (acres)	F38,800	F38,800	F38,800	F38,800	F38,800	F38,800
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	2,376	1,034	1,034	1,996	2,376	2,376
Long term (AUMs)	1,996	.....	1,034	1,996	2,743	2,747
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Lower Cattle (72,611)						
Condition (acres)	F61,783	G61,783	F61,783	F61,783	F61,783	F61,783
Apparent trend	Static	Static	Up	Up	Up	Up
Initial (AUMs)	4,115	.....	2,771	4,115	4,643	4,643
Long term (AUMs)	3,497	.....	2,771	4,643	4,643	4,643
Riparian condition/trend	.....	.....	.....	.....	.....	.....
McGath Point (3,440)						
Condition (acres)	F2,183	F2,183	F2,183	F2,183	F2,183	F2,183
Apparent trend	Static	Up	Static	Static	Up	Up
Initial (AUMs)	120	.....	.....	120	120	120
Long term (AUMs)	.....	.....	.....	120	147	147
Riparian condition/trend	Fair/	Good/	Good/	Fair/	Fair/	Fair/
	static	static	static	static	static	static
Moody (44,086)						
Condition (acres)	F14,198	F14,198	F14,198	F14,198	F14,198	F14,198
Apparent trend	Static	Up	Up	Static	Static	Static
Initial (AUMs)	639	.....	.....	639	740	740
Long term (AUMs)	575	.....	.....	639	840	840
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Pine Creek (3,822)						
Condition (acres)	F2,952	F2,952	F2,952	F2,952	F2,952	F2,952
Apparent trend	Static	Up	Up	Static	Static	Static
Initial (AUMs)	77	.....	.....	77	104	104
Long term (AUMs)	.....	.....	.....	77	104	112
Riparian condition/trend	Poor/	Good/	Good/	Poor/	Poor/	Poor/
	static	static	static	static	static	static
Saltwater Creek (10,210)						
Condition (acres)	F4,396	F4,396	F4,396	F4,396	F4,396	F4,396
Apparent trend	Static	Up	Static	Static	Up	Up
Initial (AUMs)	140	.....	.....	140	140	140
Long term (AUMs)	.....	.....	.....	140	198	198
Riparian condition/trend	Fair/	Good/	Good/	Fair/	Fair/	Fair/
	static	static	static	declining	static	static
Soda (66,048)						
Condition (acres)	F51,389	F51,389	F51,389	F51,389	F51,389	F51,389
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	1,772	.....	425	1,772	1,772	1,772
Long term (AUMs)	1,772	.....	425	1,772	1,935	1,990
Riparian condition/trend	.....	.....	.....	.....	.....	.....
	Static	Static	Static	Static	Static	Static

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Steep Creek (10,414) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F4,157 Static 220 Poor/ static	F4,157 Declining 447 187 Poor/ declining	F4,157 Up Fair/up	F4,157 Up 201 201 Fair/up	F4,157 Up 220 220 Poor/ static	F4,157 Up 220 220 Poor/ static	F4,157 Up 220 279 Poor/ static					
Upper Cattle (114,793) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F94,447 Static 5,773 Fair/ static	F94,447 Declining 10,278 4,907 Fair/ declining	F94,447 Static Good/ static	F94,447 Up Good/ static	F94,447 Up 5,773 5,773 Fair/ static	F94,447 Up 5,773 8,419 Fair/ static	F94,447 Up 5,773 8,891 Fair/ static					
Wagon Box (25,256) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F10,059 Static 445	F10,059 Static 633 445	F10,059 Up	F10,059 Static 302 302	F10,059 Static 445 445	F10,059 Static 471 599	F10,059 Static 471 599					
White Rock (1,302) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F707 Static 42	F707 Static 60 38	F707 Up	F707 Up 42 42	F707 Up 42 42	F707 Up 42 59	F707 Up 42 59					
Wide Hollow (6,471) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F5,120 Static 204	F5,120 Static 350 204	F5,120 Up	F5,120 Static 204 204	F5,120 Up 204 204	F5,120 Up 269 349	G5,120 Up 269 376					
Willow Gulch (10,215) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F8,315 Static 390 Good/ static	F8,315 Static 945 390 Good/ static	F8,315 Up Excellent /static	F8,315 Static 165 165 Excellent /static	F8,315 Static 390 390 Good/ static	F8,315 Static 390 503 Good/ static	F8,315 Static 390 555 Good/ static					
Rock Creek (92,570) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F29,365 1,742	F29,365 3,753 1,742	F29,365 Up	F36,516 Static 95 95	F36,516 Static 2,100 2,100	F36,516 Static 2,100 2,469	F36,516 Static 2,100 2,651					

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization					
PARIA PLANNING UNIT												
Blue Pools (9,188)												
Condition (acres)	F8,425	F8,425	F8,425	F8,425	F8,425	F13,290	F13,290	F8,425	F13,290	F13,290	F13,290	F13,290
Apparent trend	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static
Initial (AUMs)	516	189	250	250	516	900	900	516	900	900	900	900
Long term (AUMs)	.....	516	.....	.....	.....	959	959	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cedar Mountain (13,108)												
Condition (acres)	F9,970	F9,970	F9,970	F9,970	F9,970	CONSOLIDATED WITH BUNTING WELL	CONSOLIDATED WITH BUNTING WELL	F9,970	CONSOLIDATED WITH BUNTING WELL			
Apparent trend	Up	Up	Up	Up	Up	.....	.....	Up	.....	.....	.....	.....
Initial (AUMs)	810	1,130	.....	810	810	.....	.....	810	.....	.....	.....	.....
Long term (AUMs)	.....	729	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clark Bench (64,341)												
Condition (acres)	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257	F27,257
Apparent trend	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static
Initial (AUMs)	1,800	1,081	.....	1,789	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060
Long term (AUMs)	.....	1,800	.....	1,789	2,060	2,238	2,238	2,060	2,238	2,238	2,238	2,238
Riparian condition/trend	Poor/up	Poor/up	Fair/up	Fair/up	static	.....	.....	static	.....	.....	.....	.....
Headwaters (249,059)												
Condition (acres)	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262	F55,262
Apparent trend	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	5,930	5,930	.....	5,797	5,930	5,930	5,930	5,930	5,930	5,930	5,930	5,930
Long term (AUMs)	.....	5,930	.....	5,797	5,930	6,213	6,213	5,930	6,213	6,213	6,213	6,213
Riparian condition/trend	Fair/ static	Fair/ static	Good/ static	Good/ static	Fair/ static	.....	.....	Fair/ static	.....	.....	.....	.....
Judd Hollow (13,688)												
Condition (acres)	F9,745	F9,745	F9,745	F9,745	F9,745	CONSOLIDATED WITH BUNTING WELL	CONSOLIDATED WITH BUNTING WELL	F9,745	CONSOLIDATED WITH BUNTING WELL			
Apparent trend	Static	Static	Up	Static	Static	.....	.....	Static	.....	.....	.....	.....
Initial (AUMs)	696	1,204	.....	696	696	.....	.....	696	.....	.....	.....	.....
Long term (AUMs)	.....	696	.....	.....	.....	.....	.....	696	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lower Hackberry (17,695)												
Condition (acres)	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117	F5,117
Apparent trend	.....	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	250	480	.....	241	250	250	250	250	250	250	250	250
Long term (AUMs)	.....	225	.....	241	250	.....	.....	250	.....	.....	.....	.....
Riparian condition/trend	Poor/ static	Poor/ declining	Good/ static	Good/ static	Good/ static	.....	.....	Poor/ static	.....	.....	.....	.....
Mud Springs (14,455)												
Condition (acres)	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716	F4,716
Apparent trend	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static	Static
Initial (AUMs)	123	194	.....	123	123	123	123	123	123	123	123	123
Long term (AUMs)	.....	123	.....	123	123	.....	.....	123	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Nipple Bench (26,942)						
Condition (acres)	F16,852	F16,852	F16,852	F16,852	G16,852	G16,852
Apparent trend	Static	Up	Up	Up	Static	Static
Initial (AUMs)	515	.....	376	515	885	885
Long term (AUMs)	.....	.....	376	515	948	948
Riparian condition/trend	Poor/ static	Fair/up	Fair/up	Poor/ static	Poor/ static	Poor/ static
Round Valley (8,974)						
Condition (acres)	F5,169	F5,169	F5,169	F5,169	F5,169	F5,169
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	.....	.....	.....	.....	375	375
Long term (AUMs)	.....	.....	.....	.....	415	478
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Rushbeds (16,525)						
Condition (acres)	F6,766	F6,766	F6,766	F6,766	F6,766	F6,766
Apparent trend	Static	Static	Static	Static	Up	Up
Initial (AUMs)	246	.....	246	246	324	324
Long term (AUMs)	.....	.....	246	246	361	574
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Upper Hackberry (21,604)						
Condition (acres)	F13,889	F13,889	F13,889	F13,889	CONSOLIDATED WITH LOWER HACKBERRY	
Apparent trend	Static	Up	Up	Up		
Initial (AUMs)	578	.....	539	578		
Long term (AUMs)	.....	.....	539	578		
Riparian condition/trend	Poor/up	Good/ static	Good/ static	Poor/up		
Wahweap Creek (11,223)						
Condition (acres)	F5,609	F5,609	F5,609	F5,609	F5,609	F5,609
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	194	.....	180	194	194	194
Long term (AUMs)	.....	.....	180	194	240	240
Riparian condition/trend	Poor/ static	Fair/up	Fair/up	Poor/ static	Poor/ static	Poor/ static
ZION PLANNING UNIT						
Allon (80)						
Condition (acres)	F80	F80	F80	F80	F80	F80
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	5	.....	5	5	5	5
Long term (AUMs)	.....	.....	5	5	5	5
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Calf Pasture (2,291)						
Condition (acres)	F2,231	F2,231	F2,231	F2,231	F2,231	G2,231
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	124	.....	124	124	184	184
Long term (AUMs)	.....	.....	124	124	184	281
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization
Coal Mine (255)						
Condition (acres)	F95	F95	F95	F95	F95	F95
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	40	.....	3	3	5	5
Long term (AUMs)	2	.....	3	3	5	5
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Cove (160)						
Condition (acres)	F160	F160	F160	F160	F160	F160
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	40	.....	8	8	8	8
Long term (AUMs)	6	.....	8	8	8	8
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Dry Wash (1,441)						
Condition (acres)	F570	F570	F570	F570	F570	F570
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	35	.....	.....	35	35	35
Long term (AUMs)	31	.....	.....	35	46	46
Riparian condition/trend	.....	.....	.....	.....	.....	.....
First Point (6,216)						
Condition (acres)	F3,955	F3,955	F3,955	F3,955	F3,955	F3,955
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	650	.....	.....	405	605	605
Long term (AUMs)	345	.....	405	405	650	772
Riparian condition/trend	Very poor/declining	Poor/up	Poor/up	Poor/up	Poor/up	Poor/up
Gardner Hollow (2,200)						
Condition (acres)	F840	F840	F840	F840	F840	F840
Apparent trend	Static	Static	Up	Static	Static	Static
Initial (AUMs)	30	.....	.....	30	30	30
Long term (AUMs)	30	.....	30	30	30	30
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Gordon Point (386)						
Condition (acres)	F386	F386	F386	F386	F386	F386
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	40	.....	40	40	40	40
Long term (AUMs)	32	.....	40	40	40	40
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Hay Canyon (811) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F170 Up 18	F170 Up 18	F170 Up	F170 Up 18 18	F170 Up 18 18	F170 Up 18 18	F170 Up 18 18					
Isolated Tracts (1,510) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F1,430 Static 67	F1,430 Static 80 67	F1,430 Up	F1,430 Up	F1,430 Static 67 67	F2,273 Up 96 103	F2,273 Up 96 159					
Lydia (3,336) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F669 Static 58	F669 Declining 216 46	F669 Up	F669 Up 58 58	F669 Up 58 58	F669 Up 58 58	F669 Up 58 58					
Spencer Bench (2,220) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F1,668 Static 98	F1,668 Static 224 88	F1,668 Up	F1,668 Up	F1,668 Up 98 98	CONSOLIDATED WITH BUCK KNOLL	F620 Up 15 15 20					
Sugar Knoll (2,648) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F620 Declining 15	F620 Declining 112 15	F620 Up	F620 Up	F620 Up 15 15	F620 Up 15 20	F620 Up 15 20					
Upper North Fork (810) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F30 Up 3 Good/ static	F30 Up 88 2 Good/ declining	F30 Up 3 Good/ static	F30 Up Good/ static	F30 Up 3 3 Good/ static	F30 Up 3 3 Good/ static	F30 Up 3 3 Good/ static					
Willow Creek (1,158) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	F389 Up 30	F389 Up 129 30	F389 Up	F389 Up 30 30	F389 Up 30 30	F389 Up 30 30	F389 Up 30 30					

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1			2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization						
<u>CANAAN MOUNTAIN PLANNING UNIT</u>													
Cottonwood Point (8,705)	F3,582 Static	F3,582 Static	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up	F3,582 Up
Apparent trend	120	424	.....	114	120	120	120	120	120	120	120	120	120
Initial (AUMs)	.....	102	.....	114	120	168	168	168	168	168	168	168	168
Long term (AUMs)	Fair/ static	Fair/ declining	Fair/up	Fair/up	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grafton Wash (1,778)	F954 Static	F954 Static	F954 Up	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static	F954 Static
Condition (acres)	36	25	.....	29	36	36	36	36	36	36	36	36	36
Apparent trend	.....	32	.....	29	36	41	41	41	41	41	41	41	41
Initial (AUMs)	Fair/ static	Fair/ static	Good/ static	Good/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riverview Ranch (863)	F605 Declining	F605 Declining	F605 Up	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining	F605 Declining
Condition (acres)	24	22	.....	21	24	21	21	24	24	21	21	21	21
Apparent trend	.....	20	.....	21	24	24	24	24	24	24	24	24	24
Initial (AUMs)	Fair/ static	Fair/ static	Good/up	Good/up	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static	Fair/ static
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<u>VERMILION PLANNING UNIT</u>													
Bunting Canyon (339)	F65 Up	F65 Up	G65 Static	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up	F65 Up
Condition (acres)	4	24	.....	4	4	4	4	4	4	4	4	4	4
Apparent trend	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dry Lake (2,006)	F1,931 Static	F1,931 Static	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up	F1,931 Up
Condition (acres)	62	74	.....	62	62	60	60	62	62	60	60	60	60
Apparent trend	.....	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<u>GLASSEYE (7,427)</u>													
Condition (acres)	F2,380 Up	F2,380 Up	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static	F2,380 Static
Apparent trend	91	372	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	77	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Management	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization					
Hells Bellows (2,019)	F505 Declining	F505 Declining	F505 Up	F505 Static	F505 Up	F505 Up	F505 Up	F505 Up	F505 Up	F505 Up	F505 Up	F505 Up
Condition (acres)	45	121	.....	28	45	45	45	45	45	45	45	45
Apparent trend	.....	34	.....	28	45	45	45	45	45	45	45	45
Initial (AUMs)	Fair/static	Fair/static	Good/static	Good/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnson Point (2,277)	F930 Declining	F930 Declining	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up	F930 Up
Condition (acres)	40	135	.....	40	40	40	40	40	40	40	40	40
Apparent trend	.....	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnson Ranch (5,642)	F2,220 Static	F2,220 Static	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up	F2,220 Up
Condition (acres)	40	265	.....	40	40	40	40	40	40	40	40	40
Apparent trend	.....	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kanab Creek (4,098)	F683 Static	F683 Static	F683 Up	F683 Static	F683 Static	F683 Static	F683 Static	F683 Static	F683 Static	F683 Static	F683 Static	F683 Static
Condition (acres)	30	100	.....	30	30	30	30	30	30	30	30	30
Apparent trend	.....	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kinnikinnic (4,964)	F3,793 Static	F3,793 Static	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up	F3,793 Up
Condition (acres)	128	90	.....	128	128	128	128	128	128	128	128	128
Apparent trend	.....	128	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lost Springs (601)	F295 Declining	F295 Declining	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static	F295 Static
Condition (acres)	6	4	.....	6	6	6	6	6	6	6	6	6
Apparent trend	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oak Springs (2,864)	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up	F1,714 Up
Condition (acres)	88	145	.....	88	88	88	88	88	88	88	88	88
Apparent trend	.....	88	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization					
Red Butte (5,321)	F5,166 Static	F5,166 Static	F5,166 Up	F5,166 Up	F5,166 Up	F5,166 Up	F5,166 Up					
Condition (acres)	196	238	196	196	196	196	196					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
School Section (430)	F40 Declining	F40 Declining	F40 Static	F40 Static	F40 Static	F40 Static	F40 Static					
Condition (acres)	2	20	2	2	2	2	2					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Sheep Spring (3,311)	F1,035 Up	F1,035 Up	F1,035 Up	F1,035 Up	F1,035 Up	F1,035 Up	F1,035 Up					
Condition (acres)	92	220	92	92	92	92	92					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Twin Hollow (1,210)	F710 Up	F710 Up	F710 Up	F710 Up	F710 Up	F710 Up	F710 Up					
Condition (acres)	.....	100	.....	.....	.....	.....	.....
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Virgin River (3,799)	F1,900 Up	F1,900 Up	F1,900 Static	F1,900 Up	F1,900 Up	F1,900 Up	F1,900 Up					
Condition (acres)	108	230	60	60	108	108	108					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	108	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
ALLOTMENTS IN POOR CONDITION												
ESCALANTE PLANNING UNIT												
Boulder Stock Trail (2,598)	P2,598 Static	P2,598 Static	P2,598 Static	P2,598 Static	P2,598 Static	P2,598 Static	P2,598 Static					
Condition (acres)	135	135	135	135	135	135	135					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization
Collets (15,252)						
Condition (acres)	P588	P588	P588	P588	P588	P588
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	90	.....	.....	27	27	27
Long term (AUMs)	22	.....	.....	27	31	31
Riparian condition/trend	.....	.....	.....	.....	.....	.....
King Bench (48,268)						
Condition (acres)	P23,037	P23,037	P23,037	P23,037	P23,037	P23,037
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	2,415	.....	.....	1,075	1,370	1,370
Long term (AUMs)	967	.....	.....	1,075	1,576	1,576
Riparian condition/trend	Fair/ static	Good/ static	Good/ static	Fair/ static	Fair/ static	Fair/ static
Lakes (23,301)						
Condition (acres)	P17,706	P17,706	P17,706	P17,706	P17,706	P17,706
Apparent trend	Static	Up	Static	Static	Up	Up
Initial (AUMs)	1,308	.....	612	845	845	845
Long term (AUMs)	718	.....	612	845	1,472	1,884
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Last Chance (229,224)						
Condition (acres)	P84,470	P84,470	P84,470	P84,470	P84,470	P84,470
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	3,077	.....	1,413	3,390	3,390	3,390
Long term (AUMs)	3,090	.....	1,413	3,390	4,332	4,332
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Long Neck (610)						
Condition (acres)	P130	P130	P130	P130	P130	P130
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	21	.....	.....	.....	.....	7
Long term (AUMs)	5	.....	.....	.....	.....	7
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Mudholes (15,405)						
Condition (acres)	P10,853	P10,853	P10,853	P10,853	P10,853	P10,853
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	800	.....	358	358	358	358
Long term (AUMs)	358	.....	358	358	358	358
Riparian condition/trend	.....	.....	.....	.....	.....	.....
PARIA PLANNING UNIT						
Cockscomb (1,961)						
Condition (acres)	P1,036	P1,036	P1,036	P1,036	P1,036	P1,036
Apparent trend	Static	Up	Declining	Static	Static	Static
Initial (AUMs)	37	.....	36	36	36	36
Long term (AUMs)	36	.....	36	36	36	36
Riparian condition/trend	.....	.....	.....	.....	.....	.....

CONSOLIDATED WITH
ROCK CREEK

(continued)

APPENDIX 10 (continued)

	1		2		3		4		5		6	
Allotment and Total Federal Acres	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization					
Deer Range (10,294) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P2,280 Declining 213	P2,280 Declining 213 213	P2,280 Up	P2,280 Declining 213 213	P2,280 Declining 213 219	P2,280 Static 219 522	P2,280 Static 219 522					
ZION PLANNING UNIT												
Bald Knoll (6,701) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P860 Static 25	P860 Static 214 21 Very poor/ declining	P860 Up Poor/up	P860 Up Poor/up	P860 Up 25 25 Poor/ static	P860 Up 144 169 Poor/ static	P860 Up 144 169 Poor/ static					
Black Rock (18,044) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P12,759 Static 662	P12,759 Static 950 662	P12,759 Up	P12,759 Up	P12,759 Up 950 950	P12,759 Up 950 1,025	P12,759 Up 950 1,025					
Black Mountain (1,210) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P869 Declining 42	P869 Declining 134 38	P869 Up	P869 Up 42 42	P869 Declining 42 42	P869 Declining 42 46	P869 Declining 42 46					
Buck Knoll (4,745) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P3,725 Static 168	P3,725 Static 151 168	P3,725 Up	P3,725 Up 168 168	P3,725 Static 168 168	P5,393 Static 328 338	P5,393 Static 328 338					
Burnt Cedar Point (2,980) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P2,430 Static 105	P2,430 Static 125 105	P2,430 Static	P2,430 Static 105 105	P2,430 Static 105 105	P2,430 Static 119 136	P2,430 Static 119 136					

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range Land Management Recommendation	Livestock Optimization					
Burnt Flat (866)	P726 Static	P726 Static	P726 Up	P726 Up	P726 Static	P726 Static	P726 Static					
Condition (acres)	20	30	.....	.....	20	20	20			
Apparent trend	.....	17	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Cave Creek (770)	P410 Declining	P410 Declining	P410 Up	P410 Up	P410 Declining	P410 Declining	P410 Declining					
Condition (acres)	26	16	.....	.....	26	26	26			
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Cottonwood Springs (3,176)	P2,236 Static	P2,236 Declining	P2,236 Up	P2,236 Up	P2,236 Up	P4,696 Up	P4,696 Up					
Condition (acres)	95	430	.....	.....	.....	316	316		
Apparent trend	.....	76	.....	.....	.....	341	341	
Initial (AUMs)	.....	.....	.....	.....	.....	Poor/ static	Poor/ static
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Deer Spring Point (21,662)	P9,463 Static	P9,463 Static	P9,463 Up	P9,463 Up	P9,463 Static	P9,463 Static	P9,463 Static					
Condition (acres)	534	1,194	.....	.....	534	1,194	1,194			
Apparent trend	.....	454	.....	.....	534	1,256	1,520		
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Dump (201)	P201 Static	P201 Declining	P201 Up	P201 Up	P201 Up	P201 Up	P201 Up					
Condition (acres)	7	80	.....	.....	7	7	7			
Apparent trend	.....	6	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Elbow Falls (2,945)	P1,492 Static	P1,492 Declining	P1,492 Up	P1,492 Up	P1,492 Up	CONSOLIDATED WITH COTTONWOOD	CONSOLIDATED WITH COTTONWOOD					
Condition (acres)	60	180	.....	.....	60	60	60			
Apparent trend	.....	48	.....	.....	.....	.....	.....
Initial (AUMs)	.....	Poor/ static	Fair/up	Fair/up	Poor/ static	.....	.....			
Long term (AUMs)	.....	declining	.....	.....	.....	.....	.....
Riparian condition/trend	.....	declining	.....	.....	.....	.....	.....
Flume Hollow (775)	P190 Static	P190 Declining	P190 Up	P190 Up	P190 Up	P190 Up	P190 Up					
Condition (acres)	9	49	.....	.....	9	9	9			
Apparent trend	.....	7	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization					
Ford Well (7,981)	P6,601 Static	P6,601 Static	P6,601 Up	P6,601 Up	P6,601 Static	P6,601 Static	P6,601 Static					
Condition (acres)	222	291	.....	.....	222	291	291			
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	222	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Four-Mile (1,695)	P1,695 Static	P1,695 Static	P1,695 Up	P1,695 Up	P1,695 Static	CONSOLIDATED WITH COTTONWOOD						
Condition (acres)	60	60	.....	.....	60					
Apparent trend	.....	.....	.....	.....	.....		
Initial (AUMs)	.....	60	.....	.....	60				
Long term (AUMs)	.....	.....	.....	.....	.....		
Riparian condition/trend	.....	.....	.....	.....	.....		
Glendale Bench (1,784)	P1,784 Declining	P1,784 Declining	P1,784 Up	P1,784 Up	P1,784 Up	P1,784 Up	P1,784 Up					
Condition (acres)	72	129	.....	.....	72	108	108			
Apparent trend	.....	65	.....	.....	.....	138	138	
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Hogs Heaven (1,771)	P880 Static	P880 Static	P880 Up	P880 Up	P880 Up	P880 Up	P880 Up					
Condition (acres)	45	540	.....	.....	45	45	45			
Apparent trend	.....	38	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Levanger Lakes (890)	P740 Declining	P740 Declining	P740 Up	P740 Up	P740 Static	P740 Static	P740 Static					
Condition (acres)	33	29	.....	.....	33	33	33			
Apparent trend	.....	33	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Lower Herd (860)	P385 Static	P385 Static	P385 Up	P385 Up	P385 Up	P385 Up	P385 Up					
Condition (acres)	24	165	.....	.....	24	24	24			
Apparent trend	.....	20	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Lower North Fork (840)												
Condition (acres)	60	P60	P60	P60	P60	P60	P60	P60	P60	P60	P60	P60
Apparent trend	Static	Static	Up	Static	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	24	165	.....	14	24	24	24	24	24	24	24	24
Long term (AUMs)	.....	2	.....	14	24	24	24	24	24	24	24	24
Riparian condition/trend	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
	/static	/static	/static	/static	/static	/static	/static	/static	/static	/static	/static	/static
Meadow Canyon (1,733)												
Condition (acres)	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453	P1,453
Apparent trend	Static	Static	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	25	35	.....	.....	35	25	25	25	25	25	25	25
Long term (AUMs)	.....	21	.....	.....	25	25	25	25	25	25	25	25
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mill Creek (13,479)												
Condition (acres)	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309	P3,309
Apparent trend	Static	Static	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	132	300	.....	.....	132	148	148	148	148	148	148	148
Long term (AUMs)	.....	112	.....	.....	132	300	300	300	300	300	300	300
Riparian condition/trend	Very poor/declining	Very poor/declining	Poor/up	Poor/up	Very poor/declining	Very poor/declining	Very poor/declining	Very poor/declining	Very poor/declining	Very poor/declining	Very poor/declining	Very poor/declining
Neuts Canyon (2,479)												
Condition (acres)	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441	P1,441
Apparent trend	Static	Static	Up	Static	Static	Static	Static	Static	Static	Static	Static	Static
Initial (AUMs)	147	111	.....	145	147	147	147	147	147	147	147	147
Long term (AUMs)	.....	147	.....	145	147	147	147	147	147	147	147	147
Riparian condition/trend	Fair/up	Fair/up	Good/static	Good/static	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up
North Fork (280)												
Condition (acres)	P280	P280	P280	P280	P280	P280	P280	P280	P280	P280	P280	P280
Apparent trend	Declining	Declining	Up	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining
Initial (AUMs)	30	16	.....	30	30	30	30	30	30	30	30	30
Long term (AUMs)	.....	30	.....	30	30	30	30	30	30	30	30	30
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orderville Gulch (4,857)												
Condition (acres)	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351	P2,351
Apparent trend	Static	Static	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Initial (AUMs)	200	250	.....	197	200	200	200	200	200	200	200	200
Long term (AUMs)	.....	170	.....	197	200	200	200	200	200	200	200	200
Riparian condition/trend	Fair/up	Fair/up	Good/static	Good/static	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Red Hollow (801)						
Allotment and Total Federal Acres	P450	P450	P450	P450	P450	P450
Condition (acres)	Declining	Up	Up	Up	Up	Up
Apparent trend	102	.....	.....	30	30	30
Initial (AUMs)	25	.....	30	30	30	30
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Robinson Creek (536)						
Condition (acres)	P436	P436	P436	P436	P436	P436
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	66	.....	24	24	24	24
Long term (AUMs)	20	.....	24	24	24	24
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Rocking Chair (1,631)						
Condition (acres)	P1,561	P1,561	P1,516	P1,561	P1,561	P1,561
Apparent trend	Up	Up	Up	Up	Up	Up
Initial (AUMs)	61	.....	.....	61	61	61
Long term (AUMs)	61	.....	61	61	61	61
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Sink Valley (8,329)						
Condition (acres)	P5,224	P5,224	P5,224	P5,224	P3,871	P3,871
Apparent trend	Static	Up	Static	Up	Up	Up
Initial (AUMs)	342	.....	.....	177	189	189
Long term (AUMs)	177	.....	177	177	204	204
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Spring Hollow (510)						
Condition (acres)	P330	P330	P330	P330	P330	P330
Apparent trend	Static	Static	Static	Static	Static	Static
Initial (AUMs)	0	.....	.....	8	8	8
Long term (AUMs)	8	.....	.....	8	8	8
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Stewart Creek (325)						
Condition (acres)	P325	P325	P325	P325	P325	P325
Apparent trend	Static	Static	Static	Static	Static	Static
Initial (AUMs)	6	.....	6	6	6	6
Long term (AUMs)	6	.....	6	6	6	6
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Swains Creek (371)						
Condition (acres)	P341	P341	P341	P341	P341	P341
Apparent trend	Static	Static	Static	Static	Static	Static
Initial (AUMs)	18	.....	.....	18	18	18
Long term (AUMs)	14	.....	.....	18	20	20
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range Land Management Recommendation	Livestock Optimization
Swallow Park (11,594)						
Condition (acres)	P10,694	P10,694	P10,694	P10,694	P10,694	P10,694
Apparent trend	Static	Up	Static	Static	Up	Up
Initial (AUMs)	868	.....	.....	1,230	1,230	1,230
Long term (AUMs)	738	.....	868	1,230	1,250	1,622
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Slyer Knoll (415)						
Condition (acres)	P100	P100	P100	P100	P100	P100
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	4	.....	4	4	4	4
Long term (AUMs)	13	.....	4	4	4	4
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Table Mountain (2,254)						
Condition (acres)	P1,262	P1,262	P1,262	P1,262	P1,262	P1,262
Apparent trend	.....	Up	.....	.....	.....	.....
Initial (AUMs)	127	.....	123	127	127	127
Long term (AUMs)	.....	.....	127	127	127	127
Riparian condition/trend	Good/up	Good/up	Good/up	Good/up	Good/up	Good/up
Timber Mountain (6,664)						
Condition (acres)	P6,664	P6,664	P6,664	P6,664	P6,664	P6,664
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	403	.....	403	403	403	403
Long term (AUMs)	.....	.....	403	403	403	938
Riparian condition/trend	Good/up	Excellent/static	Excellent/static	Good/declining	Good/declining	Good/declining
Upper Place (1,715)						
Condition (acres)	P635	P635	P635	P635	P635	P635
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	23	.....	.....	23	23	23
Long term (AUMs)	19	.....	2	23	23	23
Riparian condition/trend	Poor/static	Fair/up	Fair/up	Poor/static	Poor/static	Poor/static
Zion (11,012)						
Condition (acres)	P7,668	P7,668	P7,668	P7,668	P7,668	P7,668
Apparent trend	Static	Up	Up	Static	Static	Static
Initial (AUMs)	270	.....	.....	270	270	270
Long term (AUMs)	.....	.....	.....	270	270	270
Riparian condition/trend	Poor/static	Fair/up	Fair/up	Fair/up	Fair/up	Fair/up
CANAAN MOUNTAIN PLANNING UNIT						
Big Plains (664)						
Condition (acres)	P196	P196	P196	P196	P196	P196
Apparent trend	Static	Up	Static	Static	Static	Static
Initial (AUMs)	12	.....	12	12	12	12
Long term (AUMs)	.....	.....	12	12	12	12
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Buttermilk (1,714) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P1,474 Static 40	P1,474 Static 50 34	P1,474 Up	P1,474 Static 40 40	P1,474 Static 40 40	P1,474 Up 40 67	P1,474 Up 40 67					
Canaan Mountain (7,794) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P6,591 Static 160	P6,591 Static 224 136	P6,591 Up	P6,591 Static 160 160	P6,591 Static 160 160	P6,591 Static 160 337	P6,591 Static 160 337					
Canaan Ranch (2,755) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P919 Static 20	P919 Static 168 20	P919 Up	P919 Up 20 20	P919 Up 24 24	P919 Up 24 24	P919 Up 24 24					
Cottonwood (3,380) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P1,990 Declining, 92	P1,990 Declining, 131 74	P1,990 Up	P1,990 Up 92 92	P1,990 Up 92 92	P1,990 Up 110 114	P1,990 Up 110 114					
Goat Ranch (8,501) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P7,244 Static 207	P7,244 Static 486 176	P7,244 Up	P7,244 Up 207 207	P7,244 Up 208 208	P7,244 Up 354 377	P7,244 Up 354 377					
Grafton Mesa (1,854) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P639 Static 2	P639 Static 25 2	P639 Up	P639 Up 2 2	P639 Up	P639 Up 15 24	P639 Up 15 24					
Grapevine (4,764) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P540 Declining 26	P540 Declining 120 21 Poor/ declining	P540 Up	P540 Up 21 Fair/up	P540 Up 24 Fair/ static	P540 Up 24 30 Fair/ static	P540 Up 24 30 Fair/ static					

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range Land Management Recommendation	Livestock Optimization					
Horse Valley (4,218)	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898	P1,898
Condition (acres)	Declining	Declining	Up	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining
Apparent trend	70	210	.....	65	70	72	72	72	72	72	72	72
Initial (AUMs)	.....	59	Fair/up	65	70	84	84	84	84	84	84	84
Long term (AUMs)	.....	Poor/declining	Fair/up	Fair/up	Poor/declining	Poor/declining	Poor/declining	Poor/declining	Poor/declining	Poor/declining	Poor/declining	Poor/declining
Riparian condition/trend	declining	declining	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maxwell Canyon (3,569)	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242	P1,242
Condition (acres)	Static	Static	Up	Static	Static	Static	Static	Static	Static	Static	Static	Static
Apparent trend	40	40	.....	35	40	40	40	40	40	40	40	40
Initial (AUMs)	.....	34	.....	35	40	43	43	43	43	43	43	43
Long term (AUMs)	.....	Good/static	Good/up	Good/up	Good/static	Good/static	Good/static	Good/static	Good/static	Good/static	Good/static	Good/static
Riparian condition/trend	static	static	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Park (640)	P640	P640	P640	P640	P640	P640	P640	P640	P640	P640	P640	P640
Condition (acres)	Static	Static	Up	Static	Static	Static	Static	Static	Static	Static	Static	Static
Apparent trend	25	16	.....	23	25	25	25	25	25	25	25	25
Initial (AUMs)	.....	25	.....	23	25	27	27	27	27	27	27	27
Long term (AUMs)	.....	Fair/static	Good/up	Good/up	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static	Fair/static
Riparian condition/trend	static	static	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockville (308)	P308	P308	P308	P308	P308	P308	P308	P308	P308	P308	P308	P308
Condition (acres)	Static	Static	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Apparent trend	10	21	.....	10	10	10	10	10	10	10	10	10
Initial (AUMs)	.....	8	.....	10	10	11	11	11	11	11	11	11
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Russell Fields (633)	P352	P352	P352	P352	P352	P352	P352	P352	P352	P352	P352	P352
Condition (acres)	Static	Declining	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Apparent trend	12	60	.....	12	12	12	12	12	12	12	12	12
Initial (AUMs)	.....	11	.....	12	12	12	12	12	12	12	12	12
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Well Springs (2,192)	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306	P1,306
Condition (acres)	Static	Declining	Up	Up	Up	Up	Up	Up	Up	Up	Up	Up
Apparent trend	28	120	.....	28	27	64	64	64	64	64	64	64
Initial (AUMs)	.....	22	.....	28	27	82	82	82	82	82	82	82
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
VERMILION PLANNING UNIT												
Airport (468)	P468	P468	P468	P468	P468	P468	P468	P468	P468	P468	P468	P468
Condition (acres)	Declining	Declining	Up	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining	Declining
Apparent trend	8	20	.....	8	8	8	8	8	8	8	8	8
Initial (AUMs)	.....	7	.....	8	8	8	8	8	8	8	8	8
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Art Canyon (9,092 Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P5,120 Static 350 155 Good/up	P5,120 Up Good/up	P5,120 Up 153 Good/up	P5,120 Static 155 155 Good/ static	P5,120 Static 155 189 Good/ static	P5,120 Static 155 189 Good/ static
Barracks Point (7,915) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P3,965 Static 268 32	P3,965 Up	P3,965 Up 40	P3,965 Up 40 40	P3,965 Up 84 115	P3,965 Up 84 167
Boot (2,491) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P887 Static 37	P887 Up	P887 Up 37 37	P887 Up 37 37	P887 Up 52 52	P887 Up 52 52
Brown Canyon (1,730) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P296 Static 20	P296 Up	P296 Up	P296 Up	CONSOLIDATED WITH JOHNSON RANCH	
Buck Pasture (2,740) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P970 Declining 100 31	P970 Up	P970 Up 39 39	P970 Up 39 39	P970 Up 39 48	P970 Up 39 62
Cedar Ridge (87) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P87 Declining	P87 Declining	P87 Declining 6 6	P87 Declining 6 6	P87 Declining 6 6	P87 Declining 6 6
Chris Spring (4,703) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P3,940 Static 133	P3,940 Up	P3,940 Up 153	P3,940 Up 153 153	P6,070 Up 216 278	P6,070 Up 216 317

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	Existing Situation	Contingency of Present Allotment	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Clay Flat (5,420)	P2,250 Static	P2,250 Static	P2,250 Up	P2,250 Up	P2,250 Up	P2,250 Up	P2,250 Up
Condition (acres)	Static	Static	Up	Up	Up	Up	Up
Apparent trend	80	210	.....	.....	80	80	80
Initial (AUMs)	.....	68	.....	.....	.....	118	162
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Cougar Canyon (1,546)	P530 Declining	P530 Declining	P530 Up	P530 Up	P530 Up	P530 Up	P530 Up
Condition (acres)	Declining	Declining	Up	Up	Up	Up	Up
Apparent trend	.....	55	.....	.....	.....	15	15
Initial (AUMs)	.....	.....	.....	.....	.....	22	22
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Dishpan (210)	P210 Static	P210 Static	P210 Static	P210 Static	P210 Static	P210 Static	P210 Static
Condition (acres)	Static	Static	Static	Static	Static	Static	Static
Apparent trend	.....	.....	.....	.....	.....	7	7
Initial (AUMs)	.....	.....	.....	.....	.....	10	10
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Driveaway (860)	P560 Declining	P560 Declining	P560 Static	P560 Declining	P560 Declining	P560 Declining	P560 Declining
Condition (acres)	Declining	Declining	Static	Declining	Declining	Declining	Declining
Apparent trend	.....	.....	.....	.....	.....	19	19
Initial (AUMs)	.....	.....	.....	.....	.....	27	27
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Eight-Mile Gap (449)	P449 Declining	P449 Declining	P449 Up	P449 Declining	P449 Declining	P449 Declining	P449 Declining
Condition (acres)	Declining	Declining	Up	Declining	Declining	Declining	Declining
Apparent trend	15	25	.....	15	15	15	15
Initial (AUMs)	.....	15	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Elephant Cove (7,604)	P5,250 Static	P5,250 Static	P5,250 Up	P5,250 Up	P5,250 Up	CONSOLIDATED WITH KANE SPRING	CONSOLIDATED WITH KANE SPRING
Condition (acres)	Static	Static	Up	Up	Up		
Apparent trend	105	432	.....	105	105		
Initial (AUMs)	.....	84	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....
Farm Canyon (3,363)	P2,850 Static	P2,850 Static	P2,850 Up	P2,850 Up	P2,850 Up	P2,850 Up	P2,850 Up
Condition (acres)	Static	Static	Up	Up	Up	Up	Up
Apparent trend	100	243	.....	.....	100	105	105
Initial (AUMs)	.....	180	.....	100	100	130	130
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization
Fishtail (3,249)						
Condition (acres)	P1,640 Static	P1,640 Up	P1,640 Up	P1,640 Up	P1,640 Up	P1,640 Up
Apparent trend	230	.....	52	52	52	52
Initial (AUMs)	47	.....	52	52	69	69
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Five-Mile Mountain (15,837)						
Condition (acres)	P13,062 Static	P13,062 Up	P13,062 Up	P13,062 Up	P13,062 Up	P13,062 Up
Apparent trend	1,302	.....	.....	170	385	385
Initial (AUMs)	136	.....	.....	170	830	1,723
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
FAR (4,397)						
Condition (acres)	P2,209 Declining	P2,209 Up	P2,209 Up	P2,209 Static	P2,209 Static	P2,209 Static
Apparent trend	101	.....	68	68	68	68
Initial (AUMs)	54	.....	.....	68	118	167
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Flood Canyon (6,191)						
Condition (acres)	P990 Static	P990 Up	P990 Up	P990 Up	CONSOLIDATED WITH JOHNSON LAKE	.....
Apparent Trend	200	.....	.....	39	.....	.....
Initial (AUMs)	31	.....	39	39	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Granary Ranch (1,809)						
Condition (acres)	P280 Declining	P280 Up	P280 Up	P280 Up	P280 Up	P280 Up
Apparent trend	70	.....	.....	.....	11	11
Initial (AUMs)	.....	.....	.....	.....	13	13
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Gravel Pit (191)						
Condition (acres)	P191 Declining	P191 Up	P191 Static	P191 Static	P191 Static	P191 Static
Apparent trend	24	.....	5	8	8	8
Initial (AUMs)	6	.....	5	8	8	8
Long term (AUMs)	.....	.....	Good/ static	Fair/ static	Fair/ static	Fair/ static
Riparian condition/trend	declining	declining	.....	.....	.....	.....
Harris Flat (4,350)						
Condition (acres)	P3,410 Static	P3,410 Up	P3,410 Up	P3,410 Up	CONSOLIDATED WITH KANE SPRINGS	.....
Apparent trend	140	.....	.....	140	.....	.....
Initial (AUMs)	119	.....	140	140	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
John R. Flat (10,007)						
Condition (acres)	P6,048	P6,048	P6,048	P6,048	CONSOLIDATED WITH JOHNSON RANCH	
Apparent trend	Declining	Up	Up	Declining		
Initial (AUMs)	258	.....	.....	134		
Long term (AUMs)	150	.....	.....	150		
Riparian condition/trend	Poor/declining	Fair/up	Fair/up	Poor/declining		
Johnson Canyon (8,139)						
Condition (acres)	P5,355	P5,355	P5,355	P5,355	P5,355	P5,355
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	132	.....	.....	132	134	134
Long term (AUMs)	119	.....	.....	132	246	246
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Johnson Lake (10,150)						
Condition (acres)	P8,970	P8,970	P8,970	P8,970	P12,340	P12,340
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	267	.....	.....	267	472	472
Long term (AUMs)	240	.....	.....	267	604	787
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Kane Springs (10,944)						
Condition (acres)	P8,980	P8,980	P8,980	P8,980	P17,640	P17,640
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	300	.....	.....	300	572	572
Long term (AUMs)	270	.....	.....	300	798	850
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Locke Ridge (4,232)						
Condition (acres)	P2,057	P2,057	P2,057	P2,057	CONSOLIDATED WITH MEADOW CANYON	
Apparent trend	Static	Up	Up	Up		
Initial (AUMs)	114	.....	.....	114		
Long term (AUMs)	97	.....	.....	114		
Riparian condition/trend	.....	.....	.....	.....
Lone Forty (40)						
Condition (acres)	P40	P40	P40	P40	P40	P40
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Lower Hog (2,340)	P710 Static	P710 Up	P710 Up	P710 Up	P710 Up	P710 Up
Condition (acres)	Static	Up	Up	Up	Up	Up
Apparent trend	52	.....	18	28	28	28
Initial (AUMs)	25	.....	18	28	28	28
Long term (AUMs)	Very poor/ declining	Poor/up	Poor/up	Very poor/ declining	Very poor/ declining	Very poor/ declining
Riparian condition/trend	poor/ declining	poor/ declining	poor/up	poor/ declining	poor/ declining	poor/ declining
Meadow Canyon (4,715)	P4,715 Static	P4,715 Up	P4,715 Up	P4,715 Up	F6,772 Static	F6,772 Static
Condition (acres)	Static	Up	Up	Up	Static	Static
Apparent trend	240	.....	.....	.....	280	280
Initial (AUMs)	.....	.....	.....	.....	367	513
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Mollies Nipple (93,080)	P57,585 Static	P57,585 Up	P57,585 Up	P57,585 Up	P57,585 Up	P57,585 Up
Condition (acres)	Static	Up	Up	Up	Up	Up
Apparent trend	3,436	.....	.....	2,928	2,928	2,928
Initial (AUMs)	2,430	.....	2,678	2,928	4,144	5,259
Long term (AUMs)	Poor/ static	Fair/up	Fair/up	Poor/ static	Poor/ static	Poor/ static
Riparian condition/trend	poor/ static	poor/ static	poor/up	poor/ static	poor/ static	poor/ static
Neaf (1,215)	P623 Declining	P623 Up	P623 Up	P623 Up	P623 Up	P623 Up
Condition (acres)	Declining	Up	Up	Up	Up	Up
Apparent trend	34	.....	.....	.....	.....	56
Initial (AUMs)	29	.....	.....	.....	.....	56
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Old Fort (2,151)	P165 Declining	P165 Up	P165 Up	P165 Static	P165 Static	P165 Static
Condition (acres)	Declining	Up	Up	Static	Static	Static
Apparent trend	5	.....	.....	5	5	5
Initial (AUMs)	.....	.....	.....	5	5	5
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Pine Springs (8,503)	P7,976 Up	P7,976 Up	P7,976 Up	P7,976 Up	P7,976 Up	P7,976 Up
Condition (acres)	Up	Up	Up	Up	Up	Up
Apparent trend	284	.....	284	284	284	284
Initial (AUMs)	.....	.....	284	284	325	464
Long term (AUMs)	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (continued)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range Land Management Recommendation	Livestock ^a Optimization
Poverty Flat (9,651) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P2,048 Declining 414 56 48 Very poor/ declining	P2,048 Up Poor/up	P2,048 Up Poor/up	P2,048 Up 56 56 Very poor/ declining	P2,048 Up 60 82 Very poor/ declining	P2,048 Up 60 126 Very poor/ declining
Red Canyon (11,831) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P6,033 Static 577 135	P6,033 Up	P6,033 Static 135	P6,033 Static 135 135	P6,033 Static 194 30	P6,033 Static 194 230
Red Knoll (6,084) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P5,660 Static 175 175	P5,660 Up	P5,660 Up 175	P5,660 Up 175 175	P5,660 Up 175 233	P5,660 Up 175 233
Rock Springs (6,732) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P4,292 Static 139 Good/ static	P4,292 Up Good/up	P4,292 Up 129 129 Good/up	P4,292 Up 139 139 Good/ static	P4,292 Up 139 190 Good/ static	P4,292 Up 139 203 Good/ static
Seaman (6,849) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P1,770 Static 126 30	P1,770 Up	P1,770 Up 33 33	P1,770 Up 33 33	P1,770 Up 33 33	P1,770 Up 33 33
Seeps (4,002) Condition (acres) Apparent trend Initial (AUMs) Long term (AUMs) Riparian condition/trend	P980 Declining 33 27	P980 Up	P980 Up 33 33	P980 Up 33 33	P980 Up 30 55	P980 Up 30 183

(continued)

APPENDIX 10 (continued)

Allotment and Total Federal Acres	1		2		3		4		5		6	
	Existing Situation	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock ^a Optimization					
Sethy's Canyon (7,630)	P2,290 Static	P2,290 Declining	P2,290 Up	P2,290 Up	P2,290 Up	P2,290 Up	P2,290 Up					
Condition (acres)	80	260	80	80	80	80	80					
Apparent trend	.....	64	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Sink Holes (6,667)	P4,161 Static	P4,161 Static	P4,161 Up	P4,161 Up	P4,161 Up	P4,161 Static	P4,161 Static					
Condition (acres)	108	459	108	108	108	108	108					
Apparent trend	.....	97	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Sunnyside (350)	P290 Static	P290 Static	P290 Up	P290 Static	P290 Up	P290 Up	P290 Up					
Condition (acres)	12	12	12	12	12	12	12					
Apparent trend	.....	.....	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Thompson Point (1,511)	P736 Declining	P736 Declining	P736 Up	P736 Static	P736 Static	P736 Static	P736 Static					
Condition (acres)	28	64	28	28	28	28	28					
Apparent trend	.....	24	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Trail Canyon (6,886)	P2,505 Declining	P2,505 Declining	P2,505 Up	P2,505 Up	P2,505 Up	P2,505 Up	P2,505 Up					
Condition (acres)	108	210	108	108	108	108	108					
Apparent trend	.....	86	.....	.....	.....	.....	.....
Initial (AUMs)	.....	Fair/declining	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Trail Well (1,300)	P420 Up	P420 Static	P420 Up	P420 Up	P420 Up	P420 Up	P420 Up					
Condition (acres)	20	88	20	20	20	20	20					
Apparent trend	.....	16	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....
Upper Hog (4,343)	P603 Static	P603 Declining	P603 Up	P603 Up	P603 Up	P603 Up	P603 Up					
Condition (acres)	28	100	28	28	28	28	28					
Apparent trend	.....	22	.....	.....	.....	.....	.....
Initial (AUMs)	.....	.....	.....	.....	.....	.....	.....
Long term (AUMs)	.....	.....	.....	.....	.....	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 10 (concluded)

	1	2	3	4	5	6
Allotment and Total Federal Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recommendation	Livestock Optimization
Vermilion (31,906)						
Condition (acres)	P22,937	P22,937	P22,937	P22,937	P22,937	P22,937
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	2,432	.....	.....	1,770	1,770	1,770
Long term (AUMs)	1,571	.....	1,719	1,770	1,770	2,269
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Water Canyon (3,170)						
Condition (acres)	P680	P680	P680	P680	P680	P680
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	23	.....	.....	23	23	23
Long term (AUMs)	18	.....	.....	23	31	31
Riparian condition/trend	Good/static	Good/up	Good/up	Good/up	Good/up	Good/up
White Sage (2,195)						
Condition (acres)	P1,395	P1,395	P1,395	P1,395	P1,395	P1,395
Apparent trend	Declining	Up	Static	Static	Static	Static
Initial (AUMs)	21	.....	21	21	39	39
Long term (AUMs)	17	.....	21	21	61	116
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Willis Canyon (1,166)						
Condition (acres)	P280	P280	P280	P280	P280	P280
Apparent trend	Declining	Up	Up	Up	Up	Up
Initial (AUMs)	4	.....	.....	4	4	4
Long term (AUMs)	.....	.....	.....	4	10	10
Riparian condition/trend	Poor/up	Fair/up	Fair/up	Poor/up	Poor/up	Poor/up
Willow Spring (2,700)						
Condition (acres)	P2,130	F2,130	F2,130	F2,130	CONSOLIDATED WITH CHRIS SPRING	CONSOLIDATED WITH CHRIS SPRING
Apparent trend	Declining	Up	Up	Up	.....	.....
Initial (AUMs)	60	.....	.....	60	60	60
Long term (AUMs)	.....	.....	60	60	.....	.....
Riparian condition/trend	.....	.....	.....	.....	.....	.....
Yellow Jacket (10,036)						
Condition (acres)	P6,967	P6,967	P6,967	P6,967	P6,967	P6,967
Apparent trend	Static	Up	Up	Up	Up	Up
Initial (AUMs)	280	.....	.....	280	280	280
Long term (AUMs)	.....	.....	280	280	311	359
Riparian condition/trend	.....	.....	.....	.....	.....	.....

^a Initial AUMs available in Alternative 6 reflect AUMs that would be gained due to management, development and access, and treatments in Alternative 5. Long-term AUMs available in Alternative 6 reflect those AUMs that would be gained in Alternative 6 due to additional treatments.

NOTE: G = Good F = Fair P = Poor.

APPENDIX 11

Methodology Used to Determine Apparent Trend for Vegetation

The factors used to determine the apparent trend in livestock forage condition were vigor, seedlings, surface litter, pedestals, and gullies. Relative values for each factor were determined by allotment. For any given factor, the higher the relative value, the more favorably this factor contributes to a positive (upward) indication of trend. For example, in rating desirable plant vigor, a value of 7 is more favorable than a value of 3.

These ratings were made from direct field observations during field inventory work in 1975-79. Specific writeup forms are on file in the Cedar City District by allotment. The exact value assigned to each factor was a subjective interpretation made by the examiner. However, narrative guidelines (descriptions) were standard for each factor and aided the examiner in determining the approximate value in relation to the total scale of possible ratings. Figure 1 illustrates a sample form.

OBSERVED APPARENT TREND

Examiner _____ Date _____

(Check appropriate box in each category which best fits area being observed).

VIGOR (10 points) / <input type="checkbox"/> /	Desirable grasses, forbs, and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
(6 points) / <input type="checkbox"/> /	Desirable grasses, forbs, and shrubs have moderate vigor. They are medium size with fair color and produce moderate amounts of herbage. Some seed stalks and seedheads are present.
(2 points) / <input type="checkbox"/> /	Desirable grasses, forbs, and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions or entire plants are dead or dying. Seed stalks and seedheads almost non-existent except in protected areas.
SEEDLINGS (10 points) / <input type="checkbox"/> /	There is seedling establishment of desirable grasses, forbs, and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
(6 points) / <input type="checkbox"/> /	Some seedlings of desirable grasses, forbs, and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
(2 points) / <input type="checkbox"/> /	Few if any seedlings of desirable grasses, forbs, and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
SURFACE LITTER (5 points) / <input type="checkbox"/> /	Surface litter is accumulating.
(3 points) / <input type="checkbox"/> /	Moderate movement of surface litter is apparent and has been deposited against obstacles.
(1 point) / <input type="checkbox"/> /	Very little surface litter is remaining.
PEDESTALS (5 points) / <input type="checkbox"/> /	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and are accumulating litter. Desirable forage grasses may be found along edges of pedestals.
(3 points) / <input type="checkbox"/> /	Moderate plant pedestalling. No visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
(1 point) / <input type="checkbox"/> /	Most rocks and plants are pedestalled. Pedestals are sharp-sided with erosion, often exposing grass roots.
GULLIES (5 points) / <input type="checkbox"/> /	Gullies may be present in stable condition with moderate sloping or rounded sides. Perennials should be establishing themselves on bottom and sides of channel.
(3 points) / <input type="checkbox"/> /	Gullies are well developed with small amounts of active erosion. Some vegetation may be present.
(1 point) / <input type="checkbox"/> /	Sharply incised V-shaped gullies cover most of the area with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants with fresh cutting of the bottom.
TOTAL POINTS General Comments: _____	Rating: 26-35 = Upward; 17-25 = Static; 7-16 = Downward

FIGURE 1

Apparent Trend Form

APPENDIX 12

Survey Procedures and Quality Determination for Forage

Methodology Used to Calculate Forage Availability

The following is a summary of procedures used to determine the present and potential grazing capacity in the K/E EIS area.

The procedure has been divided into three components and will be discussed in the following order: (1) determination of current grazing capacity; (2) allocation of grazing capacity to livestock and wildlife; and (3) determination of potential grazing capacity.

Determination of Current Grazing Capacity

During 1975-79, BLM employees completed a forage inventory in the K/E EIS area. The Ocular Reconnaissance Forage Survey Method (BLM Manual 4412.11A) was used and the following is a summary of procedures. This survey method provides an estimate of forage production and grazing capacity. These grazing capacity estimates are valid only at the time the survey is actually conducted and are properly used as a starting point in management. Continuous studies which may include actual use, climate analysis, condition, trend, utilization and production studies, are needed to follow up a survey and adjust initially established grazing capacities (BLM Manual 4412.11A 1a).

The inventory consisted of two phases: data collection and compilation of data. In order to complete the data collection phase, the EIS area was first divided into vegetation subtypes (a relatively homogenous group of plants). A writeup area was delineated for each vegetation subtype by allotment. Suitability criteria (Appendix 9) were used to determine each write up area.

The next phase was collecting data within the various writeup areas. The Ocular Reconnaissance Inventory Method required measurement or estimation of vegetation density (cover) and composition of the various species within each vegetation subtype.

A 100-point transect was then run. At each point on the transect the observer determined if a "hit" was made on a plant. If so, the species was recorded and a determination was made whether the plant was available and usable for grazing animals. The number of hits of vegetation were then translated directly into density (percent vegetation cover), i.e., 25 hits equals 25 percent density. The determination of plant composition for each species by writeup area was made using the transect information supplemented by an ocular estimate of composition. The percentage of hits on any particular species was divided by the total hits and that figure became the percentage composition, i.e., 20 hits on plant A divided by 100 equals 20 percent composition of plant A. All transect information was supplemented by other observations within the writeup area. The results of the transect and observations were recorded on BLM form Resource Field Data Record. This process was repeated for each of the 1,833 writeup areas in the K/E area.

Other observations were also made in each writeup area, such as livestock forage condition rating, apparent trend, erosion conditions, rangeland suitability, plant phenology, threatened and endangered plant species, existing rangeland improvements, undeveloped water, percent slope, elevation, exposure, transect hits on litter, bare ground, and rocks.

The second phase of determining grazing capacity involved compilation. The following is a description of the actions taken to arrive at a grazing capacity. The first step was to multiply the composition of each species by the Proper Use Factor (PUF). A PUF represents the percent of a plant's current year's growth that can be consumed by grazing animals without causing damage to the plant or a decline in rangeland condition. The PUFs varied depending on the physiology of the plant, type of grazing animal, and the season when grazing occurred. The PUFs for all common species were listed by grazing animal and each grazing season on a PUF table.

The products of multiplying each species' composition by the appropriate PUF were then added. This sum was multiplied by the average vegetation density (percent vegetation cover) and was shown on Form 4412-1 as the Forage Acre Factor (FAF). The FAF represented the part of an area that was covered with usable forage in the writeup area, i.e., FAF of 3.9 means that 3.9 percent of the writeup area was covered with available forage.

In most cases (an estimated 90 percent of the acreage) the FAF computed at this point already takes into account suitability and applies to the suitable acreage only. It was considered to be the net forage acre factor.

However, where suitability could not be specifically delineated prior to the forage computation process due to small isolated outcrops of unsuitable areas (steep slopes, rocks, etc.) occurring throughout an allotment, the FAF was multiplied by a utilization factor.

The utilization factor is the percent of the forage usable by a particular group of animals (cows, sheep, deer, etc.) within the writeup area (Appendix 9). The product of this multiplication (FAF x Utilization Factor = Net FAF) is the Net Forage Acre Factor.

Forage on some entire writeup areas that were unsuitable for livestock was allocated to wildlife, although it may not be totally usable. This forage is essentially noncompetitive. Forage on other writeup areas suitable for livestock was allocated to both livestock and wildlife. This forage is competitive.

Following this process, the Net Forage Acre Requirement (FAR) was divided by the Forage Acre Factor. The FAR is that portion of an acre covered with sufficient forage to sustain one cow and calf or their equivalent for 1 month.

The result of this division process is the grazing capacity of the writeup area expressed in acres per AUM, i.e., the number of acres required to produce one AUM. By dividing this figure into the number of acres in the vegetation subtype, the number of AUMs available was obtained (Form 4412-1). This process was repeated for each of the 1,833 writeup areas in the K/E EIS area. The result was the total number of AUMs available for grazing.

One of the most important steps of the Ocular Reconnaissance Inventory Method was determining the FAR. A total of four FARs were utilized in the K/E EIS area. A 0.3 FAR was computed on the crested wheatgrass seedings. At the higher precipitation areas a 0.45 FAR was used, and FAR 0.7 was utilized on the remaining area except for Canaan Mountain where a 0.6 FAR was used.

Calculations used to compute the FAR are illustrated in table 1. This calculation is based on information gathered from a properly used pasture and requires actual use and utilization information.

In areas considered unsuitable for livestock grazing (Appendix 9), available wildlife forage is of moderate value in terms of quality and is characteristically composed of pinyon-juniper, sagebrush, and other shrub species. This accounts for approximately 39 percent of the total wildlife forage. In areas considered suitable for livestock grazing, available wildlife forage is of fairly high quality and is preferred by wildlife. This forage is characteristically composed of more desirable species; grasses, forbs, and preferred shrubs such as four-wing saltbush and bitterbrush, although it may also consist of other less desirable forage.

Allocation of Grazing Capacity to Livestock and Wildlife

To allocate grazing capacity for livestock and wildlife, a total allowable PUF was assigned to each plant species and then appropriated to livestock and wildlife (Form 4412-1). As an example, the following PUFs were established for blackbrush:

	<u>Cattle</u>	<u>Wildlife</u>
Total Allowable	PUF or percent current years' growth allocated	PUF or percent current years' growth allocated
Blackbrush		
25	10	15

If the writeup area is suitable for grazing and both cattle and wildlife are present, then 25 percent of the current year's growth is allocated to cattle and wildlife; 10 percent to cattle and 15 percent to wildlife.

If wildlife is not present and the writeup area is suitable for cattle, then only 10 percent of the current year's growth can be allocated to cattle. Likewise, if the writeup area is unsuitable for cattle but suitable for wildlife, then only 15 percent of the current year's growth can be allocated to wildlife. This is because the PUF is based on the percent current year's growth a plant can be utilized by a specific animal without causing a decline in rangeland condition. If the residual 15 percent allocated to wildlife would be allocated to livestock (when there were no wildlife species to utilize the 15 percent) overutilization of key forage species would result. Where residual wildlife forage would be available, it would not be allocated to livestock so that there would not be an overutilization of key forage species. Instead, the residual would be made available for other wildlife species such as small mammals, birds, and reptiles.

TABLE 1

Forage Acre Requirement Calculations

Writeup Area	Surface Area	Forage X Acre Factor	Forage Acre
1	615	0.0482	29.64
2	1,322	0.06435	85.07
3	220	0.054	11.88
4	<u>2,834</u>	0.03585	<u>97.77</u>
	4,991		228.09

Utilization On Big Galleta Grass (Hilaria rigida)

Transect	Percent Utilization	X Acres	= Weighted Factor
WS-1	0.32	621	198.72
WS-2	0.52	996	517.92
WS-3	0.58	856	496.48
WS-4	0.40	896	358.40
WS-5	0.16	<u>1,622</u>	<u>759.52</u>
		4,991	1,831.04

$$\frac{1,831.04}{4,991.00} = 37\% \text{ Utilization}$$

Average Utilization = 37 percent
 Average Actual Use = 240 AUMs

$$\frac{37\% \text{ (Utilization)}}{50\% \text{ (Proper Utilization)}} \times \frac{240 \text{ (Actual Use)}}{X \text{ (Proper AUMs)}}$$

$$\frac{120}{37\%} = 324 \text{ Proper Use AUMs}$$

$$\frac{\text{Forage Acres}}{\text{Proper Use AUMs}} = \frac{228.09}{324.00} = 0.7 \text{ Forage Acre Requirement}$$

$$\frac{\text{Acres in Pasture}}{\text{Proper Use AUMs}} = \frac{4,991}{324} = 15.4 \frac{\text{ac}}{\text{AUM}}$$

$$15.4 \frac{\text{ac}}{\text{AUM}} = \text{Proper Stocking Rate for Pasture}$$

Determination of Potential Grazing Capacity

Approximately 53 areas in or near climax condition were used as comparison areas to determine the capability of the various rangeland sites to produce livestock and wildlife forage under ideal conditions.

These 53 areas are presently in good livestock forage condition and are considered to be representative of the remainder of the K/E area's potential forage production with improved rangeland management practices.

The present forage production on the 53 sites was determined using the Ocular Reconnaissance Forage Survey method (BLM Manual 4412.11A). These production figures were then applied to other areas that are presently in less than good livestock forage condition. This application involved matching soils, vegetation, and precipitation characteristics between the 53 sites and the remaining suitable areas to ensure that potential production figures were realistically attainable.

Table 2 illustrates an example of how the potential grazing capacity was determined for a site writeup area in the K/E area. This example pertains to livestock forage, but similar calculations were made to determine potential wildlife forage production.

TABLE 2
Potential Livestock Forage Calculations

Writeup Shown in Table 1

Present Livestock Forage Production	=	15.4 Acres/AUM
Acreage in Writeup Area	=	2,000 Acres
Present Livestock AUMs	=	130 AUMs
$\frac{2,000 \text{ Acres}}{15.4 \text{ Acres/AUM}}$	=	130 AUMs

Comparable Writeup Area in Good Condition With Similar Site Characteristics

Present Livestock Forage Production	=	8 Acres/AUM
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Potential Livestock Forage Production for Writeup Shown in Table 1

Realistically Attainable Livestock Forage Production	=	8 Acres/AUM
Acreage in Writeup Area	=	2,000 Acres
Potential Livestock AUMs	=	250 AUMs
$\frac{2,000 \text{ Acres}}{8 \text{ Acres/AUM}}$	=	250 AUMs

Thus

Writeup Area Shown in table 1

Present Livestock Forage Production	=	130 AUMs
Potential Livestock Forage Production	=	250 AUMs

Note: Similar calculations were made for potential wildlife forage production.

APPENDIX 13

Miles of Stream and Riparian Condition

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Right Fork Maxwell Canyon Maxwell Canyon	1.5	5.0	Poor
Horse Valley Wash Grapevine	1.25	5.0	Poor
Horse Valley	2.75	40.0	Poor
South Creek Grapevine	1.5	20.0	Poor
Upper South Creek	3.4	35.0	Poor
Left Fork Maxwell Canyon Maxwell Canyon	1.25	5.0	Good
Squirrel Creek Cottonwood Point	1.75	10.0	Good
Virgin River Grafton Wash	1.0	40.0	Fair
Park	0.25	10.0	Fair
Riverview	0.5	20.0	Fair
Unallotted	0.1	5.0	Fair
Upper Short Creek Cottonwood Point	2.0	20.0	Fair
Water Canyon Maxwell Canyon	1.75	10.0	Good
Escalante River Big Bown Bench	3.9	70.2	Fair
Big Bown Bench	1.8	10.5	Poor
Escalante River	4.8	84.1	Good
Escalante River	20.1	232.6	Fair
Escalante River	7.5	17.2	Poor
Boulder Creek ^a Boulder Creek	3.0	22.9	Fair
Boulder Creek	2.7	7.6	Poor
Escalante River	0.9	4.3	Good
Escalante River	1.7	2.0	Fair
Unallotted	1.9	8.5	Fair

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Deer Creek ^a			
Boulder Stock Trail	0.3	1.4	Good
Deer Creek	6.3	20.7	Good
Deer Creek	0.4	5.8	Fair
Escalante River	1.2	3.6	Good
Escalante River	3.1	6.0	Fair
King Bench	2.8	11.6	Good
Steep Creek	0.4	0.5	Good
The Gulch			
Boulder Stock Trail	2.8	23.5	Good
Circle Cliffs	8.0	57.6	Poor
Deer Creek	9.9	47.5	Poor
King Bench	7.0	5.4	Fair
Dry Hollow			
Dry Hollow	5.4	16.4	Good
Willow Patch Creek			
McGath Point	1.7	8.2	Fair
Pine Creek ^a			
Pine Creek	1.5	0.9	Fair
Pine Creek	0.3	1.2	Poor
Sand Creek			
Salt Water Creek	4.0	17.1	Good
Salt Water Creek	7.5	41.6	Fair
Salt Water Creek	3.0	4.7	Poor
Steep Creek			
Steep Creek	0.3	1.4	Fair
Steep Creek	4.7	16.5	Poor
Ten-Mile Wash			
Upper Cattle	0.2	10.8	Fair
Harris Wash			
Upper Cattle	0.4	12.0	Fair
Upper Cattle	5.0	60.0	Poor
Twenty-Five Mile Wash			
Upper Cattle	0.6	23.4	Poor
Calf Creek ^a			
Willow Gulch	1.1	21.0	Excellent
Willow Gulch	8.0	58.9	Good

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Birch Creek Unallotted	4.1	74.6	Poor
North Creek ^a Unallotted	3.0	17.0	Fair
	3.0	12.1	Poor
Death Hollow ^a Unallotted	11.1	64.5	Good
	1.0	9.6	Fair
Mamie Creek ^a Unallotted	0.5	1.3	Good
Skutumpah Creek First Point	0.5	5.0	Very poor
Mill Creek Mill Creek	4.0	20.0	Very poor
Thompson Creek Bald Knoll	1.7	10.0	Very poor
Fuller Cove Upper Place	0.7	5.0	Poor
Fisher Canyon Elbow Springs	1.0	10.0	Good
Meadow Creek Zion	0.7	5.0	Poor
Kanab Creek Elbow Falls	1.0	10.0	Very poor
Muddy Creek Zion	0.5	5.0	Poor
Orderville Gulch Zion	0.7	5.0	Poor
	2.0	15.0	Fair
	3.1	20.0	Fair
North Fork Virgin River Lower North Fork	1.0	20.0	Excellent
	0.3	15.0	Good
	0.4	15.0	Good

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Lydia's Canyon Lydia's Canyon	0.4	5.0	Fair
Kitchen Canyon Mollies Nipple	1.0	40.0	Poor
Middle Buckskin Wash Mollies Nipple	0.3	10.0	Poor
Lower Flood Canyon Hells Bellows	0.2	10.0	Poor
Lower Johnson Lakes Canyon Hells Bellows	2.3	110.00	Fair
Willis Canyon Willis Canyon	1.4	30.0	Poor
Middle Johnson Wash Unallotted	0.8	90.0	Poor
Lower Johnson Wash Driveway	0.5	10.0	Very poor
Muggins Flat	0.5	10.0	Good
Upper Indian Canyon Art Canyon	0.2	10.0	Good
South Fork Indian Canyon Water Canyon	0.4	30.0	Good
Middle Fork Indian Canyon Water Canyon	0.3	30.0	Good
Upper Water Canyon Water Canyon	1.0	80.0	Excellent
Lower Water Canyon Water Canyon	2.3	150.0	Poor
Cottonwood Canyon Water Canyon	0.7	70.0	Poor
Meadow Creek Poverty Flat	5.0	100.0	Very poor

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Mineral Creek Poverty Flat	0.6	10.0	Very poor
East Fork Virgin River Virgin River	4.0	290.0	Fair
Poverty Flat	4.0	290.0	Fair
Rock Canyon Rock Springs	1.0	40.0	Good
Upper Kanab Creek John R. Flat	0.5	40.0	Poor
Middle Kanab Creek Unallotted	2.7	310.0	Good
Lower Kanab Creek Gravel Pit	0.2	20.0	Fair
Upper Hog Canyon Upper Hog	3.0	100.0	Poor
Lower Hog Canyon Lower Hog	2.0	90.0	Very poor
North Fork Hog Canyon Lower Hog	0.5	10.0	Very poor
Tiny Canyon Trail Canyon	1.5	20.0	Poor
South Fork Tiny Canyon Trail Canyon	1.0	20.0	Good
Cottonwood Canyon Cottonwood Management Area	7.4	65.0	Poor
Coyote Wash Cottonwood Management Area	0.4	6.0	Poor
Croton Canyon Last Chance	1.8	6.0	Poor
Rock Creek	0.3	18.0	Poor
Deer Springs Canyon Cottonwood Management Area	0.5	2.0	Good
Headwaters	2.7	12.0	Fair

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Dry Valley Draw Dry Valley	0.8	14.0	Fair
Fifty-Mile Tallus Spring Spencer Bench	0.1	1.0	Fair
Four-Mile Canyon Headwaters	0.8	14.0	Fair
Hackberry Canyon Lower Hackberry	6.8	41.0	Fair to poor
Harry Cowless Spring Spencer Bench	0.01	0.5	Good
Henrieville Creek Headwaters	11.8	324.0	Poor to fair
Howard Creek Headwaters	2.9	15.0	Fair
Hogeye Canyon Cottonwood Management Area Lower Hackberry	0.4 1.2	1.0 4.0	Fair Fair
John Henry Canyon Upper Warm Creek	0.3	2.0	Poor
Last Chance Creek Headwaters Last Chance	5.0 4.2	54.0 44.0	Poor Poor to fair
Little Creek Headwaters	5.3	28.0	Fair to poor
Little Valley Rock Creek	1.4	6.0	Poor
Long Canyon Headwaters	1.6	15.0	Good
Nipple Creek Nipple Bench	0.2	1.0	Poor
North Creek Headwaters	0.4	2.0	Poor

(continued)

APPENDIX 13 (continued)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Paradise Canyon Headwaters	0.3	2.0	Poor
Paria River			
Bunting Well	1.5	71.0	Poor
Clark Bench	1.0	75.0	Poor
Cottonwood Management Area	14.4	1,489.0	Poor
Dry Valley	2.7	12.0	Poor
East Clark Bench	1.0	48.0	Poor
Headwaters	3.2	174.0	Poor
Upper Hackberry	7.5	221.0	Poor to fair
Unallotted	3.6	35.0	Poor
Reece Canyon Spring Last Chance	0.3	1.0	Poor
Rogers Canyon Last Chance	3.6	12.0	Fair to poor
Sheep Creek Headwaters	10.4	83.0	Poor
Sheep Creek Detention Reservoir Headwaters	0.5	52.0	Poor
Snake Creek Lower Hackberry	2.0	9.0	Fair
Spring East of Spencer Point Harvey's Fear	0.7	1.0	Poor
Tibbet Canyon Nipple Canyon	0.2	1.0	Poor
Tibbet Spring Nipple Bench	0.2	1.0	Poor
Tommy Smith Creek Headwaters	2.0	55.0	Poor
Wahweap Creek			
Clark Bench	0.3	11.0	Poor
Coyote	1.3	93.0	Poor
Headwaters	1.8	98.0	Fair
Wahweap	1.2	44.0	Poor

(continued)

APPENDIX 13 (concluded)

Stream and Allotment	BLM Stream Miles	Acres	Riparian Community Condition
Warm Creek			
Upper Warm Creek	0.1	2.0	Poor
Wesses Canyon			
Upper Warm Creek	0.5	2.0	Poor
Willis Creek			
Headwaters	0.9	12.0	Poor
Willow Gulch			
Last Chance	<u>0.1</u>	<u>1.0</u>	Poor
TOTAL	349.41	6,807.2	

Source: URA, Wildlife, all planning units, 1975-79.

^aIndicates streams containing trout populations.

APPENDIX 14

Areas With Sediment Yields in High or Very High Categories

Allotment	Acres	Allotment	Acres
Buttermilk	69	Nipple Bench	2,370
Grafton Wash	824	Upper Warm Creek	300
Grapevine	13	Wahweap	400
Horse Valley	631	Driveway	300
Upper South Creek	12	Locke Ridge	1,330
Unallotted	221	Lost Springs	306
Big Bown Bench	500	Mollies Nipple	4,330
Cedar Washes	2,249	Seaman	290
Chimney Rock	11,019	Thompson Point	275
Circle Cliffs	340	Upper Hog	2,546
Collets	190	Vermilion	2,780
Death Hollow	3,760	Ben's Hollow	30
Forty-Mile Ridge	3,530	Black Rock	422
Lower Cattle	19,400	Burnt Flat	20
Moody	9,990	Calf Pasture	60
Navajo Bench	1,405	Dry Wash	976
Soda	3,312	Elkheart Cliffs	200
Upper Cattle	16,195	Meadow Canyon	40
Wide Hollow	330	Sink Valley	315
Cockscomb	1,100	Spencer Bench	600
Cottonwood	7,100	Sugar Knoll	982
Coyote	2,800	Swains Creek	100
Dry Valley	110	Swallow Park	410
Headwaters Summer	15,900	Zion	491
Headwaters Winter	460	Zion Park	<u>1,383</u>
Judd Hollow (Utah)	130	TOTAL	123,346
Nipple Bench	2,370		

APPENDIX 15

Improvement Expected by Alternative on BLM Acres in
Critical Erosion Condition with Greater than 60-Percent Utilization

Allotment	Existing ^a Situation and Alternative 2	ALTERNATIVES			
		3	4	5	6
Canaan Ranch	86	86	86	86	86
Grafton Wash	384	.....	.....	.....	.....
Riverview Ranch	53	.....	.....	.....	.....
Cedar Wash	90	90	90	.....	.....
Chimney Wash	390	390	390	390	390
Escalante River	1,090	1,090	.....	.....	.....
Forty-Mile Ridge	650	570	.....	.....	.....
King Bench	1,466	1,466	1,466	1,466	1,466
Coyote	4,690	.....	.....	.....	.....
Headwaters Winter	3,010	.....	.....	.....	.....
Nipple Bench	1,145	1,145	1,145	.....	.....
Cottonwood Springs	235	235	235	235	235
Dry Wash	20	20	20	20	20
Four-Mile	530	530	.....	530	530
Glendale Bench	170	170	170	.....	.....
Isolated Tracts	150	150	.....	.....	.....
Meadow Canyon	40	40	.....	.....	.....
Spencer Bench	281	281	281	281	281
Zion	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>
TOTAL	14,500	6,283	3,903	2,498	2,498

Source: 1977-78 Range Inventories; Zion URA, Watershed, 1979.

^aThis analysis is based on changes in management and livestock numbers. Alternative 1 is not included since none of the acres identified would have different management or livestock numbers and no improvement would be expected. All acres identified in the existing situation would improve under Alternative 2.

APPENDIX 16

Drainage Channels With Observed Erosion Problems

Drainage Channel	Allotment	Miles
Broad Hollow	Goat Ranch	3.0
Horse Valley Wash	Horse Valley, Grapevine	4.0
Maxwell Canyon	Maxwell Canyon	1.5
South Creek	Grapevine, Upper South Creek	5.0
Squirrel Creek, Short Creek	Cottonwood Point	2.0
Water Canyon	Maxwell Canyon	2.0
Alvey Wash	Alvey Wash, Upper Cattle, Wide Hollow	11.2
Birch Creek	Unallotted	4.3
Boulder Creek	Boulder Creek, Unallotted	10.2
Calf Creek	Willow Gulch, Unallotted	10.3
Coal Bed	Alvey Wash	3.0
Death Hollow	Salt Water Creek, Unallotted	9.9
Deer Creek	Deer Creek, Unallotted	12.7
Dry Hollow	Boulder Stock Trail	6.5
Escalante River	Big Bown Bench, Deer Creek, Escalante River	42.0
The Gulch	Deer Creek, Circle Cliffs	18.5
Harris Wash	Upper Cattle	16.0
Left Hand Collets Canyon	Last Chance	2.3
Long Canyon	King Bench	6.3
North Creek	Unallotted	4.0
Pine Creek	Pine Creek, Unallotted	4.8
Right Hand Collets Canyon	Collets	7.5
Sand Creek	McGath Point, Salt Water Creek	10.5
Ten-Mile Wash	Upper Cattle	4.0
Twenty-Five Mile Wash	Lower Cattle	10.0
Willow Patch Creek	McGath Point	2.5
Cottonwood Canyon	Cottonwood Management Area (Cottonwood)	6.0
Coyote	Cottonwood Management Area (Coyote)	9.4
Croton Canyon	Last Chance	1.1
Four-Mile Canyon	Headwaters (Upper Wahweap)	2.2
Hackberry Wash	Lower Hackberry	3.8

(continued)

APPENDIX 16 (continued)

Drainage Channel	Allotment	Miles
Henrieville Creek	Headwaters (Upper Paria)	2.3
Heward Creek	Headwaters (Upper Paria)	1.7
Hogeye Canyon	Lower Hackberry	1.5
Paria River	Bunting Well, Cottonwood Management Area (Cottonwood), Headwaters (Upper Paria), Upper Hackberry	8.5
Rogers Canyon	Last Chance	4.0
Sheep Creek	Headwaters (Upper Paria)	5.8
Wahweap Creek	Clark Bench, Headwaters (Upper (Wahweap)	6.0
Willis Creek	Headwaters (Upper Paria)	4.6
Bay Bill Canyon	Virgin River	0.5
Clay Hole Wash	Mollies Nipple, Vermilion	4.0
Cottonwood Canyon	Water Canyon	1.5
East Fork Virgin River	Virgin River	2.0
Fin Little Wash	Mollies Nipple	1.7
Hog Canyon	Lower Hog Canyon, Upper Hog Canyon	4.5
Johnson Lakes Canyon (side drainage)	Johnson Lakes	2.0
Johnson Wash	Dry Lake, Oak Springs	0.6
Kitchen Corral Wash	Mollies Nipple	2.0
Monument Knolls	Clay Flat, Sethy's Canyon, Yellow Jacket	3.5
Petrified Hollow	Vermilion	2.5
Seaman Wash	Seaman, White Sage	3.1
Sethy's Canyon	Seaman	1.5
Willis Canyon	Willis Canyon	1.5
Adams Wash	Deer Spring Point, Mill Creek	1.5
Bald Knoll Hollow	Bald Knoll	1.5
Bullrush Gorge	Swallow Park	1.5
Bullrush Hollow	Swallow Park	1.0
Coal Canyon	Deer Spring Point, Mill Creek	2.5
Mill Creek	Mill Creek	1.0
Mineral Creek	Mill Creek	0.5

(continued)

APPENDIX 16 (concluded)

Drainage Channel	Allotment	Miles
Red Wash	Ford Well	1.0
Sink Valley (side drainages)	Sink Valley	1.0
Unnamed drainage	Bald Knoll	0.5

Source: URA, Watershed, all planning units, 1975-79; Escalante Watershed MFP, 1979.

NOTE: Mileages are based on estimates by BLM watershed personnel from direct field observations.

APPENDIX 17

Identified Floodplains That Would Remain Heavily Grazed
After Implementation of Alternatives

Allotment	Existing Situation Miles	ALTERNATIVES			
		1 Acres ^a	4 Acres ^b	5 Acres ^b	6 Acres ^b
<u>ESCALANTE PLANNING UNIT</u>					
Alvey Wash	12.0	2,500	2,500	.....	.....
Big Bown Bench	5.0	1,146	.....	.....	.....
Boulder Creek	4.0	202	202	202	202
Boulder Stock Trail	6.5	318	.....	.....	.....
Circle Cliffs	7.0	611	611	.....	.....
Collets	7.5	830	.....	830	830
Deer Creek	17.0	408	408	408	408
Dry Hollow	9.0	298	.....	.....	.....
Escalante River	38.0	13,192	13,192	13,192	13,192
King Bench	6.3	316	.....	316	316
Last Chance	10.8	571	571	571	571
Lower Cattle	10.0	120	.....	.....	.....
McGath Point	9.5	620	620	620	620
Pine Creek	2.2	85	.....	85	85
Rock Creek	8.5	30	.....	30	30
Saltwater Creek	6.0	250	250	250	250
Upper Cattle	21.0	1,300	1,300	1,300	1,300
Wide Hollow	1.2	90	90	.....	90
Willow Gulch	11.0	171	.....	.....	171
<u>PARIA PLANNING UNIT</u>					
Bunting Well	1.2	91	91	91	91
Clark Bench	13.7	1,210	1,210	1,210	1,210
Cottonwood	22.5	2,804	2,804	2,804	2,804
Coyote	8.5	1,081	1,081	1,081	1,081
Dry Valley	10.5	110	110	110	110
East Clark Bench	1.0	82	82	82	82
Headwaters	48.0	1,640	1,640	1,640	1,640
Lower Warm Creek	4.7	90	.....	90	90
Upper Hackberry	9.5	382	382	382	382
Upper Warm Creek	6.5	40	.....	40	40
Wahweap	<u>5.5</u>	<u>473</u>	<u>.....</u>	<u>473</u>	<u>473</u>
TOTALS	325.5	31,061	27,144	25,807	26,068

NOTE: Floodplain acres include heavily grazed riparian acres. All identified floodplain areas would not be grazed in Alternatives 2 and 3. Alternative 3 would eliminate conflicts on heavily grazed watershed, identified in planning documents. It would not improve problems on those floodplains not inventoried.

^aFloodplain acres and channel miles are those identified in BLM planning documents. Additional floodplain data is not available for the other three planning units.

^bConflicts identified in these alternatives were based on individual allotment analysis and planning recommendation interactions.

APPENDIX 18

Allotments With Livestock/Big Game Conflicts

Allotment	Species in Conflict	Type of Conflict ^a	Acres
Art Canyon	Deer	A, B	2,700
Bald Knoll	Deer	A, B	1,440
Barracks Point	Deer	A, B	1,520
Black Rock	Deer	A, B	5,940
Boulder Creek	Deer, elk	A, B, G	1,705
Boulder Stock Trail	Deer	A, B	2,278
Brown Canyon	Deer	A, B	1,020
Buck Pasture	Deer	A, B	1,280
Chris Spring	Deer	A, B	2,660
Circle Cliffs	Deer, elk	A, B, G	17,263
Clark Bench	Antelope	E	215
Clay Flat	Deer	A, B	1,560
Cottonwood (Paria)	Deer, antelope	E, F	540
Cottonwood Point	Deer	A, B	20
Coyote	Deer, antelope	E, F	1,025
Deer Creek	Deer, elk	A, B, G	3,879
Deer Range	Deer	B	8,800
Dry Lake	Deer	A	1,240
Elephant Cove	Deer	A, B	5,250
Escalante River	Bighorn sheep ^b	D	95
FAR	Deer	A, B	115
Farm Canyon	Deer	A, B	2,960
First Point	Deer	A, B	780
Flag Point	Deer	A, B	260
Flood Canyon	Deer	A, B	790
Ford Well	Deer	A, B	3,440
Gardner Hollow	Deer	A, B	840
Glendale Bench	Deer	A	1,010
Grapevine	Deer	A	25
Harris Flat	Deer	A, B	3,040
Headwaters (winter)	Deer	A, B, F	3,361

(continued)

APPENDIX 18 (continued)

Allotment	Species in Conflict	Type of Conflict ^a	Acres
Headwaters (summer)	Deer	F	968
Horse Valley	Deer	A, B	40
John R. Flat	Deer	A, B	2,690
Johnson Canyon	Deer	A, B	3,630
Johnson Lakes	Deer	A, B	3,590
Kane Springs	Deer	A, B	3,380
King Bench	Deer	A, B	11,415
Kinnikinnic	Deer	A, B	2,600
Last Chance	Deer	F	34
Lower Hackberry	Deer	F	434
Long Neck	Deer	A, B	610
Meadow Canyon	Deer	A	680
Mill Creek	Deer	A, B	2,150
Mollies Nipple	Deer	A, B	6,390
Moody	Bighorn sheep ^b	D	1,230
Nipple Bench	Antelope	E	75
Pine Creek	Deer	A, B	3,822
Poverty Flat	Deer	A	730
Red Canyon	Deer	A, B	2,460
Red Hollow	Deer	A, B	740
Red Knoll	Deer	A, B	5,990
Rocking Chair	Deer	A, B	1,200
Saltwater Creek	Deer	A, B	5,814
Sethy's Canyon	Deer	A, B	1,510
Sink Holes	Deer	A, B	1,620
Sink Valley	Deer	A, B	1,230
Soda	Deer	A, B	2,511
Steep Creek	Deer, elk	A, B, G	9,170
Sugar Knoll	Deer	A, B	1,090
Swallow Park	Deer	A, B	3,610
Trail Canyon	Deer	A, B	660
Upper Place	Deer	A, B	1,080
Upper South Creek	Deer	A	35

(continued)

APPENDIX 18 (concluded)

Allotment	Species in Conflict	Type of Conflict ^a	Acres
Upper Warm Creek	Antelope	E	124
Vermilion	Deer	A, B	4,310
Wagon Box	Deer, bighorn sheep ^b	A, B, D	5,134
Wahweap	Deer	F	211
White Rock	Deer, elk	A, B, G	1,302
Wide Hollow	Deer	A, B	5,986
Willow Gulch	Deer, elk	A, B, G	4,456
Willow Spring	Deer	A, B	1,910
Yellow Jacket	Deer	A, B	2,680
Zion	Deer	A, B	540
TOTAL			186,892

^aThe letters used represent the following types of conflicts: A = Overutilization of key browse species; B = Livestock season of use reduces forage for deer; C = Livestock grazing in critical riparian areas; D = Competition with wild horses for habitat; E = Livestock grazing critical antelope fawning areas; F = Livestock grazing critical deer fawning areas; G = Livestock season of use reduces forage for elk.

^bBighorn sheep/feral horse conflicts will occur in the near future as sheep numbers increase.

APPENDIX 19

Livestock and Recreation Season of Use and
Conflicts for Outstanding Natural Areas (Present Situation)

Allotment	Present Livestock Season of Use	Recreation Use Period	Conflict
<u>PHIPPS-DEATH HOLLOW</u>			
Antone Flat	Unalloted	.....	No conflict
Salt Water Creek	3/16-6/15 10/16-12/15	3/15-11/1	3/16-6/15 10/16-11/1
McGath Point	3/16-6/15	3/15-11/1	3/16-6/15
Escalante River (Phipps Range)	9/1-4/15	3/15-11/1	3/15-4/15
Willow Gulch	11/1-3/31	3/15-11/1	3/15-3/31
<u>NORTH ESCALANTE CANYONS</u>			
Escalante River (Phipps Range)	9/1-4/15	3/15-11/1	9/1-11/1 3/15-4/15
Haymaker Bench	11/1-12/31	3/15-11/1	No conflict
Deer Creek	11/1-2/28 4/1-6/15	3/15-11/1	4/1-6/15 When in actual use
Big Bown Bench	10/15-4/30	3/15-11/1	10/15-11/1 3/15-4/30
<u>THE GULCH</u>			
King Bench	11/1-3/31	3/15-11/1	3/15-3/31
Deer Creek	11/1-2/28 4/1-6/15	3/15-11/1	4/1-6/15 When in actual use
<u>CALF CREEK RECREATION AREA</u>			
Willow Gulch	11/1-3/31	3/15-11/1	3/15-3/31
Haymaker Bench	11/1-12/31	3/15-11/1	No conflict
<u>DEER CREEK RECREATION AREA</u>			
King Bench	11/1-3/31	3/15-11/1	3/15-3/31

Source: Escalante URA, Range Management and Recreation, 1979.

NOTE: Conflicts exist in riparian areas where intense recreational use occurs. Escalante Canyons Outstanding Natural Area was deleted from the table because 1,160 acres are scattered over five areas contiguous to Glen Canyon National Recreation Area.

APPENDIX 20

Information Used to Assess Probable Impacts to Vegetation

ADDITIONAL INFORMATION USED TO PREDICT VEGETATION IMPACTS

Season of Use

Research indicates that when forage plants are continuously grazed during the growing season, early spring use is the most damaging. Stoddard et al., (1975) states, ". . . the early growing season is the critical one, both from the standpoint of vegetation and the grazing animal. If it is at all possible, grazing should not take place at this time so that forage plants can recover from dormancy and provide sufficient forage for the grazing animal."

Adverse impacts to the plant are a result of the interruption of the reproductive functions and normal growth of the plant.

Physiological needs of the plant can be at least partially met by grazing the plant after it has finished its growth for the season.

Intensity of Grazing

Recent literature indicates that herbage response due to level of use may be more significantly affected in semiarid regions than was previously thought. VanPoolen and Lacey (1979) state, ". . . it appears that livestock adjustments become increasingly important as a management tool in this region." Cook (1966) found that if heavy grazing persists for several years, it would reduce the amount of roots and rhizomes, and eventually kill the plant.

Rest

Periodic rest from grazing allows the forage plant to store carbohydrates, produce seed, and establish seedlings. Periodic rest of the rangeland will not, however, compensate for severe grazing during the critical periods of the life cycle of a plant. Four or more years of rest may not be sufficient to overcome the detrimental effects to the vigor of forage plants after 1 or 2 years of severe grazing (Sosebee et al., 1977). It would appear that even under a grazing system, a conservative stocking rate is necessary to insure productivity of the rangeland.

Grazing Systems

In a given year, rest rotation grazing systems may have average utilization exceeding 50 to 60 percent on individual pastures even though average utilization of forage on the allotment would be within proper limits.

Although studies evaluating the effects of grazing systems on vegetation have not been conclusive in many cases, recent literature indicates that management systems in general would be expected to increase average annual herbage production on western rangeland by only 13 percent (VanPoolen and Lacey, 1979).

The rate at which depressed rangeland can improve appears to be quite slow. After overgrazing, McLean and Tisdale (1972) found that 20 to 40 years of complete rest were required for rangeland to attain excellent rangeland condition. Ten years' rest yielded little change in poor condition rangeland, and it was discovered that the change in condition from poor to fair took longer than the change from fair to good.

Vegetation Treatments

Two major types of vegetation treatments are normally utilized on western rangelands in an effort to increase forage production. The first is designed to reduce competition of woody shrubs with herbaceous grasses by chemical spraying or burning. The second method of treatment is designed to eliminate existing shrubs or trees and replace them with more desirable forage plants. This is most frequently done by chaining and reseeding the area. Successful establishment of newly seeded species is dependent on soil characteristics that are conducive to germination and growth.

Vegetation treatment would be proposed for Alternatives 4, 5, and 6. Table 2-1 identifies the specific acreage and method of treatment for each alternative.

Most treatments (at least 90 percent) would be followed by seeding of desirable forage species (grasses, forbs, shrubs). The remaining treatment areas would not be artificially seeded. Seeding on these areas would be accomplished naturally by desirable forage species that are now present in sufficient numbers to reproduce successfully. The purpose of the treatment would be to remove less desirable species from competition with desirable forage species, thereby enhancing seedling establishment.

Vegetation treatment analysis was made by allotment for each alternative. Available soils data was used to determine the relative degree of success that would be expected. Results of the analysis are summarized in condition, apparent trend, and production categories in table 4-1 and Appendix 10.

Proposed vegetation treatments would impact vegetation by changing the composition of a type from sagebrush to grass dominance. Vegetation would be removed by spraying, burning, chaining, and plowing.

In pinyon-juniper types, the most common methods of treatment would be burning or chaining, while in sagebrush types, spraying, burning, or plowing treatments would be applied.

Vegetation treatment would destroy much of the existing vegetation in the treated area until reestablishment occurred. Nielsen and Hinckley (1975) reported that a 67 to 100-percent kill could be expected on big sagebrush (*Artemisia tridentata*) if proper recommendations for use of fire were followed. Data in Valentine (1971) and Linne (1978) indicates that at least 3 years would be required after fire to restore normal production to many desirable forage species. Table 1 gives the effects of fall burning on various species. Table 2 gives recovery rates. Linne (1978) also presents data indicating that rabbitbrush may increase as much as nine times over

TABLE 1

Effect of Fall Burning

Severely Damaged	Slightly Damaged	Undamaged	Enhanced
Big Sagebrush (<u>Artemisia tridentata</u>)	Bluebunch Wheatgrass (<u>Agropyron spicatum</u>)	Cheatgrass (<u>Bromus tectorum</u>)	Rabbitbrush (<u>Chrysothamnus</u> sp.)
Bitterbrush (<u>Purshia tridentata</u>)	Indian Ricegrass (<u>Dryzopsis hymenoides</u>)	Crested Wheatgrass (<u>Agropyron cristatum</u>)	Gambel's Oak (<u>Quercus gambelii</u>)
Broom Snakeweed (<u>Gutierrezia sarothrae</u>)	Nevada Bluegrass (<u>Poa nevadensis</u>)	Prairie June-grass (<u>Koeleria cristata</u>)	Horsebrush (<u>Tetraoymia</u> sp.)
Curleaf Mountain Mahogany (<u>Cercocarpus leiofolius</u>)	Penstemon (<u>Penstemon</u> sp.)	Sandberg Bluegrass (<u>Poa sandbergii</u>)	.....
Eriogonum (<u>Eriogonum</u> sp.)	Squirreltail (<u>Sitanion hystrix</u>)	Snowberry (<u>Symphoricarpos oreophilus</u>)	.....
Idaho Fescue (<u>Festuca idahoensis</u>)	Astragalus (<u>Astragalus</u> sp.)	True Mountain Mahogany (<u>Cerocarpus montanus</u>)	.....
Pussytoes (<u>Antennaria</u> sp.)	Globe Mallow (<u>Aphaeralcea</u> sp.)	Western Wheatgrass (<u>Agropyron smithii</u>)	.....
Phlox (<u>Phlox</u> sp.)	Serviceberry (<u>Amelanchier</u> sp.)	Yarrow (<u>Achillea lanulosa</u>)	.....
Needle-and-Thread (<u>Stipa comata</u>)	.....	Intermediate Wheatgrass (<u>Agropyron intermedium</u>)	.....

TABLE 2

Recovery Rates Following Burning

Species	Comments
Bluebunch Wheatgrass (<u>Agropyron spicatum</u>)	Normal production reached 1 to 3 years following burn
Needle-and Thread (<u>Stipa comata</u>)	Normal production reached 3 to 8 years following burn
Idaho Fescue (<u>Festuca idahoensis</u>)	Twelve to 30 years required for complete recovery
Prairie June-grass (<u>Koeleria cristata</u>)	Three to 8 years required for recovery
Big Sagebrush (<u>Artemisia tridentata</u>)	Ten percent of normal production after 12 years, normal production after 30 years
Bitterbrush (<u>Purshia tridentata</u>)	Fifty to 60 percent of normal after 15 years, 30 to 40 years required for complete recovery
Rabbitbrush (<u>Chrysothamnus sp.</u>)	Reduce 1 to 3 years after burn, three times normal after 12 years; on sandy soils, four to nine times normal after 8 to 18 years
Horsebrush (<u>Tetradymia sp.</u>)	Fifty percent reduction 1 year after burn, two times normal after 3 years, five times normal after 12 years
Serviceberry (<u>Amelanchier sp.</u>)	Thirty to 50 years to return to normal

preburn levels following a fire. Valentine (1971) cites a study showing that chemical application of 2,4-D caused a high proportion of rabbitbrush plants to sprout profusely and also stated, "Eradication of large acreages of undesirable range plants by herbicides is seldom possible." The application of 2,4-D may adversely affect some nontarget plants. In the K/E EIS area, the application of 2,4-D is expected to greatly reduce forbs and shrubs, but have little impact on grasses. Immediately following the application of the herbicide there would be a partial to complete reduction of competitive species. This would allow individual grass plants to increase in size and numbers. Although there would be a substantial reduction in the composition of forbs and shrubs, they would begin to recover toward pretreatment levels during the first year after treatment. Nielsen and Hinckley (1975) reported that in a 7-to-9-inch precipitation zone at 6,800 feet elevation in Wyoming, benefits as a result of spraying started decreasing after 5 years following spraying. After 14 years, benefits from treatments were negligible and after 17 years the big sagebrush was more dense than before treatment. Without following the spraying with seedings, it would, therefore, appear to be only a short-term gain and possibly not economically feasible to spray. The seedings would probably extend the time available for livestock forage, but it is not known for how much longer.

Plowing sagebrush types would remove the deep-rooted, well-established mature sagebrush plants. Native perennial grasses would respond favorably. This method of treatment would be limited to relatively flat or gently rolling terrain and deep soils. Treatment on shallow soils, particularly with hardpan or rock underlayers, would not provide good success rates and may not even be physically suitable for treatment.

Chaining would similarly remove deep-rooted mature plants (pinyon-juniper or sagebrush). This method is more widely suitable to differing terrain and can be highly successful, particularly if the method of application, weight of chain, and timing are carefully selected.

Treatments occurring in pinyon-juniper or sagebrush communities can be expected to suffer reinvasion of undesirable species. In the case of pinyon-juniper sites, redomination by undesirable species may be expected in 15 years (Tausch and Tueller, 1977).

The soils analysis in Chapter 4 indicates that soils in the areas proposed for vegetation treatments could cause an element of risk in seedling establishment. This element of risk affects the amount of forage produced. According to the minimum degree of success portrayed in Appendix 21, proposed AUM production from vegetation treatments (table 2-1) would be reduced by the percentage indicated in table 1 of Appendix 21. These reduced AUM levels are shown in Vegetation, Chapter 4 for each alternative according to how much treatment and which soils would be involved.

METHODS USED IN ANALYSIS OF IMPACTS

Impacts of livestock grazing on vegetation were determined by evaluating interactions of the existing situation (forage condition, forage trend, surveyed production, average active authorized or actual use for the past 5 to 10 years, season of use, and existing forage composition) with the

proposed action in each alternative. In those allotments in which active authorized or actual use was lacking or unreliable, the surveyed capacity was assumed to reflect the true forage production under proper grazing. Due to the complexity of the elements affecting the alternatives, the analysis of impacts was measured at the allotment level but grouped according to the dominant condition class of the allotment.

Forage Condition

Existing forage condition in each allotment was determined using vegetation cover composition data obtained during range surveys conducted in the EIS area from 1975 to 1979. Since impacts were to be evaluated at the allotment level and several forage condition classes often existed in one allotment, the dominant condition class of each allotment was applied to all suitable acres in that allotment. This allowed a compilation of allotments by condition class and a reference point for comparing each alternative. It was necessary to handle large amounts of data and the accuracy for each individual allotment is less than desired.

Substantial changes in cover composition are usually necessary to change forage condition class (Appendix 8). The change may be precipitated by a change in season of use, stocking rates, management systems, or vegetation manipulation. In the analysis, several of these "change agents" were usually required to change a condition class because literature indicates that management alone is not likely to produce significant changes to either composition or forage production in plant communities dominated by sagebrush or pinyon-juniper (Texas Tech, 1976).

Due to the inherent risk of seeding failure and the reinvasion of less desirable shrub and grass species, not all treatments would show a dramatic improvement over pretreatment forage condition. Treatment success, based on Soil Conservation Service and BLM soils information as shown in Appendix 21, was estimated for all affected allotments. Proposed forage production as a result of treatment (table 2-1) was reduced accordingly in order to give a realistically attainable production figure for wildlife and livestock forage.

Apparent Trend

In the majority of allotments, apparent trend in livestock forage condition was determined at one point in time by a field examination made during the range survey. It should be considered as a subjective estimate in that no documented long-term studies have been made correlating "apparent" trend observations with actual trend measurements. Apparent trend observations were made using the evaluation of factors shown in Appendix 11. For those allotments where long-term data existed, the actual trend data has been used in the analysis. Long-term trend studies utilized procedures set forth in BLM Manual 4410.

As in the evaluation of impacts to forage condition, the proposed season of use, amount of reduction or increase to surveyed capacity, and type of management were all primary considerations in determining trend impacts. Changes to a more favorable season of use for grasses and desirable shrubs usually resulted in projecting an improvement in trend to static or up,

depending on the amount of change. Amount of adjustment in stocking rate was determined to be less important than season of use unless it resulted in an increase above active authorized use. The order of change agent consideration was generally (1) season of use, (2) amount of adjustment in surveyed capacity, and (3) type of management proposed.

Forage Production

Available livestock forage could be increased over the present surveyed production by the three methods discussed in Vegetation, Chapter 4. Forage increases attributed to vegetation treatments were developed using criteria discussed in Appendix 21. One area of concern is that methods used to predict potential forage production (Appendix 12) may have overrated the amount of production possible, considering present forage conditions. Production figures estimated on good condition areas that are relict (or at least lightly grazed) may not be directly applicable to other ranges that are in poor condition. Baxter (1977) suggests (from studies in Arizona) that in most cases, relict areas do not represent the "potential" of depleted ranges because their "potential" may have been lost through the loss of top soil, soil fertility, and the loss of a seed source. After careful consideration of the proposed management system, season of use, vegetation type, and amount of change in AUMs due to adjustment to surveyed capacity, the vegetation analysis team developed a set of criteria that was designed to determine the potential forage production within a 24-year period (table 3).

This methodology was used to evaluate the chances of attaining projected forage production (Chapter 2) and indicates the most realistic production level attainable in 24 years.

Riparian Vegetation

In woody riparian plants the food reserves and areas of growth initiation, often located in twigs and stems, are exposed to grazing. Heavily grazing these stems after the food reserves are stored during the dormant period would reduce vigor. This impact could be partially offset by increased rest provided by grazing management systems. The herbaceous riparian plants (sedges, rushes, and grasses) would be expected to improve in a manner similar to that expected of upland herbaceous plants, but at an accelerated rate. Generally, those riparian areas not protected from grazing would not be expected to improve significantly. The classification system used for riparian communities is shown in table 4.

Summary

Specific management actions affecting each allotment were identified for the six alternatives under consideration. As each allotment was analyzed, an overall summary of impacts to vegetation was made. The summary consisted of:

1. Vegetation type and percent (example: pinyon-juniper, Putr, 7 percent, Orhy, 1 percent).

TABLE 3

Criteria Used to Determine the Possibility of Reaching Potential Forage Production

Expected Change	Conditional Criteria
1. If at least all four of the checked (✓) criteria would be met, potential forage production would be attained.	1. Composition of desirable forage expected to improve.
2. If at least three of the four checked (✓) criteria would be met, only 75 percent of the potential would be attained.	2. Vigor of desirable livestock forage expected to improve.
3. If at least two of the four checked (✓) criteria would be met, only 50 percent of the potential would be attained.	✓ 3. Positive management (rest, deferment) during growing season.
4. If only one of the seven criteria would be met, only 25 percent of the potential would be attained.	✓ 4. Favorable season of use, or a less favorable season of use tempered by rest or deferment.
	✓ 5. Initial forage allocation does not exceed the past average authorized use. That is, the degree of utilization does not increase.
	6. Projected forage increase attributed to improved management (in MFP) does not exceed 100 percent of the present available forage (dependent on condition and trend).
	✓ 7. Vegetation type is not dominantly mature undesirable forage species (high density pinyon-juniper/sagebrush). At least 10-percent desirable understory.

Source: Subjective criteria developed by the K/E analysis team (1979) to determine the possibility of reaching potential forage production.

TABLE 4

Classification System for Riparian Communities

Riparian Community

Habitat of the stream and/or pond banks and bottoms containing terrestrial plants and animals in need of a near source of continuous water or the organisms that associate with these plants and animals.

1. Excellent. Diversity and abundance of typical riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) good. Good age distribution, reproduction evident. Soil mostly covered with vegetation, bank erosion generally lacking. Cover for animals abundant. Vegetation shades water most of the day.
2. Good. Most groups of typically riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) present at or near stream border, but numbers may be reduced. Age diversity fair, reproduction evident. Some bare soil areas noticeable, but erosion at low levels. Riparian animals somewhat reduced or typical species missing due to cover loss. Vegetation shades water at least part of the day.
3. Fair. Many of the typically riparian plants (trees, shrubs, forbs, grasses, etc.) and animals (mammals, birds, amphibians, invertebrates, etc.) rare or missing from stream border. Age diversity lacking, little sign of reproduction. Bare soil may be common. Animal populations greatly reduced from lack of cover; may only be transitory in the community. Vegetation shade on stream lacking or only during morning and evening hours.
4. Poor. Typically riparian plants and animals scanty or lacking in both numbers and diversity. Little age variation, no sign of reproduction. Range plants (i.e., rabbitbrush, sagebrush, etc.) abundant down to water edge. Erosion of bare soil normally high, but may be reduced in monotypic grass communities which provide good ground cover but little diversity or animal cover. No shade on water from vegetation.
5. Very Poor. Self-explanatory.

Source: U.S. Department of the Interior, BLM, San Luis Resource Area Grazing Management Environmental Statement, 1977.

2. Condition and trend (example: fair, static).
3. Averaged authorized use versus surveyed capacity (example: 120 average authorized use versus 90 surveyed capacity).
4. Change in season (example: 5/1-10/31 versus 7/1-11/31).
5. Type of management system (example: none versus three-pasture rest-rotation).
6. Rangeland developments such as fences, troughs, pipes, wells, and reservoirs.

Each alternative was compared to the present situation. Overall summaries consisted of no change from present (0), negative change to vegetation (-), and positive change (+).

Those allotments scheduled for vegetation treatments would show an initial decline in forage condition for at least 2 years, but should then improve to at least pretreatment levels because treatment would remove most of the vegetation and litter. Until the seedlings become established, only annual grasses and forbs would be available as forage. The effects of spraying on vegetation condition would not be as disturbing; condition would improve following treatment because the spraying would not kill grass or remove standing shrubs or litter, holding the soil, shading seedlings, and leaving a residual vegetation stand of grass free from competition with big sagebrush. In addition, some brush would not be killed by spraying and may eventually reinvade. Research has shown that subsequent retreatment every 15 to 20 years can prevent reinvansion of shrub species.

Apparent trend would improve following vegetation treatment and successful establishment of desirable species, whether by natural or artificial means. Initially, short-term declines in trend would result until seedling establishment occurs and litter accumulation improves. In the long term, trends would improve but would eventually stabilize as treatment areas reached an equilibrium. The tendency for reinvansion by dominant woody invader species would increase over a period of time, particularly on shallow soils.

Forage production would similarly improve for both wildlife and livestock forage.

Example

The vegetation analysis is made in four basic steps. The first step is to identify existing vegetation resource characteristics that could be affected or are needed to determine the possibility of an impact. The second step consists of identifying the specific change proposed and those action items that would cause an impact. The third step involves determining the effect of the proposed change on existing vegetation resources. The fourth step consists of determining the resultant impact to vegetation. This step includes an assessment of significance and consideration of the timing and duration of the impact. Once all the impacts are defined for an allotment, further analysis is made to determine if there are any cumulative effects or situations where impacts may offset each other.

The following example shows how the vegetation analysis was made for an actual allotment in the K/E area. The four basic analytical steps described

above are outlined on table 5 for the Five Mile Mountain allotment. This same methodology was applied to each of the 210 allotments as they were affected by each of the six alternatives. Results of this analysis are summarized in Appendix 10.

Five-Mile Mountain Allotment Vegetation Impact Analysis: Outline

Existing Situation (affected environment):

Located in Vermilion Planning unit.
15,387 acres (Appendix 1).

13,062 suitable acres (5,620 acres presently suitable and 7,442 acres suitable upon water development).

Pinyon-juniper and sagebrush vegetation types most dominant (Vermilion URA, Step 3 Range). Sagebrush most abundant species in terms of composition. Desirable grasses comprise 10 percent of plant composition. 86 percent of suitable acres in poor livestock forage condition; 98 percent of the acreage in static trend (Appendix 10).

Key forage species Agcr, Orhy, Putr (Appendix 1, table 8); generally begin growth 3/1-4/15 (table 3-2).

Present season of use is 11/1-4/30; present grazing preference is 1,302 AUMs (Appendix 1). Present livestock grazing capacity from range survey is 170 AUMs (Appendix 10); past active authorized use is 402 AUMs.

Present wildlife grazing capacity from range survey is 698 AUMs (Appendix 22). No significant acreage of riparian habitat (Appendix 10).

(continued)

TABLE 5 (continued)

<u>Alternative 1: Continuation of Present Management</u>	
<u>Proposed Change (action items)</u> Continue present season and level of livestock use (402 AUMs - 11/1-4/30). No change in kind of management (continuous seasonal). (Chapter 2).	<u>Affects on Vegetation</u> Continued overobligation of forage vigor of desirable species remain poor and production would decline. Continued grazing during first of growing period.
	<u>Resultant Impacts</u> 20 percent reduction in available livestock and wildlife forage in long term. Forage condition would remain poor. Downward trend would occur. (Appendix 10)
<u>Alternative 2: Elimination of Livestock Grazing</u>	
<u>Proposed Change (action items)</u> Livestock grazing on public lands eliminated (Chapter 2).	<u>Affects on Vegetation</u> Improve vigor of desirable species. No livestock grazing during growing season. Reduced level of utilization of forage.
	<u>Resultant Impacts</u> Forage production would increase in long term. Trend would improve. Forage condition would remain poor (Appendix 10).
<u>Alternative 3: Multiple Resource Enhancement</u>	
<u>Proposed Change (action items)</u> Livestock grazing on public lands eliminated to enhance watershed/soils values (Chapter 2, Appendix 5).	<u>Affects on Vegetation</u> Same affect as Alternative 2.
	<u>Resultant Impacts</u> Same impacts as Alternative 2 (Appendix 10).
<u>Alternative 4: Adjustment to Grazing Capacity</u>	
<u>Proposed Change (action items)</u> Present livestock grazing reduced 402 to 170 AUMs. Present season of use adjusted from 11/1-4/30 to 11/1-3/31. (Appendix 1, table 7)	<u>Affects on Vegetation</u> Adjusted season and level would improve vigor of desirable species. Reduced grazing during growing season by about 1 month. Reduced level of utilization of forage (58 percent).
	<u>Resultant Impacts</u> Forage production maintained at 170 AUMs for livestock and 689 AUMs for wildlife. Trend would improve. Forage condition would improve but not change class (Appendix 10). (continued)

TABLE 5 (concluded)

Alternative 5: Rangeland Management Recommendation

Proposed Change (action items)
 Present livestock grazing reduced initially to capacity 402 to 170 AUMs. Present season of use maintained at 11/1-4/30.
 Water developments would make 7,442 acres suitable for grazing.
 Rest rotation grazing system implemented.
 Vegetation treatment on 2,900 acres (burn and seed)
 (Appendix 1, tables 7, 8).

Affects on Vegetation
 Reduced utilization of desirable species - improve vigor.
 Periodic rest during growing season (Appendix 4).
 Change in plant composition or treatment areas - less desirable shrubs to desirable grass, forbs browse (Chapter 2).
 More uniform utilization and distribution of livestock.

Resultant Impacts
 Trend would improve.
 Forage condition would improve but not enough to change class. Plant composition change only on 22 percent of area.
 Forage production would increase from vegetation treatment and improved management practices.
 Minimum seeding establishment success on vegetation treatment is 70+ percent (Appendix 21).
 Poor chance of attaining proposed management AUMs (Appendix 20, table 3).
 Long term forage available to livestock (830 AUMs) and wildlife (901 AUMs).
 (Appendix 10)

Alternative 6: Livestock Optimization

Proposed Change (action items)
 Same action items as Alternative 5.
 In addition, vegetation treatment on additional 6,180 acres (burn and seed) (Appendix 7).

Affects on Vegetation
 Same affect as in Alternative 5 except more acreage involved in plant composition changes.

Resultant Impacts
 Impacts are same as Alternative 5 except improvement more dramatic.
 Forage production would increase beyond Alternative 5 from additional treatment.
 However, additional vegetation treatments have lower minimum success (46+ percent - Appendix 21).
 Long term forage available to livestock (1,723 AUMs) and wildlife (1,185 AUMs).
 (Appendix 10)

APPENDIX 21

Rangeland Seeding Success Based on Edaphic Factors

To determine the success of the proposed seedings in Alternatives 4, 5, 6, the Soil Conservation Service Interim Guide for Rating Soils According to Their Soil Suitability for Range Seeding (1973) was used.

This procedure is based on the precipitation, available water holding capacity, rooting depth, surface texture, slope, surface rock fragments, abrupt textural change, electrical conductivity, and Exchangeable Sodium Percentage of soils in the proposed treatment sites.

Ratings assigned to each soil type analyzed are described below.

Good

A good rating indicates that a wide variety of plants may be successfully seeded in 7 or more years out of 10.

Fair

A fair rating indicates that fewer plants can adapt to the conditions and successful seeding will result in 5 or more years out of 10.

Poor

A poor rating indicates that only the most drought tolerant plants can be seeded and successful seeding will result in about 4 or more years out of 10.

Very Poor

A very poor rating indicates that soils are generally not suited to seeding. Seeding should only be considered under emergency circumstances, such as after a fire, to keep soil erosion losses to a minimum. Seeding success will only occur in about 3 years or less out of 10.

After ratings are assigned to each soil, an overall weighted seeding success figure is determined for each allotment based on the percent of each soil in the treatment area. These figures are listed in table 1.

An example of this procedure follows. In Alternative 6, Rushbeds Allotment would have 3,290 acres proposed for treatment and seeding. This could yield 454 AUMs. These AUMs were estimated by range survey and planning personnel based on production from successful seedings in similar areas (elevation, vegetation type, topography, etc.). Determination of Potential Grazing Capacity in Appendix 12 has further information on this subject. From the planning overlays, approximately 25 percent or 823 acres of this treatment would be in the Ustic Torriorthents-Ustic Haplargids Association, while the remaining 75 percent (2,467 acres) would be in the Lithic Ustic-Rock Outcrop Association. Based on the Interim Guide for Rating Soils, as discussed above, the respective ratings for each soil would be "good (70+ percent)" and "poor (40+ percent)". These are minimum percent success

figures. Weighing each soil rating by the percent of each soil in the treatment area and summing these figures would then give the percent of potential AUMs to be expected due to the treatment and seeding (i.e., 47+ percent).

Ustic Torriorthents -	25% x 70%+ = 17%+ x 454 AUMs = 77 AUMs
Ustic Haplargids	
Lithic Ustic - Rock	75% x 40%+ = 30%+ x 454 AUMs = 136 AUMs
Outcrop	
Total for treatment =	<u>47% x 454 AUMs = 213 AUMs</u>

Thus, of the 454 AUMs, a minimum of 47 percent (213 AUMs) could be expected.

A similar procedure was applied to each allotment with proposed treatments and the results are listed below. However, the soil suitability rating is intended to be only a relative rating of the number of successful seedings that might be expected in a given number of years. Furthermore, the rating is only as accurate as the soils information utilized (Chapter 3, Soils). It is recommended that site specific soils inventories be completed prior to the implementation of any treatment.

TABLE 1

Summary of Rangeland Seeding Success Based on Edaphic Factors

Allotment	Alternative 5				Alternative 6			
	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs
Cottonwood	296	37	40+	15	.....	.....	...	.....
Goat Ranch	1,868	221	40+	88	.....	.....	...	.....
Well Springs	736	92	50+	46	.....	.....	...	.....
Alvey Wash	1,440	156	43+	62	.....	.....	...	.....
Cedar Wash	1,200	156	50+	78	1,365	114	50+	57
Circle Cliffs	2,642	264	40+	106	1,616	145	40	58
Last Chance	7,140	601	50+	300	.....	.....	...	.....
Pine Creek	480	67	40+	27	148	16	50+	8
Wide Hollow	1,095	130	50+	65	960	61	44+	27
Lakes	.....	.....	...	.....	7,617	824	50+	412
Mudholes and Rock Creek	.....	.....	...	.....	3,383	365	50+	182
Forty-Mile Ridge	.....	.....	...	.....	440	10	40+	4
Upper Cattle	.....	.....	...	.....	9,682	945	50+	472
Long Neck	.....	.....	...	.....	130	17	41+	7
Willow Gulch	.....	.....	...	.....	880	105	50+	52
Soda	.....	.....	...	.....	2,000	110	50+	55
Lower and Upper Hackberry	800	170	46+	78	8,130	1,432	48	687
Headwaters (Paria and Wahweap)	.....	.....	...	.....	48,536	6,438	56+	3,605

(continued)

TABLE 1 (continued)

Allotment	Alternative 5				Alternative 6			
	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs
Deer Range	4,555	571	53+	303
Round Valley	1,050	141	45+	63
Mud Springs	2,519	329	49+	161
Cottonwood Management Area	1,750	279	40+	112
Coyote	385	46	40+	18
Rushbeds	3,290	454	47+	213
Rock Springs	260	32	40+	13
Harris Flat, Elephant Cove, Kane Springs	1,050	80	40+	321	1,040	131	40+	52
Trail Well	420	52	38+	20
Pine Springs	2,778	348	40+	139
Willow Spring Chris Spring	811	98	40+	39
Buck Pasture	270	34	40+	14
Yellow Jacket	957	120	40+	48
Clay Flat	640	109	40+	44
Twin Hollow	610	76	40+	30
Barracks Point	1,050	131	40+	52
Poverty Flat	880	109	40+	44
Kanab Creek, Brown Canyon	1,945	243	44+	107
John R. Flat	1,945	243	44+	107

(continued)

TABLE 1 (continued)

Allotment	Alternative 5				Alternative 6			
	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs
Five-Mile Mountain	2,900	329	70+	230	6,180	1,941	46+	893
Mollies Nipple	.....	.....	...	.....	14,598	2,371	47+	1,114
Vermilion	225	34	54+	20	7,515	1,040	48+	499
Sink Holes	.....	.....	...	.....	2,040	340	38+	130
White Sage	.....	.....	...	.....	570	95	58+	55
Seeps	.....	.....	...	.....	1,920	320	40+	128
Johnson Lakes, Glasseye, Flood Canyon	350	45	50+	22	2,880	460	40+	183
Locke Ridge, Meadow Canyon	.....	.....	...	.....	2,585	350	42+	146
Dry Lake	.....	.....	...	.....	310	39	70+	27
School Section	.....	.....	...	.....	40	5	40+	2
Johnson Point	.....	.....	...	.....	930	116	40+	46
Neaf	.....	.....	...	.....	883	147	38+	56
Red Butte	.....	.....	...	.....	300	31	40+	12
Oak Springs	.....	.....	...	.....	280	46	40+	18
Upper Hog	.....	.....	...	.....	100	12	40+	5
FAR	.....	.....	...	.....	970	122	40+	49
Sheep Spring	.....	.....	...	.....	40	5	40+	2
Bald Knoll	1,919	297	40+	119	.....	.....	...	.....
Black Rock	3,242	576	50+	288	1,008	179	50+	89

(continued)

TABLE 1 (concluded)

Allotment	Alternative 5				Alternative 6			
	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs	Acres of Treatment	Maximum Possible AUMs	Percent Weighted Treatment Success	Minimum Expected AUMs
Buck Knoll, Spencer Bench	1,670	103	48+	49	.....	.....	...	.....
Burnt Cedar Point	275	28	50+	14	.....	.....	...	.....
Calf Pasture	.....	.....	...	.....	1,382	231	42+	97
Cottonwood Springs Four-Mile, Elbow Falls	2,055	279	50+	139	.....	.....	...	.....
Deer Spring Point	8,759	1,404	47+	660	3,427	564	47+	264
First Point	8,759	490	50+	245	844	244	50+	122
Ford Well	910	138	50+	69	5,960	904	50+	452
Glendale Bench	600	72	50+	36	.....	.....	...	.....
Isolated Tracts	227	30	44+	13	938	127	44+	56
Johnson Canyon	450	58	50+	29	.....	.....	...	.....
Mill Creek	2,379	318	48+	152	7,031	935	48+	449
Sink Valley	615	112	44+	49	.....	.....	...	.....
Swallow Park	4,202	701	47+	329	4,753	791	47+	372
Timber Mountain	.....	.....	...	.....	<u>6,424</u>	<u>1,071</u>	<u>50+</u>	<u>535</u>
TOTALS	52,557	6,988	48	3,360	184,005	26,371	49	12,899

Sources: Soil Survey of Washington County Area; Soils of Utah; Escalante, Zion, Paria, and Vermilion, Soils, URA, 1979; Soil Survey and Interpretations of Buckskin - Telegraph, and Dry Valley Areas, Kane County, Utah; Soil Survey and Interpretations of Alton Pipeline Route Area, Kane County, Utah, and Mohave County, Arizona.

APPENDIX 22

Wildlife Forage Availability by Allotment

Allotment	Species	Season of Use	Percent Use Attributed to		Available Wildlife AUMs	Present Numbers	Present Wildlife AUM Demand ^a
			Federal Lands	Wildlife			
Alton	Deer ^b	.....	.....	5	.....	.....
Bald Knoll	Deer	Spring/summer	83	148	31	31	
Ben Hollow	Deer ^b	.....	.....	1	.....	.....
Black Mountain	Deer	Spring/summer	70	78	9	9	
Black Rock	Deer	Fall/winter	89	1,016	84	87	
Buck Knoll	Deer	Spring/summer	94	300	22	23	
Burnt Cedar Point	Deer	Fall/winter	95	180	31	32	
Burnt Flat	Deer	Fall/winter	94	48	6	6	
Calf Pasture	Deer	Fall/winter	86	118	21	22	
Cave Creek	Deer	Spring/summer	100	61	10	10	
Coal Mine	Deer	Spring/summer	100	6	3	3	
Cogswell Point	Deer	Spring/summer	100	22	7	7	
Coop Creek	Deer	Fall/winter	100	15	10	10	
Cottonwood Springs	Deer	Spring/summer	75	183	21	22	
Cove	Deer	Spring/summer	100	9	7	7	
Deer Spring Point	Deer	Spring/summer	92	1,021	92	95	
Dry Wash	Deer	Spring/summer	87	80	9	9	
Dump	Deer	Spring/summer	87	12	3	3	
Elbow Falls	Deer	Fall/winter	39	158	13	13	

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Present Wildlife AUM ^a
			Use Attributed to Federal Lands	Available Wildlife AUMs	
Elbow Springs	Deer	Fall/winter	100	77	42
Elkheart Cliffs ^C	Deer	Fall/winter	100	0	3
First Point	Deer	Fall/winter	91	387	43
Flume Hollow	Deer	Fall/winter	100	37	5
Ford Well	Deer	Fall/winter	93	551	62
Four-Mile	Deer	Spring/summer	68	102	15
Gardner Hollow	Deer	Fall/winter	100	87	33
Glendale Bench	Deer	Spring/summer	74	170	12
Gordon Point	Deer	Spring/summer	100	47	7
Hay Canyon	Deer	Spring/summer	100	60	10
Hogs Heaven	Deer	Spring/summer	100	136	42
Isolated Tracts	Deer	Spring/summer	100	89	4
Johnson Canyon	Deer ^b	.....	.....	105	.....
Levanger Lakes	Deer	Spring/summer	98	43	12
Lower Herd	Deer	Fall/winter	100	61	7
Lower North Fork	Deer	Fall/winter	100	36	7
Lydia	Deer	Spring/summer	100	171	83
Lydia's Canyon	Deer	Spring/summer	100	41	10
Meadow Canyon (Zion)	Deer	Fall/winter	100	132	17

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Available Wildlife AUMs	Present Numbers	Present Wildlife AUM Demand ^a
			Use Attributed to Federal Lands	Use Attributed to Available Wildlife AUMs			
Mill Creek	Deer	Spring/summer	85	429	71	73	
Neuts Canyon	Deer	Spring/summer	100	237	50	52	
North Fork ^C	Deer	Spring/summer	100	14	23	24	
Orderville Gulch	Deer	Fall/winter	100	366	50	52	
Red Hollow	Deer	Spring/summer	54	76	8	8	
Robinson Creek	Deer	Spring/summer	100	37	12	12	
Rocking Chair	Deer	Spring/summer	46	175	10	10	
Sink Valley	Deer	Spring/summer	89	413	45	46	
Spencer Bench	Deer	Spring/summer	93	160	11	11	
Spring Hollow ^C	Deer	Spring/summer	100	0	5	5	
Stewart Creek	Deer	Spring/summer	57	15	2	2	
Sugar Knoll	Deer	Fall/winter	75	48	28	29	
Swains Creek	Deer	Spring/summer	84	17	3	3	
Swallow Park	Deer	Spring/summer	95	637	95	98	
Syler Knoll	Deer	Spring/summer	91	16	6	6	
Table Mountain	Deer	Spring/summer	100	181	33	34	
Timber Mountain	Deer	Fall/winter	91	587	34	34	
Upper North Fork	Deer	Spring/summer	100	73	17	17	
Upper Place	Deer	Spring/summer	100	69	25	26	
Willow Creek	Deer	Fall/winter	100	95	10	10	

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Present Wildlife AUM ^a	Present Numbers	Present Wildlife Demand ^a
			Use Attrib- uted to Federal Lands	Available Wildlife AUMs			
Zion	Deer	Fall/winter	100	519	150	155	
Zion Park	Deer	Fall/winter	100	42	7	7	
Airport	Deer ^b	.....	.....	28	.....	.....
Art Canyon	Deer	Fall/winter	76	344	46	47	
Barracks Point	Deer	Fall/winter	92	262	60	62	
Boot	Deer	Fall/winter	78	109	27	29	
Brown Canyon	Deer	Fall/winter	60	46	17	18	
Buck Pasture	Deer	Fall/winter	79	64	22	23	
Bunting Canyon	Deer	Fall/winter	59	6	2	2	
Carmel Junction	Deer	Fall/winter	77	21	17	18	
Cedar Ridge	Deer ^b	.....	100	5	.....	.....
Chris Spring	Deer	Fall/winter	62	160	29	30	
Clay Flat	Deer	Fall/winter	90	119	29	30	
Cougar Canyon	Deer	Fall/winter	100	36	6	6	
Dishpan	Deer	Fall/winter	100	5	1	1	
Driveway	Deer	Fall/winter	97	18	5	5	
Dry Lake	Deer	Fall/winter	61	94	35	36	
Eight-Mile Gap	Deer	Fall/winter	100	27	5	5	
Elephant Cove	Deer	Fall/winter	96	304	42	43	
Farm Canyon	Deer	Fall/winter	74	122	17	17	

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent			Present Wildlife AUM Demand ^a
			Use Attributed to Federal Lands	Available Wildlife AUMs	Present Numbers	
Fishtail	Deer	Fall/winter	98	87	21	22
Five-Mile Mountain	Deer	Fall/winter	86	698	187	193
Flag Point	Deer	Fall/winter	100	7	2	2
Flood Canyon	Deer	Fall/winter	93	182	35	36
FAR	Deer	Fall/winter	86	197	43	44
Glasseye	Deer	Fall/winter	100	204	33	34
Granary Ranch	Deer	Fall/winter	98	45	12	12
Gravel Pit	Deer ^b	.....	.....	12	.....	.....
Harris Flat	Deer	Fall/winter	88	181	38	39
Hells Bellows	Deer	Fall/winter	81	56	17	18
John R. Flat	Deer	Fall/winter	90	291	72	74
Johnson Canyon	Deer	Fall/winter	97	282	58	60
Johnson Lakes	Deer	Fall/winter	91	275	71	73
Johnson Point	Deer	Fall/winter	100	69	15	16
Johnson Ranch	Deer	Fall/winter	97	110	29	30
Kanab Creek	Deer	Fall/winter	94	138	28	29
Kane Springs	Deer	Fall/winter	85	457	67	69
Kinnikinnic	Deer	Fall/winter	83	167	23	24
Locke Ridge	Deer	Fall/winter	79	152	51	53
Lone Forty	Deer ^b	.....	.....	1	.....	.....

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent Use Attrib- uted to Federal Lands	Available Wildlife AUMs	Present Numbers	Present Wildlife AUM ^a Demand ^a
Lost Springs	Deer	Fall/winter	100	15	3	3
Lost Springs Gap	Deer ^b	.....	.....	3	.....	.....
Lower Hog	Deer	Fall/winter	84	33	13	13
Meadow Canyon (Vermilion)	Deer	Fall/winter	98	172	36	37
Mollies Nipple ^c	Deer	Fall/winter	90	335	758	781
Neaf	Deer	Fall/winter	90	39	8	8
Oak Springs	Deer	Fall/winter	99	121	23	24
Pine Springs ^c	Deer	Fall/winter	90	30	50	52
Poverty Flat	Deer	Fall/winter	87	400	100	103
Red Butte	Deer	Fall/winter	99	226	44	45
Red Canyon	Deer	Fall/winter	86	417	87	90
Red Knoll	Deer	Fall/winter	67	243	35	36
Rock Springs	Deer	Fall/winter	74	345	58	60
School Section	Deer	Fall/winter	54	13	10	10
Seaman	Deer	Fall/winter	100	205	25	26
Seeps	Deer	Fall/winter	99	281	38	39
Sethy's Canyon	Deer	Fall/winter	92	224	33	34
Sheep Spring	Deer	Fall/winter	84	111	27	28
Sink Holes	Deer	Fall/winter	90	215	21	22

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Present Numbers	Present Wildlife AUM ^a
			Use Attributed to Federal Lands	Available Wildlife AUMs		
Sunnyside	Deer	Fall/winter	100	14	3	3
Thompson Point	Deer	Fall/winter	94	39	10	10
Trail Canyon	Deer	Fall/winter	78	158	31	32
Trail Well	Deer	Fall/winter	98	16	5	5
Twin Hollow	Deer	Fall/winter	88	38	9	9
Upper Hog	Deer	Fall/winter	90	98	22	23
Vermilion	Deer	Fall/winter	85	1,369	258	267
Virgin River	Deer	Fall/winter	84	122	24	25
Water Canyon	Deer	Fall/winter	89	51	14	14
White Sage	Deer	Fall/winter	100	81	12	12
Willis Canyon	Deer	Fall/winter	65	13	8	8
Willow Spring	Deer	Fall/winter	89	34	12	12
Yellow Jacket	Deer	Fall/winter	80	315	92	95
Alvey Wash	Deer	Fall/winter	93	1,191	9	9
Big Bown Bench	Deer	Fall/winter	91	354	24	25
Boulder Creek	Deer	Fall/winter	84	8	8	8
	Elk	Winter/spring		11	3	9
Boulder Stock Trail	Deer ^b	.....	100	237	.....	.....
Cedar Wash	Deer	Fall/winter	84	591	7	7
Chimney Rock	Deer	Fall/winter	84	1,673	5	5

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent Use Attributed to		Available Wildlife AUMs	Present Numbers	Present Wildlife AUM Demand ^a
			Federal Lands	Wildlife			
Circle Cliffs	Deer Elk	Fall/winter Winter/spring	97	442	23	24	
Collets	Deer ^b	.....	.....	196	.....	.....
Death Hollow	Deer	Fall/winter	87	738	15	15	
Deer Creek	Deer Elk	Fall/winter Winter/spring	95	45 137	44 30	45 95	
Dry Hollow	Deer ^b	.....	91	11	.....	.....
Escalante River	Deer	Fall/winter	90	481	33	34	
Forty-Mile Ridge	Deer	Fall/winter	92	617	7	7	
Haymaker	Deer	Fall/winter	88	137	10	10	
King Bench	Deer	Fall/winter	80	711	50	52	
Lakes	Deer ^b	.....	99	1,834	.....	.....
Last Chance (Escalante)	Deer	Fall/winter	90	2,417	32	33	
Long Neck	Deer	Fall/winter	100	41	5	5	
Lower Cattle	Deer	Fall/winter	87	945	13	13	
McGath Point	Deer	Fall/winter	98	87	10	10	
Moody	Deer Bighorn sheep	Fall/winter Yearlong	89	61 d ₂₆₁	19 40	20 86	
Mudholes	Deer ^b	.....	94	364	.....	.....
Muley Twist	Deer	Fall/winter	100	8	8	8	

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Present Numbers	Present Wildlife AUM ^a
			Use Attributed to Federal Lands	Available Wildlife AUMs		
Navajo Bench	Deer ^b	.....	.....	12	.....	.....
Pine Creek	Deer	Fall/winter	86	356	18	19
Rattlesnake Bench	Deer	Fall/winter	100	50	5	5
Saltwater Creek	Deer	Fall/winter	89	122	25	26
Soda	Deer	Fall/winter	100	932	9	9
Steep Creek	Deer	Fall/winter	86	39	38	39
	Elk	Winter/spring		142	35	114
Upper Cattle	Deer	Fall/winter	89	3,406	33	34
Wagon Box	Deer	Fall/winter	90	708	19	20
White Rock	Deer	Fall/winter	94	20	7	7
	Elk	Winter/spring		37	1	3
Wide Hollow	Deer	Fall/winter	100	412	17	18
Willow Gulch	Deer	Fall/winter	100	35	32	33
	Elk	Winter/spring		140	15	45
Blue Pools	Deer ^b	.....	.....	73	.....	.....
Bunting Well	Deer ^b	.....	.....	49	.....	.....
Cedar Mountain	Deer ^b	.....	.....	366	.....	.....
Clark Bench	Deer	Fall/winter	92	809	11	11
	Antelope	Yearlong		384	6	7
Cockscomb	Deer ^b	.....	.....	82	.....	.....
Cottonwood	Deer	Fall/winter	92	483	8	8
	Antelope	Yearlong		1,201	6	7

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent Use Attributed to		Available Wildlife AUMs	Present Numbers	Present Wildlife AUM ^a Demand ^a
			Federal Lands	Wildlife			
Coyote	Deer	Fall/winter	92		680	4	4
	Antelope	Yearlong			279	6	7
Deer Range	Deer	Fall/winter	87		787	22	23
Dry Valley	Deer ^b	.....	.....		249	.....	.....
East Clark Bench	Deer	Fall/winter	96		292	3	3
Flat Top	Deer ^b	.....	.....		138	.....	.....
Harvey's Fear	Deer	Fall/winter	100		87	.....	.....
Headwaters (summer and winter)	Deer	Fall/winter	84		7,524	63	65
Judd Hollow	Deer ^b	.....	.....		264	.....	.....
Last Chance (Paria)	Deer	Fall/winter	90		3,135	20	21
Lower Hackberry	Deer	Fall/winter	87		797	6	6
Lower Warm Creek	Deer	Fall/winter	99		19	3	3
Mud Springs	Deer	Fall/winter	87		989	6	6
Nipple Bench	Deer	Fall/winter	88		350	3	3
	Antelope	Yearlong	.....		290	6	7
Rock Creek	Deer	Fall/winter	100		682	.....	.....
Round Valley	Deer	Fall/winter	93		253	3	3
Rushbeds	Deer ^b	.....	.....		470	.....	.....
Spencer Bench	Deer	Fall/winter	91		195	4	4

(continued)

APPENDIX 22 (continued)

Allotment	Species	Season of Use	Percent		Present	Present
			Use Attributed to Federal Lands	Available Wildlife AUMs			Wildlife AUM Demand^{a}
Upper Hackberry	Deer	Fall/winter	91	6	6	6
Upper Warm Creek	Deer	Fall/winter	91	442	6	6
	Antelope	Yearlong		367	6	7
Wahweap	Deer ^b	.....	.....	188	.....	.....
Big Plains	Deer	Fall/winter	65	16	8	8
Buttermilk	Deer	Fall/winter	96	106	5	5
Canaan Mountain	Deer	Spring/summer	83	495	50	52
Canaan Ranch	Deer	Fall/winter	67	117	8	8
Cottonwood	Deer	Fall/winter	59	116	4	4
Cottonwood Point	Deer	Fall/winter	85	470	20	21
Goat Ranch	Deer	Fall/winter	94	557	15	16
Grafton Mesa	Deer	Fall/winter	77	68	7	7
Grafton Wash	Deer	Fall/winter	98	113	5	5
Grapevine	Deer	Fall/winter	88	160	10	10
Horse Valley	Deer	Fall/winter	79	224	20	21
Maxwell Canyon	Deer	Fall/winter	100	158	8	8
Park	Deer	Fall/winter	94	44	3	3
Riverview Ranch	Deer	Fall/winter	98	62	15	15
Rockville	Deer	Fall/winter	71	22	3	3
Russet Fields	Deer	Fall/winter	98	60	3	3

(continued)

APPENDIX 22 (concluded)

Allotment	Species	Season of Use	Percent Use Attributed to Federal Lands	Available Wildlife AUMs	Present Numbers	Present Wildlife AUM	Demand ^a
Upper South Creek	Deer	Fall/winter	97	142	15	15	
Well Springs	Deer	Fall/winter	80	74	8	8	
Unallotted	Deer	Spring/summer	40	282	80	82	
TOTALS				69,253	5,539	6,184	
	Deer			15,527		5,747	
	Antelope			2,521	30	35	
	Elk			798	100	316	
	Bighorn Sheep			261	40	86	
	Other Wildlife			50,146	.....	.....

Source: Utah Department of Wildlife Resources, 1977-79; URA, wildlife, all planning units, 1975-79; Range Surveys, all planning units, 1975-79.

^aAll wildlife AUMs are converted from livestock AUMs according to Stoddart and Smith, 1955 (5.8 deer = 1 livestock AUM, 5.6 bighorn sheep = 1 livestock AUM, 9.9 antelope = 1 livestock AUM, 1.9 Elk = 1 livestock AUM). Deer and elk allocations are based on 6 months use. Bighorn sheep and antelope allocations are based on 12 months use.

^bNo information is available concerning the number of deer for these allotments, but deer use appears to be low.

^cAllotments which currently have a shortage of deer forage.

^dAdditional forage may be available from areas not surveyed.

NOTE: Increasing numbers of bighorn sheep would be expected to move into the Escalante River and Wagon Box allotments, which have sufficient forage to support these animals.

APPENDIX 23

Vegetation Affected by Proposed Rangeland Developments

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence				
	Acres	Acres Loss ^a	Miles	Acres Loss	Num- ber	Acres Loss	Miles	Acres Loss	Miles	Acres Loss													
Alvey Wash Short term Long term	1,440	1,440 821	8.0	8 0 .....	..... ..... .....	..... ..... .....	1	3 ..... .....	..... ..... .....	..... ..... .....	2	0.5 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	2.6 3.12 0	
Big Bown Bench Short term Long term	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	3 ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	0.4
Cedar Wash Short term Long term	1,200	1,200 600 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	4	12 4 .....	..... ..... .....	..... ..... .....	2	0.5 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	2.5 3.0 0
Chimney Rock Short term Long term	..... ..... .....	..... ..... .....	2	2 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	1	0.25 0.15	2	0.5 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	8 0.96 0
Circle Cliffs Short term Long term	2,642	2,642 1,585	1.5	1.5 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	1	0.25 0	1 ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	1.7 2.04 0
Collets Short term Long term	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	1	0.25 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....										
Death Hollow Short term Long term	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	4	12 4 .....	..... ..... .....	..... ..... .....	4 ..... .....	..... ..... .....	1 0 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	
Deer Creek Short term Long term	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	4	0.8 0.8 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	
Escalante River Short term Long term																						
Forty-Mile Ridge Short term Long term	11.8																					
..... Short term Long term																						
..... Short term Long term																						

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Stock Trails		Fence					
	Acres	Acre Loss	Miles	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Miles	Acre Loss				
Upper Cattle Short term	28	.....	17	.....	3	.....	.....	.....	2	.....	.....	.....	.....	1	.....	2.5	.....		
Upper Cattle Long term	28	.....	3.4	.....	9	.....	.....	.....	0.5	.....	.....	.....	.....	.....	.....	3	.....	
Wagon Box Short term	0	.....	3.4	.....	3	.....	.....	.....	0	.....	.....	.....	.....	.....	.....	.....	0	.....
Wagon Box Long term	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wide Hollow Short term
Wide Hollow Long term	1,095	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1.5	.....	.....	.....	.....
Willow Gulch Short term	1,095	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.8	.....	.....
Willow Gulch Long term	548	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	.....	.....
Art Canyon Short term
Art Canyon Long term
Barracks Point Short term	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barracks Point Long term	3	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buck Pasture Short term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buck Pasture Long term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chris Spring Short term	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chris Spring Long term
Kane Springs Short term	1,050	.....	5	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kane Springs Long term	630	.....	0	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Farm Canyon Short term	0.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Farm Canyon Long term	0.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Five-Mile Mountain Short term
Five-Mile Mountain Long term	2,900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
..... Short term	2,900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
..... Long term	870	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Stock Trails		Fence		
	Acres	Acres Loss ^a	Miles	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Miles	Acres Loss	Miles	Acres Loss	
FAR	0.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	0.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnson Canyon	450	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	450	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	225	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnson Lakes	350	.....	3.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	350	.....	3.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	210	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kinnikinnic	0.5	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	0.5	.....	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Meadow Canyon	1.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McLies Nipple	4.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	4.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seeps	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oak Springs
Short term
Long term
Pine Springs
Short term
Long term
Poverty Flat
Short term
Long term
Red Butte
Short term
Long term

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence	
	Acres	Acres Loss	Miles	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss
Red Canyon
Short term
Long term
Rock Springs	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sethy's Canyon	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermilion	225	.....	2.5	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	225	.....	2.5	.....	0.4	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	103	.....	0	.....	0.4	.....	.....	.....	0.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virgin River	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Water Canyon
Short term
Long term	0.25
Yellow Jacket	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Pools	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Long term	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bunting Well	3.5	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Short term	3.5	.....	0.2	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Long term	0	.....	0.2	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Clark Bench	7	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	7	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cottonwood (Paria)	9	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	9	.....	0.2	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	0.2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence	
	Acres	Acre Loss ^a	Miles	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Miles	Acre Loss	Miles	Acre Loss
Coyote Short term	1	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	1	.....	0.5	.....
Coyote Long term	0.2	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	0.5	.....	0.6
Deer Range Short term	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Deer Range Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Dry Valley Short term	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.5	.....
Dry Valley Long term	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.2
Headwaters Short term	8	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Headwaters Long term	0	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lower Hackberry Short term	800	.....	3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lower Hackberry Long term	432	.....	.....	0	.....	.....	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.6
Mud Springs Short term	1	.....	.....	3	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Mud Springs Long term	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nipple Bench Short term	3.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nipple Bench Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Round Valley Short term	1.5	.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Round Valley Long term	0	.....	0.4	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rushbeds Short term
Rushbeds Long term
Upper Warm Creek Short term	2.5	.....	3	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Upper Warm Creek Long term	0	.....	0.3	.....	9	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wahweap Short term
Wahweap Long term

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence		
	Acres	Acre Loss	Miles	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Num-ber	Acre Loss	Miles	Acre Loss	Miles	Acre Loss	
Bald Knoll	1,221	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	1,221	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	730	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Black Mountain	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Black Rock	1,621	.....	2.8	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	1,621	.....	2.8	.....	0.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	810	.....	0	.....	0.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buck Knoll	1,556	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	1,556	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	808	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burnt Cedar Point	.....	.....	0.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	.....	.....	0.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	.....	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Calf Pasture	.....	.....	2.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	.....	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Four-Mile	2,055	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	2,055	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	1,027	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deer Spring Point	4,013	.....	7.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	4,013	.....	7.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	2,115	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
First Point	1,516	.....	1.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	1,516	.....	1.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	758	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ford Well	455	.....	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	455	.....	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	228	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glendale Bench	475	.....	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	.....	475	.....	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	.....	238	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(continued)

APPENDIX 23 (continued)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence	
	Acres	Acres Loss ^a	Miles	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Miles	Acres Loss	Miles	Acres Loss
Isolated Tracts	100	.....	4.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	100	.....	4.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	56	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mill Creek	1,142	.....	1.5	.....	2	.....	3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1,142	.....	1.5	.....	0.4	.....	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	592	.....	0	.....	0.4	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sink Valley	947	.....	2.75	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	947	.....	2.75	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	528	.....	0	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Swallow Park	1,605	.....	3.75	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1,605	.....	3.75	.....	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	849	.....	0	.....	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Timber Mountain	0.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	0.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canaan Mountain
Short term
Long term
Cottonwood Point
Short term
Long term
Goat Ranch	1,868	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	1,868	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	1,120	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grafton Mesa
Short term
Long term
Riverview Ranch
Short term
Long term

(continued)

APPENDIX 23 (concluded)

Allotment	Seedings		Pipeline		Storage Tanks		Reservoirs		Wells		Spring Development		Water Catchment		Cattleguards		Stock Trails		Fence	
	Acres	Acres Loss ^a	Miles	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Num- ber	Acres Loss	Miles	Acres Loss	Miles	Acres Loss
Well Springs	736	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	736	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term	368	.....	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horse Valley
Short term
Long term
Maxwell Canyon
Short term
Long term
Cottonwood	296	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(Canaan Mountain)	296	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Short term	178	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Long term
TOTAL	39,378	.....	149	.....	39	.....	59	.....	17	.....	60	.....	38	.....	12	.....	5.2	.....	117.60	.....
SHORT TERM	39,378	.....	149	.....	7.4	.....	177	.....	4.25	.....	15	.....	38	.....	0.24	.....	2.6	.....	141.23
LONG TERM	20,462	.....	0	.....	7.4	.....	59	.....	2.60	.....	0	.....	38	.....	0.24	.....	2.6	.....	0

^aThis number represents the maximum loss of acres due to seedings potential.

APPENDIX 24

Economic Methodologies

SECTION 1 - IMPACTS TO RANCH BUDGETS

In order to determine how changes in the levels of authorized use in each respective alternative would affect each of the ranch size classes, the following steps were followed.

1. The percent change in average active authorized use was determined by comparing the baseline AUM figures with the new AUM figures by the following equation:

$$\text{Percent Change} = \frac{(\text{NEW AUTHORIZED LEVELS}) - (\text{BASELINE LEVELS})}{(\text{BASELINE LEVELS})}$$

2. The percent change figures for each size class in each alternative were multiplied by the percent dependency of each respective size class. The product of the multiplication was then added to 1 and used to adjust the baseline income or cost figure:

$$(\text{BASELINE DOLLARS}) [1+(\text{PERCENT CHANGE IN AUMs})] (\text{PERCENT DEPENDENCY})$$

Taking an example from table 4-4; in Alternative 3 the baseline gross income for small scale ranchers is \$3,661. Small scale ranchers have an average percentage dependency of 51 percent (Socioeconomics, Chapter 3) and the net percent change in active authorized use for the small scale in the short term was determined to be -34 percent. Therefore, the adjusted short-term gross income level for small scale operations would be:

$$(\$3661)[1+(-.34)(.51)] = \$3,026$$

SECTION 2 - THE CAPITAL VALUES OF PERMITS

Although the Taylor Grazing Act does not allow BLM to recognize a marketable value for grazing permits, there are two general means by which such values do actually accrue. One is in terms of the collateral worth of a permit, and the other is in terms of the permit's capitalized sales value.

Collateral Worth

The collateral worth of a permit refers to the ability of a permittee to pledge his ranch assets, including his BLM permit, as collateral for both short and long-term loans. Although lending institutions recognize that BLM permits are not leaseholds and are revocable at any time, the permits have tended to be secure enough to be borrowed against when considered in conjunction with the rest of the ranching enterprise. That is, the permit by itself is not generally considered as collateral, but is taken to be a part of the overall ranch unit, all assets of which are considered together in making a loan. A generalized equation for the collateral worth of a ranch (including BLM permits) is given below:

$$CW = (.70)(1 - .4 D)(A)$$

Where: CW = Collateral Worth

D = the ranch percent dependency on BLM

A = the appraised value of the ranch

.7 = lending institutions commonly limit the total amount of the appraised value of a ranch property that can be borrowed against to 70 percent.

Impacts to collateral worths generally occur at the margin; that is, a ranch would not begin to feel the effects of reductions in collateral worth, as such, until they reached the level at which the rancher wished to borrow.

Capitalized Sales Values

Another generalized value commonly associated with grazing permits is in terms of the transferability of a permit either in conjunction with the base property or to another base. This is the permit's sales value and is determined in a number of ways. Again, although BLM is not legally bound by nor required to honor the sales of a permit from one rancher to another, the convention has been that such transferrals have not been opposed by the BLM as long as other legal requirements have been met. The maximum economic value that a permit could sell for can be expressed in terms of the capitalized differential in price between BLM feed and other, say, private sources as:

$$CV = \frac{F_p - F_f}{i} + F_f$$

Where: CV = Sales value of a permit

F_p = Private grazing fees (approximately \$8.00/AUM)^a

F_f = Federal grazing fees (\$1.89/AUM)

i = The going interest rate (approximately 12 percent)^b

Therefore, the maximum sales value should be around \$53.00.

$$CV = \frac{\$8.00 - \$1.89}{.12} + \$1.89 = \$52.81/\text{AUM}$$

Actual sales prices would be expected to be less than this amount.

^aSource: Carlson, Rancher Economic Survey, 1979.

^bFrom informal discussions with local Federal Land Bank personnel.

There are other factors which would enter into such valuations. Among these are:

1. The price and relative abundance of alternative feed sources before and after grazing adjustments. Substantial reductions in BLM capacity would have the effect of placing additional demands on alternative sources resulting in higher prices. This would in turn increase the sales value of the remainder of BLM permits since the private-Federal price differential would have been increased.

2. Any new improvements (seedings, wells, fencing, etc.) on BLM lands would have the effect of making those permits which were affected relatively more valuable since more services would be available at a constant price (\$1.89/AUM).

3. Any remaining AUMs after BLM adjustments would be relatively more valuable since much of the risk and uncertainty associated with their purchase would have been resolved by the adjustments.

4. The relative advantages (other than as a feed source) of holding a given BLM permit (access to limited water supplies, operational convenience, etc.) also bear on the value one would place on the permit. These would be viewed differently by different operators depending upon their individual requirements.

These factors combine to make it impossible to determine any one number to enter as general sales value for BLM permits. One could expect, however, that the relative value per AUM would be greater after grazing adjustments than before, but this probably would be insufficient to recover losses from reductions.

SECTION 3 - IMPACTS TO COLLATERAL WORTHS

In estimating the impacts that grazing adjustments would have on the collateral worths of ranches, the following assumptions were made:

- 1) There are no economically viable alternative sources of feed available, so reductions in Federal grazing would be lost by the rancher rather than transferred elsewhere.
- 2) Changes in herd size would yield changes in both dependency levels and assessed valuation.
- 3) Assessed valuation was treated only in terms of herd size and not real estate values since data on the latter is not generally available and is usually considered to be confidential. Assessed values of livestock were derived from Utah State Tax Commission suggested valuation schedules (Section 4 of this appendix).

By employing these assumptions, the resulting estimates tend to be highly conservative. That is, actual impacts would probably be of a lower magnitude and the estimates should be considered to be "worst case" depictions.

The percent change in collateral worth resulting from the implementation of any given alternative is calculated through the following:

$$CW_0 = (.7)[1-(.4)(D_0)](A_0)$$

$$CW_i = (.7)[1-(.4)(D_i)](A_i)$$

Where: CW_0 = collateral worth in the baseline period

CW_i = collateral worth with the implementation of alternative "i"

D_0 = Dependence in the baseline period

D_i = Dependence with the implementation of alternative "i", and calculated as follows:

$$H_i = H_o[1+(D_o)(R)]$$

$$D_i = \frac{(H_o)[(D_o)(1+R)]}{H_i}$$

Where: H_o = total herd size in animal units (AUs) in the baseline period

H_i = total herd size after adjustments in Federal grazing

R = percent reduction (or increase) in authorized grazing levels; reductions shown as negatives, increases shown as positives

A_o = assessed value of the baseline herd, H_o ; assessed valuation of small scale herds was calculated at \$272/AU; medium, \$301/AU; and large, \$279/AU

A_i = Assessed value of the adjusted H_i

An example of these calculations is provided below and utilizes the situation of the medium scale operator under Alternative 4.

$$D_o = .85$$

$$R = -.04$$

$$H_o = 112 \text{ AU}$$

$$A_o = \$33,695 @ \$300.85/\text{AU}$$

$$CW_o = (.7)[1-(.4)(.85)](\$33,695) = \$15,569$$

$$H_i = (112)(.85)(-.04) + 112 = 108$$

$$D_i = \frac{(112)(.85)[1+(-.04)]}{108.19} = .84$$

$$A_i = (108/\text{AU})(\$300.85/\text{AU}) = \$32,492$$

$$CW_i = (.7)[1-(.4)(.84)](\$32,492) = \$15,102$$

The percent change in collateral worth is then calculated by:

$$\text{percent change} = \frac{CW_i - CW_o}{CW_o}$$

$$= \frac{15,102 - 15,569}{15,569} = -3 \text{ percent}$$

Therefore, a 4-percent reduction in Federal grazing would result in a 3-percent reduction in collateral worth in this case.

SECTION 4 - IMPACTS TO REGIONAL TAX RECEIPTS

To determine the regional tax receipts from livestock, information was obtained from the Utah State University Extension Agent for Garfield and Kane Counties (personal communication, Verl Mathews) about the taxing structures of the two counties. This information was then applied to the herd makeups of each scale and prorated on the basis of the size classes' percent dependency on BLM to determine the amount of tax generated by Federal grazing.

In general, livestock are assessed at 20 percent of their market value (a conservative estimate of market values is suggested annually by the Utah State Tax Commission). A mill levy is then imposed against the assessed value to determine the tax amount. In 1979 the mill levy was in the neighborhood of 57.9 mills for both counties. The table below shows the calculations in determining the baseline regional tax amounts.

<u>Size Class</u>	<u>Head</u>	<u>x Tax/head</u>	<u>x Percent Dependency</u>	<u>x Number of Operators</u>	<u>= Taxes Generated by Federal Grazing</u>
<u>SMALL SCALE</u>					
Calves	12	\$1.50	51	80	\$734.40
Yearlings	5	2.02	51	80	848.80
Cows	16	2.31	51	80	1,507.97
Bulls	1	4.04	51	80	164.83
<u>MEDIUM SCALE</u>					
Calves	84	1.50	85	113	12,102.30
Yearlings	9	2.02	85	113	1,746.19
Cows	99	2.31	85	113	21,965.67
Bulls	4	4.04	85	113	1,552.17
<u>LARGE SCALE</u>					
Calves	234	1.50	61	89	19,055.79
Yearlings	74	2.02	61	89	8,115.27
Cows	301	2.31	61	89	37,748.38
Bulls	15	4.04	61	89	<u>3,289.97</u>
TOTAL					\$108,831.74

APPENDIX 25

Methodology for Projecting Big Game Numbers and a Summary of Impacts to Wildlife Habitat

In order to project mule deer numbers as they would be affected by each alternative, the prior stable numbers provided by UDWR were used as a data base. Changes in condition found in Appendix 10, which are based on the livestock forage condition, were also used in this projection.

The following methodology was used:

1. If the vegetation class would not change, no change in the present numbers would be anticipated.

2. If condition would change from poor to fair or fair to good, 75 percent of the prior stable numbers would be achieved.

3. If condition would improve from poor to good, all the prior stable numbers would be obtained.

The impacts to wildlife habitat (both big game and upland game birds) can be found in table 1.

TABLE 1

Summary of Impacts to Wildlife Habitat: Affected Allotments

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization	
AIRPORT Big Game	I 468	Poor	Poor	Poor	Poor	Poor	Poor	Poor
ALVEY WASH Big Game	I 48,581	Fair	Fair	Fair	Fair	Fair	Fair	Fair
ART CANYON Big Game	C 2,700 I 9,092	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BALD KNOLL Big Game	C 1,440	Poor	Poor	Poor	Poor	Fair	Fair	Fair
BARRACKS POINT Big Game	C 1,520 I 7,915 910	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird								
BIG PLAINS Big Game	I 664	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BLACK ROCK Big Game	C 5,940 I 18,044 1,000	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
BLUE POOLS Upland Game	164	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
BOOT Big Game	I 2,491	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BOULDER CREEK Big Game	C 1,705	Fair	Fair	Fair	Fair	Fair	Fair	Fair

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization	
BOULDER STOCK TRAIL Big Game	C 2,278	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BROWN CANYON Big Game	C 1,020 I 1,730	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BUCK PASTURE Big Game	C 1,280 I 2,740	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BUNTING CANYON Big Game	I 339	Fair	Good	Fair	Fair	Fair	Fair	Fair
BUNTING WELL Upland Bird	164	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
BURNT CEDAR POINT Big Game	I 2,980	Poor	Poor	Poor	Poor	Poor	Poor	Poor
BURNT FLAT Big Game Upland Bird	I 866 866	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
BUTTERMILK Big Game	I 558	Poor	Poor	Poor	Poor	Poor	Poor	Poor
CANAAN RANCH Big Game	I 2,755	Poor	Poor	Poor	Poor	Poor	Poor	Poor
CARMEL JUNCTION Big Game	I 2,063	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
CAVE CREEK Upland Bird	770	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
CEDAR WASH Big Game	I 9,004	Fair	Fair	Fair	Fair	Fair	Fair	Fair

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization	
CHIMNEY ROCK Upland Bird	17,547	Fair	Fair	Fair	Fair	Fair	Fair	Fair
CHRIS SPRING Big Game	C 2,660 I 4,703	Poor	Poor	Poor	Poor	Poor	Poor	Poor
CIRCLE CLIFFS Big Game	C 17,263 I 17,263	Fair	Fair	Fair	Fair	Good	Good	Good
Upland Bird	10,765	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
CLARK BENCH Big Game Upland Bird	C 140 3,471	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
CLAY FLAT Big Game	C 1,560 I 5,420	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	230	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COCKSCOMB Big Game	I 1,143	Poor	Poor	Poor	Poor	Poor	Poor	Poor
COGSWELL POINT Upland Bird	1,441	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COLLETS Big Game Upland Bird	I 15,252 458	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
COOP CREEK Big Game Upland Bird	I 432 430	Unknown Unknown	Unknown Unknown	Unknown Unknown	Unknown Unknown	Unknown Unknown	Unknown Unknown	Unknown Unknown
COTTONWOOD (Canaan) Big Game	I 3,339	Poor	Poor	Poor	Poor	Poor	Poor	Poor

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES					Rangeland Management Recom- mendation	Livestock Optimization
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity			
COTTONWOOD (Paria) Big Game	C 540 I 14,056	Good	Good	Good	Good	Good	Good	Good
Upland Bird	8,735	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COTTONWOOD POINT Big Game	C 20 I 8,706	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Upland Bird	334	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
COUGAR CANYON Big Game	I 1,546	Poor	Poor	Poor	Poor	Poor	Poor	Poor
COYOTE Big Game	C 1,025 I 2,118	Good	Good	Good	Good	Good	Good	Good
Upland Bird	13,501	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
DEER CREEK Big Game	C 3,879 I 3,539	Fair	Fair	Fair	Fair	Fair	Fair	Fair
DEER RANGE Big Game	C 8,800	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	10,294	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
DISHPAN Big Game	I 210	Poor	Poor	Poor	Poor	Poor	Poor	Poor
DRIVEWAY Big Game	I 860	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	610	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
DRY LAKE Big Game	C 1,240 I 2,006	Fair	Fair	Fair	Fair	Fair	Fair	Fair

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES					Livestock Optimization
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	
DRY VALLEY Big Game Upland Bird	I 11,355 4,035	Good Unknown	Good Unknown	Good Unknown	Good Unknown	Good Unknown	Good Unknown
EAST CLARK BENCH Upland Bird	652	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
EIGHT-MILE GAP Big Game Upland Bird	I 449 150	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
ELBOW FALLS Big Game	I 2,945	Poor	Poor	Poor	Poor	Poor	Poor
ELBOW SPRINGS Big Game	I 2,364	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
ELEPHANT COVE Big Game	C 5,250 I 7,604	Poor	Poor	Poor	Poor	Consolidated	Consolidated
ELKHEART CLIFFS Big Game	I 391	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
ESCALANTE RIVER Big Game	C 95 I 140	Fair	Fair	Fair	Fair	Fair	Fair
FAR Big Game	C 115	Poor	Poor	Poor	Poor	Poor	Poor
FARM CANYON Big Game	C 2,960 I 3,363	Poor	Poor	Poor	Poor	Poor	Poor
FIRST POINT Big Game	C 780 I 6,216	Fair	Fair	Fair	Fair	Fair	Fair

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization	ALTERNATIVES	
FISHTAIL Big Game	I 3,249	Poor	Poor	Poor	Poor	Poor	Poor		
FIVE-MILE MOUNTAIN Big Game	I 15,837	Poor	Poor	Poor	Poor	Poor	Poor		
FLAG POINT Big Game	C 260 I 380	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown		
FLOOD CANYON Big Game	C 790 I 6,191	Poor	Poor	Poor	Poor	Poor	Poor		
FLUME HOLLOW Big Game	I 775	Poor	Poor	Poor	Poor	Poor	Poor		
FORD WELL Big Game	C 3,440	Poor	Poor	Poor	Poor	Poor	Poor		
FORTY-MILE RIDGE Upland Bird	6,156	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown		
GARDNER HOLLOW Big Game	C 840 I 2,200	Fair	Fair	Fair	Fair	Fair	Fair		
Upland Bird	2,200	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown		
GLASSEYE Big Game	I 7,427	Fair	Fair	Fair	Fair	Fair	Fair		
GLENDALE BENCH Big Game	C 1,010 I 1,010	Poor	Poor	Poor	Poor	Poor	Poor		
GOAT RANCH Big Game	I 8,509	Poor	Poor	Poor	Poor	Poor	Poor		

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES					Rangeland Management Recom- mendation	Livestock Optimization
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Unknown		
GORDON POINT Upland Bird	386	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
GRAFTON MESA Big Game	I 1,854	Poor	Poor	Poor	Poor	Poor	Poor	Poor
GRAFTON WASH Big Game Upland Bird	I 1,778 281	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
GRANARY RANCH Big Game	I 1,809	Poor	Poor	Poor	Poor	Poor	Poor	Poor
GRAPEVINE Big Game Upland Bird	C 20 I 4,764 1,784	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
HARRIS FLAT Big Game	C 3,040 I 4,350	Poor	Poor	Poor	Poor	Poor	Poor	Poor
HARVEY'S FEAR Upland Bird	201	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
HAY CANYON Big Game	I 811	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
HAYMAKER Big Game	I 3,206	Good	Good	Good	Good	Good	Good	Good
HEADWATERS (Winter) Big Game Upland Bird	C 3,361 I 105,527 56,925	Fair Unknown	Good Unknown	Good Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Good Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	ALTERNATIVES	
						Rangeland Management	Livestock Optimization
HEADWATERS (Summer) Big Game	C 968	Fair	Good	Good	Fair	Fair	Good
HELLS BELLOWS Big Game	I 2,019	Poor	Fair	Fair	Fair	Fair	Fair
HOGS HEAVEN Upland Bird	1,771	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
HORSE VALLEY Big Game	C 40 I 4,216	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	20	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
JOHN R. FLAT Big Game	C 2,690 I 1,007	Poor	Poor	Poor	Poor	Consolidated	Consolidated
JOHNSON CANYON (Vermilion) Big Game	C 3,630 I 8,139	Poor	Poor	Poor	Poor	Poor	Poor
JOHNSON CANYON (Zion) Big Game	I 2,553	Fair	Fair	Fair	Fair	Fair	Fair
JOHNSON LAKES Big Game	C 3,590 I 10,150	Poor	Poor	Poor	Poor	Poor	Poor
JOHNSON POINT Big Game	I 2,277	Fair	Fair	Fair	Fair	Fair	Fair
JOHNSON RANCH Big Game	I 5,642	Fair	Fair	Fair	Fair	Fair	Fair
KANAB CREEK Big Game	I 4,098	Fair	Fair	Fair	Fair	Fair	Fair

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management	
						Recom- mendation	Livestock Optimization
KANE SPRINGS Big Game	C 3,380 I 10,944	Poor	Poor	Poor	Poor	Poor	Poor
KING BENCH Big Game	C 11,415 I 15,518	Poor	Poor	Poor	Poor	Poor	Poor
KINNIKINNIC Big Game	C 2,600 I 4,964	Fair	Fair	Fair	Fair	Fair	Fair
LAKES Upland Bird	4,038	Poor	Poor	Poor	Poor	Poor	Poor
LAST CHANCE Big Game	C 34 I 77,985	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	56,160	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LOCKE RIDGE Big Game	I 4,232	Poor	Poor	Poor	Poor	Consolidated	Consolidated
LONG NECK Big Game	C 610 I 610	Poor	Poor	Poor	Poor	Poor	Poor
LOST SPRINGS GAP Big Game	I 601	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LOWER CATTLE Big Game	I 8,390	Fair	Good	Fair	Fair	Fair	Fair
LOWER HACKBERRY Big Game	C 434 I 14,230	Fair	Good	Fair	Fair	Fair	Good
LOWER HERD Big Game	I 860	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	540	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management	
						Recom- mendation	Livestock Optimization
KANE SPRINGS Big Game	C 3,380 I 10,944	Poor	Poor	Poor	Poor	Poor	Poor
KING BENCH Big Game	C 11,415 I 15,518	Poor	Poor	Poor	Poor	Poor	Poor
KINNIKINNIC Big Game	C 2,600 I 4,964	Fair	Fair	Fair	Fair	Fair	Fair
LAKES Upland Bird	4,038	Poor	Poor	Poor	Poor	Poor	Poor
LAST CHANCE Big Game	C 34 I 77,985	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	56,160	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LOCKE RIDGE Big Game	I 4,232	Poor	Poor	Poor	Poor	Consolidated	Consolidated
LONG NECK Big Game	C 610 I 610	Poor	Poor	Poor	Poor	Poor	Poor
LOST SPRINGS GAP Big Game	I 601	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LOWER CATTLE Big Game	I 8,390	Fair	Good	Fair	Fair	Fair	Fair
LOWER HACKBERRY Big Game	C 434 I 14,230	Fair	Good	Fair	Fair	Fair	Good
LOWER HERD Big Game Upland Bird	I 860 540	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						Livestock Optimization
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range/land Management Recom- mendation		
LOWER HOG Big Game	I 2,340	Poor	Poor	Poor	Poor	Poor	Poor	Poor
LOWER NORTH FORK Big Game	I 840	Poor	Poor	Poor	Poor	Poor	Poor	Poor
LOWER WARM CREEK Upland Bird	210	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LYDIA Upland Bird	7,541	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
LYDIA'S CANYON Upland Bird	466	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
MAXWELL CANYON Big Game Upland Bird	I 3,548 417	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
MCGATH POINT Big Game	I 3,440	Fair	Fair	Fair	Fair	Fair	Fair	Fair
MEADOW CANYON (Vermilion) Big Game Upland Bird	I 4,715 1,733	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
MILL CREEK Big Game Upland Bird	C 2,150 399	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Fair Unknown	Fair Unknown	Fair Unknown
MOLLIES NIPPLE Big Game Upland Bird	C 6,390 I 93,080 1,770	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization	
MOODY Big Game	C 1,230 I 20	Fair	Fair	Fair	Fair	Fair	Fair	Fair
MUD SPRINGS Big Game	I 14,455	Fair	Fair	Fair	Fair	Fair	Fair	Fair
MULEY TWIST Big Game	I 1,877	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
NAVAJO BENCH (Paria) Upland Bird	320	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
NEAF Big Game	I 1,215	Poor	Poor	Poor	Poor	Poor	Poor	Poor
NEUTS CANYON Upland Bird	2,479	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
NIPPLE BENCH Big Game	C 67	Fair	Fair	Fair	Fair	Good	Good	Good
Upland Bird	9,293	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
NORTH FORK Upland Bird	280	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
OAK SPRINGS Big Game	I 2,864	Fair	Fair	Fair	Fair	Fair	Fair	Fair
ORDERVILLE GULCH Upland Bird	4,857	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
PARK Big Game	I 640	Poor	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	603	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Range and Management Recom- mendation	Livestock Optimization	
ROCKVILLE Big Game Upland Bird	I 307 270	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
ROUND VALLEY Big Game Upland Bird	I 8,974 4,884	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
RUSHBEDS Big Game Upland Bird	I 16,525 513	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
RUSSELL FIELDS Big Game Upland Bird	I 633 63	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
SALTWATER CREEK Big Game	C 5,814 I 10,210	Fair	Fair	Fair	Fair	Fair	Fair	Fair
SCHOOL SECTION Big Game	I 430	Poor	Poor	Poor	Poor	Poor	Poor	Poor
SEAMAN Big Game	6,849	Poor	Poor	Poor	Poor	Poor	Poor	Poor
SEEPS Big Game	I 4,002	Poor	Poor	Poor	Poor	Poor	Poor	Poor
SETHY'S CANYON Big Game	C 1,510 I 7,630	Poor	Poor	Poor	Poor	Poor	Poor	Poor
SHEEP SPRING Big Game	I 3,311	Fair	Fair	Fair	Fair	Fair	Fair	Fair
SINK HOLES Big Game	C 1,620 I 6,667	Poor	Poor	Poor	Poor	Poor	Poor	Poor

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland	
						Management Recom- mendation	Livestock Optimization
SINK VALLEY Big Game	C 1,230	Poor	Poor	Poor	Poor	Poor	Poor
SODA Big Game	C 2,511 I 3,411	Fair	Fair	Fair	Fair	Fair	Fair
SPENCER BENCH Upland Bird	262	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
SPRING HOLLOW Upland Bird	510	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
STEEP CREEK Big Game	C 9,170 I 9,170	Fair	Fair	Fair	Fair	Fair	Fair
SUGAR KNOLL Big Game	C 1,090 I 1,739	Fair	Fair	Fair	Fair	Fair	Fair
SUNNYSIDE Big Game	I 350	Poor	Poor	Poor	Poor	Poor	Poor
SWAINS CREEK Big Game	I 371	Poor	Poor	Poor	Poor	Poor	Poor
SWALLOW PARK Big Game	C 3,610 I 3,556	Poor	Poor	Poor	Fair	Fair	Fair
TABLE MOUNTAIN Upland Bird	2,254	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
THOMPSON POINT Big Game	I 1,511	Poor	Poor	Poor	Poor	Poor	Poor
TIMBER MOUNTAIN Big Game	I 6,664	Poor	Poor	Poor	Poor	Poor	Good

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management	
						Recom- mendation	Livestock Optimization
TRAIL CANYON Big Game	C 660 I 6,886	Poor	Poor	Poor	Poor	Poor	Poor
TRAIL WELL Big Game	I 1,300	Poor	Poor	Poor	Poor	Poor	Poor
TWIN HOLLOW Big Game Upland Bird	I 1,210 I 1,161	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
UPPER CATTLE Big Game Upland Bird	I 9,020 I 3,600	Fair Poor	Fair Poor	Fair Poor	Fair Poor	Fair Poor	Fair Poor
UPPER HACKBERRY Big Game Upland Bird	I 21,604 I 1,420	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
UPPER HOG Big Game	I 4,343	Poor	Poor	Poor	Poor	Poor	Poor
UPPER PLACE Big Game Upland Bird	C 1,080 I 2,367 571	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown	Poor Unknown
UPPER SOUTH CREEK Big Game Upland Bird	C 35 I 2,367 30	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown
UPPER WARM CREEK Big Game Upland Bird	C 124 I 8,820 13,334	Good Unknown	Good Unknown	Good Unknown	Good Unknown	Good Unknown	Good Unknown

(continued)

TABLE 1 (continued)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES						Rangeland Management Recom- mendation	Livestock Optimization
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity				
VERMILION Big Game	C 4,310 I 31,906	Poor	Poor	Poor	Poor	Poor	Poor	Poor	
VIRGIN RIVER Big Game Upland Bird	I 3,799 599	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	
WAGON BOX Big Game	C 35 I 1,366	Fair	Fair	Fair	Fair	Fair	Fair	Fair	
WAHWEAP Big Game	C 211 I 11,223	Fair	Fair	Fair	Fair	Fair	Fair	Fair	
Upland Bird	I 2,506	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	
WATER CANYON Big Game	I 3,170	Poor	Poor	Poor	Poor	Poor	Poor	Poor	
WHITE ROCK Big Game	C 1,302 I 1,052	Fair	Fair	Fair	Fair	Fair	Fair	Fair	
WHITE SAGE Big Game	I 2,195	Poor	Poor	Poor	Poor	Poor	Poor	Poor	
WIDE HOLLOW Big Game	C 5,986 I 5,986	Fair	Fair	Fair	Fair	Fair	Fair	Fair	
WILLIS CANYON Big Game	I 1,166	Poor	Poor	Poor	Poor	Poor	Poor	Poor	
WILLOW CREEK Big Game Upland Bird	I 1,158 1,158	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	Fair Unknown	
WILLOW GULCH Big Game	C 4,456 I 10,215	Fair	Fair	Fair	Fair	Fair	Fair	Fair	

(continued)

TABLE 1 (concluded)

Allotment and ^a Habitat Condition	Significant Habitat Acres	ALTERNATIVES					
		Continuation of Present Management	Elimination of Livestock Grazing	Multiple Resource Enhancement	Adjustment to Grazing Capacity	Rangeland Management Recom- mendation	Livestock Optimization
WILLOW SPRING Big Game	C 1,910 I 2,700	Poor	Poor	Poor	Poor	Poor	Poor
YELLOW JACKET Big Game	C 2,680 I 10,036	Poor	Poor	Poor	Poor	Poor	Poor
ZION Big Game	C 540 I 11,012	Poor	Poor	Poor	Poor	Poor	Poor
Upland Bird	11,356						
ZION PARK Big Game	I 1,298	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Upland Bird	1,298	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

LEGEND: I = Important C = Critical

^aThese are only allotments with significant big game or upland game bird habitat.

GLOSSARY

Accelerated Erosion. Wearing away of the earth's surface above the geologic or natural erosion rate, due to disturbance by man or his activities.

Acre-Foot. A volume that will cover an area of one acre to a depth of 1 foot (43,560 cubic feet).

Average Active Authorized Use. The portion of grazing preference that is authorized for a given period of time.

Allotment. An area of land where one or more operators graze their livestock. Generally consists of public land but may include parcels of private or state lands. The number of livestock and season of use are stipulated for each allotment. An allotment might consist of several pastures or only one pasture.

Allotment Management Plan (AMP). A written program of livestock grazing management, including supportive measures if required. Designed to attain specific management goals in a grazing allotment.

Alluvium. Soil and rock debris deposited by streams.

Animal Unit Month (AUM). The amount of forage required to sustain the equivalent of one cow or five sheep for 1 month. This is approximately 800 pounds of air dried forage. Animal unit equivalents for wildlife and wild horses have been derived from this amount of forage.

Aquifer. A formation, group of formations, or part of a formation that contains enough saturated permeable material to yield significant quantities of water to wells and springs.

AUM Capital Value. Economic value reflected in the open market for an AUM of forage.

Base Property. Those lands in a ranching enterprise which are owned or under long-term control of the operator and have the capability to sustain the number of livestock for a specified time period for which a grazing privilege is sought (base property requirement).

Base Property Qualifications. Those qualifications or privileges which are directly attached to or supported by base property. The maximum amount of grazing privileges on Federal range property allowable to base properties (see also Present Grazing Preference).

Biomass. The amount of living matter (as in a unit area or volume of habitat).

Carrying Capacity. The maximum stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates such things as the suitability of the rangeland to grazing as well as the proper use which can be made on each and all the plants

within the area. Normally expressed in terms of acres per animal unit month or sometimes referred to as the total AUMs that are available in any given area such as an allotment. Areas that are unsuitable for livestock use are not computed in the carrying capacity. This may or may not be the same as the stocking rate.

Climax Community. The final vegetation community which emerges after a series of successive vegetational stages and perpetuates itself indefinitely unless disturbed by outside forces.

Coliform. A general term for the group of bacteria which comprise all of the aerobic and facultatively anaerobic, gramnegative (type of strain related to cell wall composition) nonspore-forming, rod-shaped bacteria which ferment lactose (millsugar) with gas formation within 48 hours at 35 degrees C.

Convective Storm. A storm characterized by the development of thunderheads and highly intense, usually short-term rainfalls. This is primarily a summer phenomenon in the K/E EIS region.

Critical Wildlife Habitat. That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

Cubic Feet Per Second (ft³/s). The cubic foot volume of water past a given point in 1 second. Used primarily in stream flow measurement.

Cultural Resources. Those fragile and nonrenewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events. These resources consist of (1) physical remains; (2) areas where significant human events occurred, even though evidence of the event no longer remains; and (3) the environment immediately surrounding the actual resource. Cultural resources, including both prehistoric and historic remains, represent a part of the continuum of events from the earliest evidences of man to the present day.

Current Year's Growth. The amount of vegetation growth that occurs in the period of 1 year.

Debt Servicing. The ability to maintain periodic payments on existing or future operating and capital loans.

Deferred Rotation Grazing. Discontinuance of grazing on various parts of rangeland in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor. Two, but usually 3 or more separate units are required. Control is usually insured by unit fencing, but may be obtained by camp unit herding.

Density. Density is the number of individuals per count area. The ocular reconnaissance survey method used by BLM considers density to consist of

general estimates of overhead ground cover for the current year's growth of usable forage. This is recorded as the decimal portion of ground that is covered as viewed from directly above (BLM Manual 4412).

Desirable Plants. Those plants which are palatable and productive forage species, often are dominant under climax or near climax conditions. They are normally long-lived plants which can include grasses, forbs, and browse. These plants are to be maintained or increased by intensive livestock management.

Discharge. The volume of water flowing past a point per unit of time, commonly expressed as cubic feet per second, million gallons per minute, or cubic meters per second.

Drainage, Natural. A soil condition referring to the frequency and duration of periods when the soil is free of saturation or partial saturation. Two drainage classes are recognized in this EIS:

Well-Drained. Water is removed from the soil readily but not rapidly. These soils are normally medium-textured, but finer or coarser-textured soils may also fall into this class.

Moderately Well-Drained. Water is removed from the soil slowly so that the profile is wet for a small but significant part of the time. These soils commonly have a slowly permeable layer within or immediately underneath the solum.

Edaphic. Of or relating to soils or soil characteristics.

Erosion Condition Classes. Expression of current erosion activity using the following ratings (Soil Surface Factor): stable, 0 to 20; slight, 21 to 40; moderate, 41 to 60; critical, 61 to 80; severe 81 to 100.

Evapotranspiration. The total water loss from the soil, including that by direct evaporation and that by transpiration from the surfaces of plants.

Exchange of Use. An agreement made with a licensee having ownership or control of non-Federal land interspersed and grazed in conjunction with surrounding Federal rangeland. This agreement specifies the carrying capacity and gives the BLM control of the non-Federal land for grazing purposes.

Fair Rangeland Condition. Rangeland is in fair condition if the plant composition is 15 to 39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Soil surface factor (SSF) is less than 60. Also, those ecosystems where the composition comprises 60 percent or more of intermediate species and less than 5 percent desirable species are present will be rated "fair" when SSF is less than 60.1. The actual parent compositions by species are determined by paced transect and ocular reconnaissance procedures. Soil surface factor is determined by an onsite investigation and evaluation.

Forage Acre Factors. The net forage acre factor is a figure representing the portion of a surface area which is completely covered with completely usable forage. This factor is expressed as a decimal figure - e.g., 0.05, 0.10, etc. Surface acres multiplied by the net forage acre factor give forage acres.

Forb. A broadleaved herb other than grass; a weed.

Frail or Fragile Lands. Areas which exhibit low vegetation productivity and soil instability. Surface disturbance readily accelerates erosion of these areas. Soil surface factors (SSF) are in excess of 60 or in the critical or severe erosion condition classes. Because of excessive erosion, loss of top soil, infertility, and inadequate plant cover, these areas generally have limited potential for improvement under livestock management.

Good Rangeland Condition. Rangeland is in good condition if plant composition is 40 percent or more of both desirable and intermediate species with at least 20 percent of the composition made up of desirable species and has an SSF less than 40. Species composition is determined using paced transects and ocular reconnaissance procedures and the SSF is determined directly through field investigation and evaluation.

Grazing Cycle. The number of years required to apply all of the treatments in the grazing formula to each pasture of the allotment. In other words, it is the completion of one full cycle of yearly schedules back to the point of beginning.

Grazing Preference. The total number of animal unit months of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee.

Grazing System. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple use goals or objectives by improving the quality and quantity of the vegetation.

Grazing Treatment. Under a grazing system, grazing or resting a particular unit of land (usually a pasture) at particular times each year to attain particular vegetation goals.

Guzzlers. A water collection development designed for wildlife, especially birds.

Hedging. The persistent browsing of terminal buds of browse species causing excessive lateral branching and a reduction in upward growth.

Infiltration Rate. Characteristic describing the maximum rate at which water can enter the soil under specific conditions.

Interdisciplinary Team. A team composed of (or represented by) resource specialists with a variety of professionally trained backgrounds such as soils, vegetation, recreation, wildlife, archaeology, economics, etc.

Interim Management. Management which is proposed to be implemented before specific management and immediately following adjustments in stocking rates. No new grazing systems, vegetation treatments, or range developments are proposed during interim management.

Irreversible/Irretrievable. Incapable of being reversed or recovered once an action is initiated.

Key Species. A plant that is a relatively or potentially abundant species. It should be able to endure moderately close grazing and serve as an indicator of changes occurring in the vegetation complex. The key species is an important vegetation component that if overused, will have a significant effect on watershed conditions, grazing capacity, or other resource values. More than one key species may be selected on an allotment. For example, a species may be important for watershed protection, and a different species may be important for livestock forage or wild-life forage, etc.

License. An authorization which permits the grazing of a specified number and class of livestock on a designated area of grazing district lands for a period of time, usually not in excess of 1 year.

Litter. A surface layer of organic debris consisting of freshly fallen or slightly decomposed organic material. Litter is essential because it covers and protects the soil, reduces runoff rates, increases infiltration, and because it is continually being broken down, it yields organic matter which improves soil fertility.

Loam. A soil in which both fine particles (silt and clay) and coarse sizes (sand) are found.

Management Framework Plan (MFP). Land use plan for public lands which provides a set of goals, objectives and constraints for a specific planning area; a guide to the development of detailed plans for the management of each resource.

Ocular Reconnaissance Survey. A forage survey method which inventories vegetation by estimating total forage density, percent composition by species, and total usable forage in a given rangeland type to determine the carrying capacity for livestock and wildlife. All of the range surveys in Garfield, Kane, and Washington Counties utilized this method of survey to determine carrying capacity.

Off-Road Vehicle (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland or other terrain.

Outstanding Natural Area (ONA). An area of unusual natural characteristics where management of recreation activities is necessary to preserve those characteristics.

Pedestalling. A phenomenon of erosion where plants or rocks are left standing on pedestals of soil. Pedestals are formed because a rock or plant has held the soil underneath in place.

Percent Use. Grazing use of current growth, usually expressed as a percent of weight removed.

Permeability. Capacity for transmitting a fluid. It is measured by the rate at which a fluid of standard viscosity can move through material in a given interval of time under a given hydraulic gradient.

Permit. An authorization which allows grazing of a specific number and class of livestock on a designated area of grazing district lands during specified seasons each year for a period of usually 10 years.

Phenology. The science concerned with periodic biological events in their relation to seasonal climatic changes. Plant phenology refers to dates of sprouting, flowering, seed production, and regrowth, as well as other observable occurrences in plant development. Essential in developing a grazing system which will compliment or conform with seasonal plant requirements.

Phreatophytic Area. An area characterized by deep-rooted plants that obtain water from the water table or the layer of soil just above it.

Plant Vigor. The relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

Present Grazing Preference. The total number of animal unit months of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee.

Primitive Area. An area that is composed of natural, undeveloped lands that are essentially unaffected by civilization. The area is located where the natural environment can be preserved by management of recreation activities and exclusion of additional roads and commercial developments.

Prior Stable. These are wildlife numbers and represent past demonstrated carrying capacities for the rangeland involved. These numbers were supplied by Utah Division of Wildlife Resources.

Proper Use Determination. "Proper use" for a particular plant is the degree to which its current growth will be utilized by a grazing animal by determining the differences between total current production in a normal growth year and the amount left after proper use. This difference indicates all forage removed during grazing, including wastage by trampling. Any foliage removal or damage by rodents, insects, or disease is provided for under utilization deductions, and is therefore not considered in establishing proper use factors. If a plant provides no forage for a kind of grazing animal during a particular season, it is rated zero for that combination, although it may be present on the range and supply forage at other seasons. This may especially be the case for winter rangeland where some plants are evident during the growing season but are unable to provide forage during the dormant period.

Public Lands. Lands administered by the Bureau of Land Management. Formerly called national resource lands or public domain.

Range Betterment Fund. This is a fund for on-the-ground rehabilitation, protection, and improvement of the public lands established by Section 401(b)(1) of FLPMA.

Rangeland Condition. In the Kanab/Escalante EIS area, rangeland is referred to as grazing condition. Grazing condition is based on the percent of desirable forage in the composition for livestock and the existing erosion condition of a site. Condition of the rangeland must include consideration of vegetation quality and quantity and soil erosion characteristics. Present rangeland condition is determined by direct field examination which includes transect and ocular reconnaissance procedures as well as determination of the soil surface factor (SSF).

Rangeland Trend. This is the change in vegetation and soil characteristics as a direct result of environmental factors, primarily climate and grazing. Studies in range trend are used in combination with other studies to evaluate allotment management plans and grazing systems. Trend data is collected on key areas and relies on key species to represent the pasture or allotment. A trend index is used in evaluating trend data. This index is computed by adding the following factors: composition of key species, total cover of key species, number of seedlings of key species, and percent litter in entire plot. Any change in rangeland trend is reflected by a corresponding rise or decline in the trend index.

Riparian Vegetation. Plants that are adapted to moist growing conditions found along permanent waterways and ponds.

Seasonal Dependency. The percent of a permittee's total herd grazing on BLM rangeland during the permittee's season of use.

Season Long Use. Grazing use made during an entire season such as summer or winter. Usually the same use is made each year.

Sediment Yield. The average amount of soil moved from a given point to another point as a result of runoff.

Soil Association. A group of defined and named taxonomic soil units occurring together in individual and characteristic patterns over a geographic region. Comparable to plant associations in many ways.

Soil Surface Factor (SSF). A numerical expression of surface erosion activity caused by wind and water as reflected by soil movement, surface litter, erosion pavement, pedestalling, rills, flow patterns, and gullies. Values may vary from 0 for no erosion to 100 for severe erosion conditions. A determination of the SSF is made directly in the field by evaluating each of the above factors.

Specific Management. Management which is proposed to be implemented after interim management and includes specific grazing systems, vegetation treatments, and rangeland developments.

Stocking Rate. The degree to which a grazing unit is stocked with livestock, usually expressed in AUMs. The stocking rate may be more or less than the carrying capacity.

Streambank Sloughing. An erosion process (natural or accelerated) whereby streams are widened and made more shallow by the collapse of streambanks into the stream.

Strutting Ground. A site to which sage grouse regularly resort for purposes of sexual display or courtship.

Total Dissolved Solids (TDS). An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts and are dissolved in water. High TDS values can adversely affect humans, animals, and plants. TDS is often used as a measure of salinity.

Turn-on Date. Specific day on which livestock are legally allowed to enter and graze a stipulated area on public lands.

Undesirable Plants. Consist principally of invaders, noxious, and low value forage plants. The aim in management is to improve range condition to a point where these species are replaced by desirable or intermediate species.

Unit Resource Analysis (URA). A comprehensive display of physical resource data and an analysis of the current use, production, condition, and trend of the resource. The URA also includes potentials and opportunities within a planning unit, including a profile of ecological values.

Utilization. The proportion of the current year's forage production that is consumed or destroyed by grazing animals. This may refer either to a single species or to the whole vegetation complex. Utilization is expressed as a percent by weight, height, or numbers within reach of the grazing animal. The percent utilization largely determines whether the productivity of the rangeland will be lowered or improved and thus directly influences rangeland trend and condition. Since utilization data actually records the effect of livestock grazing on the vegetation and related resources, particularly for watershed, it is possible to determine the correct grazing capacity directly from utilization information. Any adjustments in carrying capacity will be in direct proportion to the utilization desired by the following formula:

$$\frac{\text{Average Percent Utilization (present)}}{\text{Desired Utilization (if properly used)}} = \frac{\text{AUMs use at present (actual use)}}{\text{AUMs to obtain desired use}}$$

When this relationship is used in calculating carrying capacity, both utilization data and actual use information is examined for the same period.

Vegetation Type. A plant community with distinguishable characteristics. A more or less distinct vegetation unit may be delineated on the basis of aspect, composition, or density.

Vigor. The state of health of a plant. The capacity of a plant to respond to growing conditions, to make and store food, produce food, produce seed, or reproduce vegetatively, that is, by stolons or rhizomes.

LIST OF ABBREVIATIONS

ac-ft/mi ² /yr	=	acre-feet per square mile per year
AMP	=	Allotment Management Plan
AUM	=	Animal Unit Month
BLM	=	Bureau of Land Management
EIS	=	Environmental Impact Statement
EPA	=	Environmental Protection Agency
FAF	=	Forage Acre Factor
FAR	=	Forage Acre Requirement
FLPMA	=	Federal Land Policy and Management Act of 1976 (PL 94-579)
GCNRA	=	Glen Canyon National Recreation Area
K/E	=	Kanab/Escalante
MFP	=	Management Framework Plan
NPS	=	National Park Service
ONA	=	Outstanding Natural Area
ORV	=	Off-Road Vehicle
PAA	=	Planning Area Analysis
PSIAC	=	Pacific Southwest Interagency Committee
PUF	=	Proper Use Factor
SEP	=	Social Economic Profile
SSF	=	Soil Surface Factor
UDWR	=	Utah Division of Wildlife Resources
URA	=	Unit Resource Analysis
FS	=	Forest Service
USFWS	=	United States Fish and Wildlife Service
VRM	=	Visual Resource Management
WSA	=	Wilderness Study Area

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INDEX

- Active Authorized Use: See Grazing Preference
- Adjustment to Grazing Capacity Alternative: See Alternatives
- Agriculture: S:1; 3:16, 17
- Air Quality: 3:43
- As Affected by Vegetation Treatments: 4:98
- Existing: 3:43
- Allocation: See Forage
- Alternatives: 1:9
- Description of: S:7-9; 2:1, 4
- 1 - Continuation of Present Management: 2:2, 4, 5
- 2 - Elimination of Livestock Grazing: 2:2, 5, 6
- 3 - Multiple Resource Enhancement: 2:2, 7, 8
- 4 - Adjustment to Grazing Capacity: 2:2, 8, 9
- 5 - Rangeland Management Recommendation: 2:2, 9-11
- 6 - Livestock Optimization: 2:2, 9-11
- Development of: 1:2-9. See also: Scoping
- Summary of Impacts: S:9-11
- Antelope: See Wildlife
- Archaeological Resources: See Cultural Resources
- Bald Eagle: See Wildlife
- Bighorn Sheep: See Wildlife
- Burning: See Vegetation, Soils, Air Quality, Water Quality, Wildlife
- Cattle Grazing: See Vegetation (Grazing)
- Chaining: See Vegetation, Soils, Water Quality, Wildlife
- Climate: 3:43, 44
- Cooperative Agreement: 1:12
- Continuation of Present Management Alternative: See Alternatives
- Costs:
- Rangeland Development and Treatment: 2:6, 17
- Rancher: See Socioeconomics
- Critical Erosion Condition: See Soils
- Cultural Resources: 2:22; 3:35; 4:81
- Desert Bighorn Sheep: See Wildlife
- Eagle: See Wildlife
- Economic: See Socioeconomics
- Elimination of Grazing Alternative: See Alternatives
- Elk: See Wildlife
- Endangered Species: See Vegetation, Wildlife
- Erosion: See Soils
- Federal Land Policy and Management Act of 1976 (FLPMA): See Laws and Policies
- Fence: See Rangeland Developments
- Fisheries: S:3; 3:31, 33, 34; 4:72-77
- Impacts to: 2:21; 4:72-77
- Floodplains: See Soils
- Forage:
- Allocation to: Wildlife: 2:1, 3-5, 7-9
- Livestock: 2:1, 3-5, 7-9; 4:37-40
- Wild Horses: 2:1, 3-5, 7-9
- Watershed: 2:1, 3, 5, 7-9

Condition: See Rangeland
Key Species: S:9-11; 2:9; 4:14, 17
Production: S:9-11; 2:19; 3:5; 4:5, 6, 8, 10, 12, 16, 18, 20
Response to Grazing: See Grazing
Utilization of: 4:8, 10
Game Species: See Wildlife
Glen Canyon National Recreation Area: S:1, 3; 1:1; 2:23; 3:41, 42
Grazing:
Effects on:
Forage Yield and Quality: 4:8, 13, 15
Plant Vigor: 4:10, 12, 13, 15
Plant Reproduction: 4:10, 15
Existing Allotments: 2:1
Monitoring: See Rangeland
Livestock: 2:20; 3:17
Systems: 2:2, 10, 12, 17, 26, 28
Continuous Seasonal: 2:2, 13, 14; 4:8
Deferred: 2:8, 12-14
Deferred Rotation: 2:12-14; 4:14
Rest Rotation: 2:12-14; 4:12, 14, 17, 18, 18
Grazing Preference: 2:12-14; 4:38-40
Habitats, Wildlife: See Wildlife, Vegetation
Historical Resources: See Cultural Resources
Horses: See Wild Horses
Initial Allocation: See Forage
Irreversible/Irretrievable Commitment of Resources:
Air Quality: 4:99
Cultural Resources: 4:81
Fisheries: 4:77
Land Use: 4:41
Recreation: 4:97
Socioeconomics: 4:53
Soils: 4:31
Vegetation: 4:22
Visual Resources: 4:88
Water Resources: 4:37
Wilderness: 4:98
Wild Horses: 4:81
Wildlife: 4:72
Issues: See Scoping
Land Ownership: S:1; 3:15, 16; 4:38
Land Uses: S:3
Laws and Policies:
Federal Land Policy and Management Act of 1976 (FLPMA): 1:2
National Environmental Policy Act (NEPA): 1:2
Livestock: See Grazing
Livestock Optimization Alternative: See Alternatives
Mule Deer: See Wildlife
Multiple Resource Enhancement Alternative: See Alternatives
National Environmental Policy Act NEPA: See Laws and Policies
National Register of Historic Places: See Cultural Resources
Off-Road Vehicles (ORV): See Recreation
Planning Units: 1:2

Plowing: See Vegetation, Soils, Water Quality, Wildlife

Public Participation: 1:5, 8, 9. See also: Scoping

Public Review: S:11

Public Values and Concerns: See Scoping

Rangeland:

Condition: S:2; 1:1; 2:19; 3:4; 4:4, 5, 7, 9, 10, 12, 14, 17

Monitoring: 2:8, 16

Potentially Suitable: S:2; 3:5, 6

Suitable: S:2; 1:1; 3:4, 5

Trend in Condition: 2:19; 3:4; 4:4, 5, 7, 8, 10, 12, 15, 17, 20

Unsuitable: S:2; 1:1

Rangeland Developments: S:6; 2:4; 4:21, 22

Fences: S:6; 2:2, 4-6, 13; 4:15

Water: S:6; 2:2, 13; 4:15

Rangeland Management Recommendation Alternative: See Alternatives

Raptors: See Wildlife

Recreation, General: S:3; 3:36-42; 4:89-97

Backpacking: 3:38, 41; 4:91, 92, 94-96

Fishing: 2:23; 3:38, 40; 4:91-96. See also: Fisheries

Hunting: 2:22; 3:38-39; 4:91-93, 95, 96

Off-Road Vehicles (ORV): 2:23, 3:38, 40; 4:92, 94-96

Sightseeing: 2:22; 3:36, 38, 39; 4:91-96

Visual Resources: 2:22; 3:36, 37, 38; 4:82-88

Riparian: See Wildlife, Vegetation

Scoping: S:3, 4

Issues: S:4; 1:5, 8, 9

Public Participation: 1:5, 8

Seeding: See Vegetation, Soils, Water Quality, Wildlife

Short-Term Uses and Long-Term Productivity:

Air Quality: 4:99

Cultural Resources: 4:81

Fisheries: 4:77

Land Use: 4:40

Recreation: 4:97

Socioeconomics: 4:52

Soils: 4:31

Vegetation: 4:21

Visual Resources: 4:88

Water Resources: 4:37

Wilderness: 4:98

Wild Horses: 4:81

Wildlife: 4:71

Socioeconomics: 3:18-26; 4:41-53

Impacts to Region: 3:22-26; 4:43-52

Lifestyles: S:2; 3:25, 26; 4:44-52

Support Industries: 3:22, 25; 4:43-52

Rancher Finances: 3:20-22

Capital Values: 3:21; 4:43-52

Fixed Costs: 3:21; 4:41-52

Gross Incomes: 3:21-22; 4:41-52

Net Incomes: S:9-11; 2:20; 3:21; 4:41-52

Variable Costs: 1:8; 3:21; 4:41-52

Soils: S:2; 3:7

Associations: 3:7-11

Erosion: S:9-11; 1:1; 2:19; 3:11-12; 4:22-31

Flood Plains: 2:7; 3:13; 4:26

Salinity: 3:12; 4:26

Sediment Yield: 2:19; 3:11-12; 4:22-31

Vegetation Treatments:

Success of: 2:15; 4:29

Discussion of Impacts: See also: Vegetation

Burning: 2:15; 4:26, 27

Chaining: 4:26, 28

Plowing: 2:15; 4:27

Spraying: 4:27

Spraying: See Vegetation, Soils, Air Quality, Wildlife, Water Quality

Unavoidable Adverse Impacts:

Air Quality: 4:99

Cultural Resources: 4:81

Fisheries: 4:76

Land Use: 4:40

Recreation: 4:97

Socioeconomics: 4:52

Soils: 4:30

Vegetation: 4:21

Visual Resources: 4:88

Water Resources: 4:37

Wilderness: 4:98

Wild Horses: 4:80

Wildlife: 4:71

Upland Game: See Wildlife

Vegetation:

Composition: 1:11

Condition/Trend: See Rangeland

Forage: See Forage

Ground Cover: 1:11

Phenology: 3:2; 4:7

Treatened and Endangered Plants: 2:19; 3:7; 4:6, 10

Treatments: 2:16, 17

Burning: 2:2, 12, 13, 15, 16; 4:14

Chaining: 2:2, 13, 15, 16; 4:14

Plowing: 2:2, 13, 15, 16; 4:14

Seeding: 2:2, 13, 15, 16; 4:15

Spraying: 2:2, 9, 12, 13, 15, 16; 4:14

Types, Description, and Discussion of: 3:1-3

Annual: 3:1-3

Barren: 3:1-3

Desert Shrub: 3:1-3

Mountain Shrub: 3:1-3

Perennial Grass: 3:1-3

Pinyon-Juniper: 3:1-3

Riparian: S:2; 2:19; 3:1-3, 6; 4:5, 6, 8, 9, 11, 13, 16, 19, 20, 92

Sagebrush: 3:1-3; 4:15

Visual Resources: See Recreation

Water, Ground: 3:13, 14

Water Quality: 2:20, 3:14, 4:32-37

As Affected by:

Burning: 4:34-36
Chaining: 4:34-36
Plowing: 4:34-36
Spraying: 4:34-36
Livestock Grazing: 4:32-37
Existing: 3:14; 4:32

Wild Horses: 3:34, 35

Distribution: 3:34; 4:77
Impacts to: 2:22; 4:77-81
Population: 3:34, 35

Wilderness: 2:24; 3:42

Instant Study Areas: 3:42
Wilderness Study Areas: 3:42

Wildlife: S:3

Big Game: S:3; 3:26-30; 4:54,55
Antelope: 2:21; 3:26-28; 4:53, 56, 59, 61, 64, 67, 70
Elk: 2:21; 3:26-28; 4:53, 56, 59, 61, 65, 68, 70
Mule Deer: 2:21; 3:26-28; 4:53, 54, 61, 63, 66, 69
Bighorn Sheep: 2:21; 3:26, 27, 29; 4:53, 57, 58, 60, 62, 65, 70

Fish: See Fisheries, Recreation

Other Wildlife: 4:58, 60, 62, 66, 69, 70

Raptors: See also: Threatened and Endangered

Bald Eagle: 3:29, 31; 4:71
Peregrine Falcon: 3:29, 31; 4:71

Threatened and Endangered: 1:11; 2:21; 3:29, 31; 4:71

Upland Game Birds: 3:31, 32; 4:57, 60, 62, 65, 68, 70
Sage Grouse: 4:57, 68

Vegetation Treatments (effects of):

Burning: 4: 64, 67
Spraying: 4:64, 67
Chaining: 4:64, 67
Plowing: 4:64, 67

T

TABLE OF CONTENTS

S

SUMMARY

1

CHAPTER 1

2

CHAPTER 2

3

CHAPTER 3

4

CHAPTER 4

LP

LIST OF PREPARERS

LS

LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

A

APPENDIXES

G

GLOSSARY

LA

LIST OF ABBREVIATIONS

RT

REFERENCES CITED IN TEXT

GR

GENERAL REFERENCES

I

INDEX

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